OPERATION & MAINTENANCE MANUAL

EXISTING
MATERIALS RECOVERY, PROCESSING AND RECYCLING FACILITY

R. SCHLEIDER CONTRACTING CORP.

OLD NORTHPORT ROAD
(WEST OF SUNKEN MEADOW PARKWAY)
"PARCEL – A"
KINGS PARK
SUFFOLK COUNTY, NEW YORK

NOVEMBER 1991

R. E. PUSTORINO, P.C.
2171 JERICHO TPKE.
COMMACK, N.Y. 11725

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"PARCEL - A"

TOWN OF SMITHTOWN

COUNTY OF SUFFOLK

NOVEMBER 1991

R.E. PUSTORINO, P.C.
CONSULTING ENGINEERS
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COMMACK, NEW YORK 11725

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SECTION 1

INTRODUCTION

PARCEL A

1.1 GENERAL

The R. SCHLEIDER CONTRACTING CORP. material recovery, processing and recycling operation and proposed yard waste facility is located in Kings Park, Town of Smithtown, Suffolk County, New York. The project site is located along Old Northport Road in the unincorporated area of Kings Park. The Parcel "A" (23.6 acres) is situated on the south side of Old Northport Road, beginning about 60 feet west of the Sunken Meadow State Parkway right-of-way.

From observation of existing operations, past experience, and available records, the R. SCHLEIDER CONTRACTING CORP. Parcel A facility recovers, processes and recycles about 1500 cubic yards/month (75 cy/day) or approximately 1875 tons/month (95 tons/day) of reclaimed soils, leaves, clearing and grubbing material and related recyclable construction materials.

The NYSDEC has requested that the R. SCHLEIDER CONTRACTING CORP. submit an amended Engineering Report on the Parcel "A" operations and obtain an Operating Permit under the current 6 NYCRR Part 360 Regulations (Effective December 31, 1988). Pursuant to Subpart 360-12.1(e)(1)(i) the R. SCHLEIDER CONTRACTING CORP. reclamation and recycling operation is still exempt upon department (NYSDEC) approval. All materials received at the R. SCHLEIDER CONTRACTING CORP. facility are reclaimed and recycled without the generation of residue for landfilling or alternative disposal methods.

R. SCHLEIDER CONTRACTING CORP. has been operating a materials recovery, processing and recycling business at this Parcel "A" site since the early 1970's. Such operations, causing the reclamation and beneficial use of soil components, recycled aggregate, leaves, etc., were exempt from NYSDEC regulations prior to 1988. The R. SCHLEIDER CONTRACTING CORP. reclamation and use of recyclable materials has expanded over the past years including the fabrication and installation of a source separation and crushing operation for construction and demolition debris inside an enclosed building constructed of recyclable materials.

In addition metals (e.g., beams, roof deck, wall panels, tanks, etc.) are salvaged from demolition projects undertaken by R. SCHLEIDER CONTRACTING CORP. and used on-site, recycled or sold to secondary vendors. Most recently these recycled metal materials were used by R. SCHLEIDER CONTRACTING CORP. to construct two (2) on-site structures, with one about 84 feet by 120 feet (10,080 s.f.), for use as a salt processing and storage facility, and the second building 80 feet by 150 feet (12,000 s.f.) for construction and demolition debris recycling and processing. Recycled metals are also used to build on-site processing equipment, such as conveyors, screens, components of the crushing operation, etc.

1.2 MATERIALS PROCESSED

To comply with Town of Smithtown requirements, the materials recovery, recycling and related operations are conducted at two (2) separate locations herein designated as Parcel "A" (23.6 acres) and Parcel "B" (3.3 acres). Recyclable materials received for processing at Parcel "A" include; soils from building and roadway construction and reconstruction; grubbing and land clearing material; metal beams, joints, roof decking and miscellaneous metals from building demolition sites; construction and demolition debris; leaves and yard waste material; and

related construction materials. In addition finished process materials may also be stored prior to sale or use as construction materials.

The screened soil materials is sold as road base blend, topsoil, and related construction components. For various specification materials, different sizes may be blended to fit specific project requirements. Material passing certain screen sizes and shredded leaves can be blended with loam to produce a topsoil like product. In winter stored soils are mixed with salt for ice control or stockpiled for subsequent use.

SECTION 2

SECTION 2

WASTE STREAM QUANTIFICATION

2.1 GENERAL

It is difficult to predict the precise amount of reclaimed soils, asphalt, concrete, metals and related materials to be received at the R. SCHLEIDER CONTRACTING CORP. Parcel A recovery and recycling facilities. In part, the quantity of material is based upon the current and future solid waste management practices and policies of the Town of Smithtown and surrounding environs and economic climate of the region. From observation of existing operations, past experience, and existing operation records, approximate quantities and types of waste material that is received at the R. SCHLEIDER CONTRACTING CORP. Parcel A facility are about 1500 cubic yards/month (75 cy/day) or approximately 1825 tons/month (95 tons/day). It is expected that over the next few years this quantity of materials for recycling at the Parcel A site will increase by a factor of three (3).

It is proposed to expand the existing materials recovery, processing and recycling operation at Parcel A to include yard waste which consists of brush, tree trimmings, grass and leaves generated by contractors, nurseries, landscapers, etc. and construction and demolition debris.

Excess soils from building and roadway construction/ reconstruction, clearing and grubbing and related activities are delivered to the R. SCHLEIDER CONTRACTING CORP. Parcel A facility for blending with salt, leaves and other soils for appropriate reuse functions. It is projected that about 200 tons per day (250 cy/day) will be received.

In addition, R. SCHLEIDER CONTRACTING CORP. has installed an enclosed construction and demolition debris processing facility. About 100 tons per day (300 cy/day) of unprocessed construction and demolition debris will be accepted at the site. After material sorting, for recyclables, and processing, it is expected that a reduction factor of about 4:1 of the incoming volume will be achieved. It is expected that the processed wood and other organics will be suitable for blending with on-site soils to generate a topsoil like material.

Generation of yard waste components is seasonal, with the fall and spring being the heaviest periods. It is projected that the Parcel may receive, on the average, about 800 cubic yards per day (75 tons per day) of yard waste components. The average of 300 cy/day is in a loose (uncompacted or shredded) condition with an in-truck density of about 300 pounds per cubic yard. It must be emphasized that delivery of yard waste components is seasonal and

actual daily quantities and type of incoming material will vary considerably.

The approximate quantities and types of waste material that will be received at the Parcel are as follows:

Soil from Construction Sites, Roadway Reconstruction, etc.	200 TPD
Construction and Demolition Debris	100 TPD
Yard Waste	75 TPD
Total Waste Received for Recycling	375 TPD

2.2 RECLAIMED SOILS, METALS AND RELATED MATERIALS

The reclaimed soils, from building and roadway construction/ reconstruction, clearing and grubbing and related activities, generally fall within the definition of construction and demolition debris resulting from the construction, remodeling, repair and demolition of structures and roads. However, it should be noted that materials received at the R. SCHLEIDER CONTRACTING CORP. recycling facility under this category do not cover the broad spectrum of typical C & D waste. This is evident from the years of recycling and history of the operation.

The primary composition of materials currently received and expected to be handled in the future under this category can be segmented into the following major components:

Waste Components

Excavated soils from building construction and/or reconstruction
Excavated soils from road construction and/or reconstruction
Soils resulting from clearing and grubbing of property

The quantity and type of material received for reclamation, processing and recycling varies on a daily, weekly and seasonal basis. It must also be recognized that raw and/or processed materials will be stored for supplemental blending and to meet specific recycling needs.

The facility can be expected to handle and process about 200 tons per day of reclaimed soils and related materials.

The material received under these waste categories may have a significant fluff volume in the trucks and trailers, therefore, the processed product volume will be less than the reported incoming volume. From a standpoint of system design, weight of material processed in tons per day (TPD) is not as critical factor as the yardage of soils product handled and processed.

Materials for recovery, reclamation, and processing are delivered in trucks and trailers generally ranging in size from 15 cy to 75 cy capacity. There are daily and weekly fluctuations in the number of vehicles received. Therefore, the average number of vehicles received daily, based upon a trailer payload capacity of 40 cy, would be about 7 trucks/trailers per day.

2.3 CONSTRUCTION AND DEMOLITION DEBRIS

Construction and demolition debris processed at the facility includes uncontaminated solid waste resulting from the construction, remodeling, repair and demolition of structures, etc. Such waste includes, but is not limited to, bricks, broken concrete and other masonry materials, soil, rock, wood, wall covering, plaster, drywall, plumbing fixtures, non-asbestos insulation, roofing shingles, asphaltic pavement, glass, plastics that are not sealed in a manner that conceals other wastes, electrical wiring and components containing no hazardous liquids, and metals that are incidental to any of the above.

The construction and demolition debris material is delivered in 20, 30 and 40 cy roll-off containers. There are daily and weekly fluctuations in the number of roll-off containers received at the facility. On the average about 300 cubic yards (100 TPD) are expected to be processed at the facility.

From a standpoint of system design and operation, weight of the construction and demolition debris material received, processed or transported in tons per day (TPD) is not as critical a factor as its cubic yardage.

The primary components of the typical construction and demolition debris waste materials expected to be handled at the R. SCHLEIDER CONTRACTING CORP. facility is segmented into the following major components:

Waste Component

Wood

Plywood
Dimensional Lumber
Lath
Doors
Window Frames

Nursery

Brush
Dirt
Grass/Sod

Metals

Tubing
Plumbing Hardware
Wiring
Cable
Leaders/Gutters
Sheet Metals
Aluminum Windows & Storm Doors
Fabricated Members
Metal Studs
Lighting Fixtures (non-hazardous)

Inert Material

Brick
Broken Concrete
Masonry Products
Stone
Ceramics
Tile
Plaster
Earth
Wall Board

Miscellaneous

Roofing Materials
Flooring
Insulation
Furniture
Textiles
Corrugated Cardboard
Paper Products
Plastics

It must be emphasized that construction and demolition debris as received at the facility has a significant void volume when in the roll-off container, therefore, the processed product volume will be significantly less than the reported incoming quantity. The expected daily average of 300 cubic yards/day is a loose (uncompacted or pre-processed) volume as received in roll-off containers. This material will have a significant volume reduction by a factor of about two (2) to three (3) after processing. The weight on the average, remains unchanged.

2.4 YARD WASTE MATERIALS

Yard waste generated by commercial contractors, landscapers, nurseries and, to some degree, the Town of Smithtown will be received and processed at the proposed yard waste facility. The R. SCHLEIDER CONTRACTING CORP. operation would also be available to leaves, brush, trees, etc., as collected by the Town and Village Departments. The primary components of the yard waste expected to be received at the R. SCHLEIDER CONTRACTING CORP. facility can be segmented into the following major components:

Waste Components

Stumps and root debris from land clearing operations
Dirt and soil
Trees with limbs and tops intact
Tangled brush piles
Dead trees and logs
Wood building demolition material
Leaves
Grass clippings

It is expected that yard waste components will be delivered in trucks, trailers and roll-off containers ranging in size from 5 cy to 40 cy capacity. On the average about 300 cy/day is anticipated in a loose (uncompacted or shredded) condition with an in-truck density of about 300 pounds per cubic yard. Total yard waste received will be in the order of 75 tons per day (TPD).

Yard waste is seasonal in nature, thus exhibiting daily, weekly and monthly variations in the material received for processing and recycling. However, on the average about 25 vehicles per day would use the yard waste site during peak season periods.

By virtue of delivery of yard waste by commercial type vehicles, the incoming material should be relatively free of plastic bags. In the event that plastics are received, they will be broken, emptied and removed from the waste stream prior to processing.

SECTION 3

SECTION 3

FACILITY DESCRIPTION AND OPERATIONS

3.1 CONSTRUCTION AND DEMOLITION DEBRIS PROCESSING AND RECYCLING

R. SCHLEIDER CONTRACTING CORP. constructed a 12,000 SF structure, from recycled building materials, to house the construction and demolition debris processing and recycling operations. The building has a concrete floor which is used for tipping and processing of waste components. Due to the type of material being processed, it is not anticipated that free liquids will be associated with the operation. Since the facility is roofed, the processing is not subject to precipitation or other climatic conditions. Sorbants will be available for use in the slight event free liquids are present and not absorbed by the waste material.

Construction and demolition debris will be delivered in 20 to 40 cy roll-off containers. On the average, about 300 cubic yards (100 tpd) are expected to be received at the facility. There will be daily, weekly and seasonal fluctuations in material received and number of roll-off containers delivering material.

After tipping on the concrete floor and inspection for unacceptble waste, recyclable components will be recovered from the construction and demolition debris including metals, broken concrete, wood, corrugated cardboard, etc. Nonrecyclables will be discharged, by a front end loader, into the feed hopper of the Telsmith Impact Crusher. Product size can be varied to as small as 3 inches. Following size reduction, components can be further screened to produce materials of varying size classification. It is the intent to further separate recyclable components for use with soil blending and construction related uses.

3.2 YARD WASTE FACILITY DESIGN AND OPERATIONS CONSIDERATION

It is anticipated that about 300 cy/day (75 tpd) of yard waste and leaves will be received at the proposed R. SCHLEIDER CONTRACTING CORP. composting facility. Yard waste consists of brush, tree trimmings, leaves and grass delivered by nurseries, landscapers and, to some degree, municipalities. In part, the quantity of yard waste and its components will be based upon current and future solid waste management practices and policies of the Town of Smithtown, local Villages and surrounding environs.

3.2.1 Process Description and Operations

Yard waste and related material will be received at the Parcel, on Old Northport Road, for appropriate truck data recording. Land clearing and grubbing waste, although considered as construction and demolition debris, will be handled and processed along with the yard waste material. After recording truck data, yard waste will be diverted to the processing area on site. This yard waste processing will contain shredding, grinding and crushing equipment required for pre-processing the yard waste and land clearing material.

Depending upon the type or combination of materials being received, the yard waste and land clearing waste will be processed as follows:

- Brush and/or wood products will be chipped/ shredded for size and volume reduction and wood chips produced for landscaping, erosion control, and/or bulking agent for the composting operation.
- Leaves will be shredded for size and volume reduction and screened. The screened residue will be blended with fine graded and loamy soils to produce a topsoil quality material for sale. Coarse leaves will be re-shredded for better size reduction.

- o Coarse shredded leaves can also be mixed with wood chips for composting. To inoculate the system, intermediate stage compost will be blended with the raw material to enhance the composting process.

- o Finished yard waste compost can be sold to landscapers or blended with other materials to generate a topsoil like product.

The grass component of yard waste will be blended with finished leaf compost and wood chips (bulking agent) then composted. Finished grass compost may be blended with the other yard waste material to produce a topsoil like product or sold as compost for appropriate uses and applications.

a. Size Reduction

Trees, limbs, tangled brush and other wood products will be pre-processed in the form of shredding and/or chipping to facilitate size reduction and to obtain a more homogenized material. Effective size reduction (shredding) can result in a 5 to 1 volume reduction from its original form, as delivered to the site in vehicles.

Shredding of the materials is essential for many reasons. First, the particles of waste material must be size reduced in such a manner that they have a high ratio of surface area to weight and uniformity. Second, the material must be homogenized so that added constituents (leaves, grass, moisture, etc.) are distributed uniformly throughout its entire mass. And third, the finished product must be homgeneous in texture if it is to be of high quality.

b. Recycled Wood Chips

The shredded/chipped wood product will be discharged into a stockpile. The stockpile material will be screened into separate sorts for saleable by-products and/or as a bulking agent for the composting operation. Material output from the chipping process prior to screening contains topsoil, dirt, ground cover and oversized fiber and should be screened.

Depending upon the numbers and types of screens to be used, the product material may be classified for the following usages:

- o potting soil containing top dirt, small wood chips and sawdust
- o mulch or ground cover suitable for landscaping or erosion control
- o oversized material to be reprocessed in the chipping operation
- o bulking agent for the composting operation

The degree to which screening is accomplished will be a function of the need for and marketability of the recycled wood chips. This material will be stockpiled at the site and sold commercially in bulk quantity to nurseries, landscapers, residential users, local government (ground cover for parks, highways, etc.) and cogeneration facilities.

c. Soil Blends

Leaves will be finely shredded and mixed (blended) with fine graded and loamy soils to produce a topsoil grade material for sale and use on construction related projects. In addition grass as received or composted can also be blended to produce a topsoil like material.

The degree of blending material components will be a function of the intended use. Since stockpiled materials will be available on-site, R. SCHLEIDER CONTRACTING CORP. can produce a product to meet specific project specifications.

d. Compost

In addition to the previously referenced yard waste material processing components, it is intended to provide an active composting operation for a small fraction of the leaves, grass clippings and bulking agents (e.g., wood chips, etc.). A description of the composting operation is presented in subsequent sections of this report.

3.2.2 Facility Description and Sizing

Access to the yard waste processing area, on the Parcel "A", will be via the main entrance road off Old Northport Road. Existing internal roadways will be used to access the pre-processing building, storage and composting area. The general location of required facilities are shown on Drawing No. 3A.

The recycling and proposed yard waste processing operations will require a relatively small portion of Parcel A (23.6 acres). Remaining portions of the Parcel's property will be used to store, process and stockpile construction excavation materials, etc., in the areas as shown on Drawing No. 3A.

Each operational area has been located to facilitate the movement of materials and to provide the greatest protection and distance between off-site structures and the processing building/ composting areas. Grade elevations and proposed contours across the site are presented on Drawing No. 3A. To facilitate site drainage in operating ares, an average slope of about 3% is provided and drainage swales located to divert stormwater runoff.

SECTION 4

SECTION 4

PERSONNEL REQUIREMENTS

4.1 PERSONNEL

About fourteen (14) individuals are required for the materials processing and recycling operations at the Parcel "A" location. The categories of personnel required are as follows:

Parcel A Category	Number of Personnel Administrative	Operations
Site Supervisor	1	
Site Foreman	1	
Equipment Operators		7
Equipment Mechanic		1
Laborers		3
Clerical	1	
	3	11

Although each employee has a specific duty, most are required to fill-in where necessary and appropriate if short-handed. All personnel currently exist at the site for ongoing operations and have been trained to carry out their required duties.

4.2 EMPLOYEE TRAINING

Like planning, training provides the foundation upon which all other protective measures depend. Because of the ongoing activities at a materials recovery, processing and recycling site, anyone entering the site, including visitors, must receive sufficient instruction to understand the operation and utilize appropriate safety and protective measures.

The materials processing and recycling operation is accomplished through the use of existing and experienced personnel available to the Owner and site operator. These employees are provided with training and safety instructions on the site and its operation and monitoring. The following is intended primarily for new employee training and other persons visiting the site.

Particularly important information, such as the site's standard operating procedures, is provided to each employee. All employees should complete refresher training at least annually to reemphasize the initial training, to maintain proficiency in the safe use of equipment, and to be up to date on any new policies or procedures.

The following describes the types of training that the various levels of site personnel and visitors will receive.

4.3 SITE WORKERS

General site workers, such as equipment operators, general laborers, and other supervised personnel, will be provided with a training session that applies to their individual jobs and responsibilities, as well as training sessions that provide an overview of the site hazards and the means of controlling those hazards. Depending on their individual jobs, worker training will include instruction in the following areas:

- Site Safety Plan.
- Safe work practices.
- Nature of the anticipated hazards.
- Handling emergencies and self-rescue.
- Rules and regulations for vehicle use.
- Safe use of field equipment.
- Handling, storage, and transportation of materials.
- Use and care of personal protective clothing and equipment
- Employee rights and responsibilities.

In addition, general site workers should engage in actual field activities under the direct supervision of a trained, experienced supervisor.

4.4 ONSITE MANAGEMENT AND SUPERVISORS

Onsite management and supervisors, who are responsible for directing others, should receive the same training as the general site workers for whom they are responsible, as well as additional training to enhance their ability to provide guidance and make informed decisions.

4.5 SAFETY

For the operations to be performed, the hazards due to material(s) present will be minimal. Physical and other types of hazards because of the nature of the hand separating of materials must be considered. It is important that personal protective equipment and safety requirements be appropriate to protect against any potential physical hazards. Protective equipment provided to operating personnel will include:

- o Safety boots/shoes
- o Hard Hat
- o Safety glasses/goggles (optional)
- o Gloves
- o Face mask (optional)

Proper personal hygiene should be exercised at the work site and sanitary facilities are provided.

All personnel involved in the source separation/recycling operations will be trained to carry out their designated duties, operations and use of equipment to be used on-site. Specifically, operations and related personnel will be trained in the use of fire extinguishers.

SECTION 5

SECTION 5

EQUIPMENT REQUIREMENTS

5.1 OPERATING EQUIPMENT AT PARCEL A

Mechanical equipment being used or to be added at the facility consists of the following:

- Scale and scale house
- Three (3) Caterpillar, or equal, front end payloaders
- Conveyors
- Screens
- Shredder/Grinder
- Trucks to transport material for processing and to move finished product for storage

Available Operation and Maintenance information for each piece of equipment is provided at the end of this Section.

5.2 PREVENTATIVE MAINTENANCE

Equipment maintenance schedules and procedures for operating equipment are developed and incorporated into a preventative maintenance program. For continuity of operations and to minimize downtime, due to equipment malfunctions, it is essential that R. SCHLEIDER CONTRACTING CORP. existing preventative maintenance program be ongoing.

R. SCHLEIDER CONTRACTING CORP. has a complete equipment maintenance structure on-site with mechanics, support personnel, spare parts and tools required to undertake all preventative maintenance and major equipment repair functions.

TRACK AND WHEEL LOADER

OPERATION AND MAINTENANCE

SEBU5758-03

CATERPILLAR

operation & maintenance

943 and 953 Track-Type Loaders

3Y1-Up	31Y1-Up	76Y1-Up	77Y1-Up
78Y1-Up	4Z1-Up	5Z1-Up	19Z1-Up
20Z1-Up	44Z1-Up		

Foreword

This publication is a reference for the new operator and a refresher for the experienced one. Read – study – and keep it handy.

Illustrations guide the operator through the correct procedures of checking, starting, operating and stopping the machine and attachments.

Operating techniques outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and its capabilities.

Your safety and the safety of others depends upon care and judgment in the operation of this machine. A careful operator is good insurance against an accident.

Some photographs in this publication may show details or attachments that may be different from your machine. Also, guards and covers may have been removed for illustrative purposes.

Continuing improvement and advancement of product design may have caused changes to your machine which may not be included in this publication.

Whenever a question arises regarding your machine, or this publication, please consult your Caterpillar dealer for the latest available information.

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Operation Section

Lubrication and Maintenance Section

Safety

Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Read and understand all safety precautions and warnings before operating or performing lubrication, maintenance and repair on this product.

Basic safety precautions are listed in the "Safety" section of the Service or Technical Manual. Additional safety precautions are listed in the "Safety" section of the owner/operation/maintenance publication. Specific safety warnings for all these publications are provided in the description of operations where hazards exist. WARNING labels have also been put on the product to provide instructions and to identify specific hazards. If these hazard warnings are not heeded, bodily injury or death could occur to you or other persons. Warnings in this publication and on the product labels are identified by the following symbol.

⚠ WARNING

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Operations that may cause product damage are identified by NOTICE labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or repair procedures you choose.

The information, specifications, and illustrations in this publication are on the basis of information available at the time it was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the complete and most current information before starting any job. Caterpillar dealers have the most current information available. For a list of the most current publication form numbers available, see the Service Manual Contents Microfiche, REG1139F.

Safety

General

Caution should be used to avoid breathing dust that may be generated when handling components containing asbestos fibers. If this dust is inhaled, it can be hazardous to your health. Components in Caterpillar products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates and some gaskets. The asbestos used in these components is usually bound in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust which contains asbestos is not generated.

If dust which may contain asbestos is present, there are several common sense guidelines that should be followed.

1. Never use compressed air for cleaning.

2. Use vacuum or wet methods for cleanup.

3. Use exhaust ventilation on permanent machining jobs.

4. Wear an approved respirator if there is no other way to control the dust.

5. Follow environmental rules and regulations for disposal of asbestos.

6. Avoid areas where asbestos particles may be in the air.

Read and understand all safety precautions and warnings before operating this machine.

Wear a hard hat, protective glasses and other protective equipment as required by job conditions.

Do not wear loose clothing or jewelry that can catch on controls or other parts of the machine.

Do not smoke while refueling or when near batteries.

Keep the machine, especially the deck, walkways and steps, free of foreign material, such as debris, oil, tools and other items which are not part of the machine. Secure all loose items such as lunch boxes, tools and other items which are not part of the machine.

Never put maintenance fluids into glass containers.

Report all needed repairs.

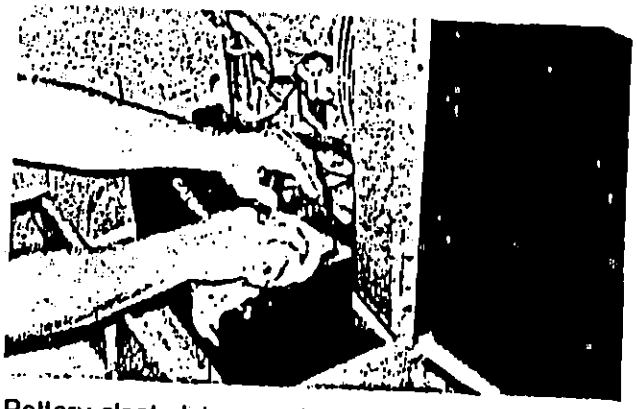
Do not allow unauthorized personnel on the machine.

Pressure air can cause personal injury. When using pressure air for cleaning, wear a protective face shield and protective clothing.

Make certain all protective guards and covers are secured in place on the machine.

Secure all loose items such as lunch boxes, tools and other items which are not part of the machine.

Know the hand signals and who gives them. Accept signals from one person only.



Battery electrolyte contains acid that can cause injury. Avoid contact with the skin and eyes.

Fire or Explosion Prevention

All fuels, most lubricants and some coolant mixtures are flammable.

Do not smoke while refueling or in a refueling area.

Do not smoke in areas where batteries are charged, or where flammable materials are stored.

Batteries in series may be located in separate compartments. When using jumper cables always connect positive (+) cable to positive (+) terminal of battery connected to starter solenoid and negative (–) cable from external source to starter negative (–) terminal. (If not equipped with starter negative terminal, connect to engine block.)

See the "Operation Section" of this guide for specific instructions.

Clean and tighten all electrical connections. Check daily for loose or frayed electrical wires. Have all loose or frayed electrical wires tightened, repaired or replaced before operating the machine.

Keep all fuels and lubricants stored in properly marked containers and away from all unauthorized persons.

Store all oily rags or other flammable material in a protective container, in a safe place.

Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.

Remove all flammable materials such as fuel, oil and other debris before they accumulate on the machine.

Do not expose the machine to flames, burning brush, etc., if at all possible.

Shields, which protect hot exhaust components from oil or fuel spray in the event of a line, tube or seal failure, must be installed correctly.

Ether is flammable. Do not smoke while changing ether cylinders.

Use ether only in well ventilated areas.

Keep ether cylinders out of the reach of unauthorized persons.

Do not store replacement ether cylinders in living areas or in the operator's compartment.

Do not store ether cylinders in direct sunlight. Discard cylinders in a safe place. Do not puncture or burn cylinders.

Lines, Tubes and Hoses

Do not bend or strike high pressure lines. Do not install bent or damaged lines, tubes or hoses.

Repair any loose or damaged fuel and oil lines, tubes and hoses. Leaks can cause fires.

Inspect all lines, tubes and hoses carefully. Do not use your bare hand to check for leaks. Tighten all connections to the recommended torque.

1. End fittings damaged or leaking.

2. Outer covering chafed or cut and wire reinforcing exposed.

3. Outer covering ballooning locally.

4. Evidence of kinking or crushing of the flexible part of hose.

5. Armouring embedded in the outer cover.

6. End fittings displaced.

Make sure that all clamps, guards and heat shields are installed correctly to prevent vibration, rubbing against other parts, and excessive heat during operation.

Mounting and Dismounting

Mount and dismount the machine only where steps and/or handholds are provided.

Use both hands and face the machine, when mounting and dismounting.

Never get on or off a moving machine. Never jump off the machine.

Do not try to climb on or off the machine when carrying tools or supplies. Use a hand line to pull equipment up onto the platform.

Preparing to Start the Engine

Inspect the condition of the seat belt and mounting hardware. Replace any damaged or worn parts. Replace the seat belt regardless of appearance, after three years of use.

Adjust the seat so that full brake pedal travel can be obtained with the operator's back against the seat back.

Make sure the machine is equipped with a lighting system as required by conditions.

Make sure all lights are working properly.

Make sure no one is working on, underneath or close to the machine before starting the engine or beginning to move the machine. Make sure the area is free of personnel.

Start the engine only from the operator's station. Never short across the starter terminals or across the batteries, as this could bypass the engine neutral-start system as well as damage the electrical system.

Starting the Engine

Do not start the engine or move any of the controls if there is a "DO NOT OPERATE" or similar warning tag attached to the start switch or controls.

Move all implement controls to the HOLD position before starting the engine.

Move the transmission control lever to PARK.

Engage the transmission lock lever.

Start and operate the engine in a well ventilated area only. In an enclosed area, vent the exhaust to the outside.

Preparing to Operate the Machine

Clear all personnel from the machine and the area.

Clear all obstacles from the path of the machine. Beware of hazards such as wires, ditches, etc.

Be sure all windows are clean. Secure the doors and windows in either the open or shut position.

For best vision, especially close to the machine, adjust the rear view mirror.

Operating

Operate machine only while seated.

Do not allow riders on machine unless additional seat, seat belt and rollover protection are provided.

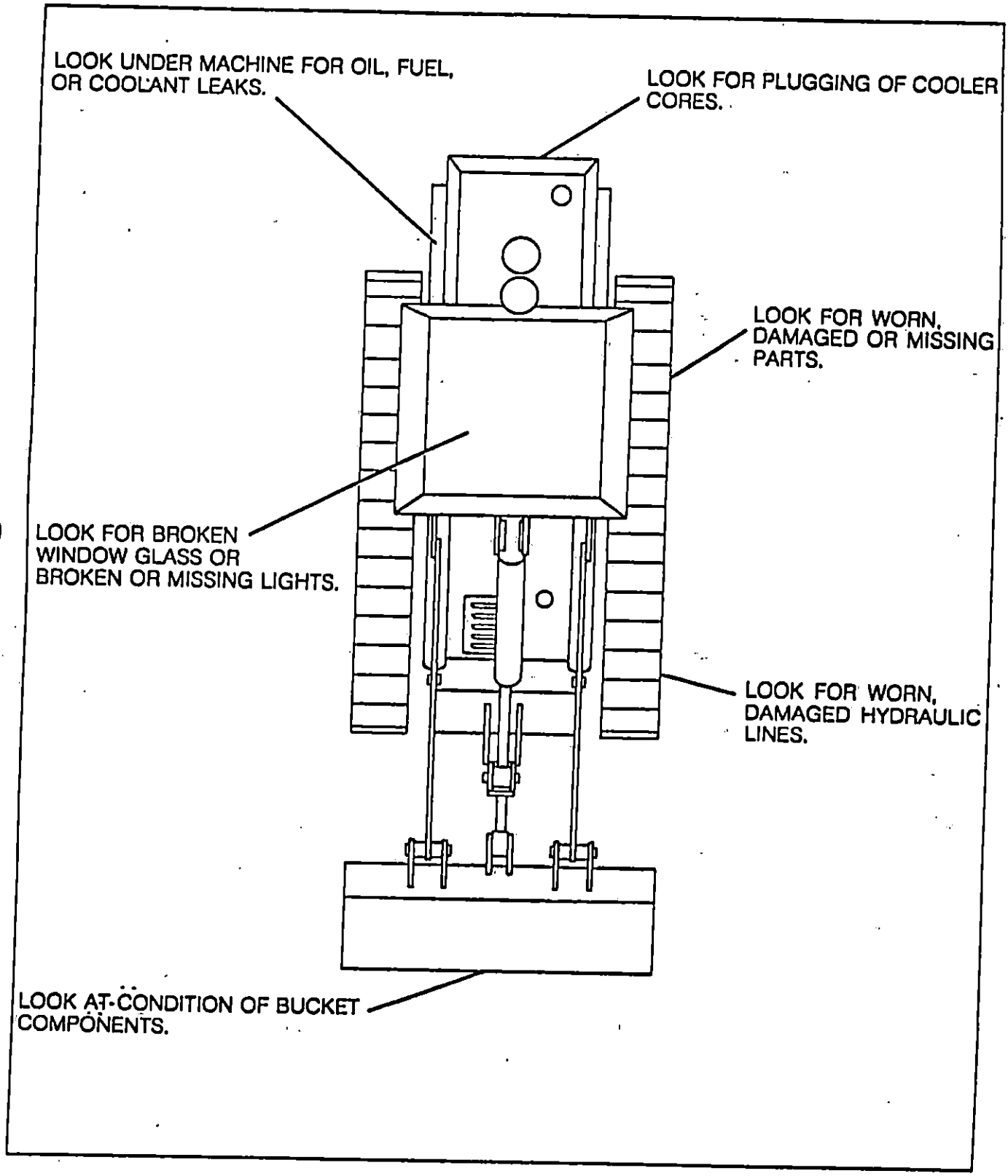
Parking Machine

Lower equipment to the ground and apply slight down pressure, place transmission lever in PARK, lock transmission lever, shut off engine, turn disconnect switch to OFF and remove key.

If machine must be parked on a slope, always block tracks in addition to having the transmission lever in PARK.

Before Starting

Walk-Around Inspection



Important Safety Notice

Periodic and proper lubrication and maintenance is important to the safe and reliable operation of this machine. This Section outlines recommended procedures, some of which require the use of special tools or work methods.

Improper lubrication and maintenance of this machine can be dangerous and could result in injury or death. READ AND UNDERSTAND ALL SAFETY PRECAUTIONS AND WARNINGS BEFORE PERFORMING LUBRICATION OR MAINTENANCE ON THIS MACHINE.

Basic safety precautions are outlined in the "Safety Section" of this Section and in the description of operations where hazards exist. Warning labels have also been put on the machine to provide instructions and to identify specific hazards which if not heeded could cause bodily injury or death to you or other persons. These warnings in the Guide and on the machine labels are identified by the symbol ⚠

Operations that may result only in machine damage are identified by CAUTION labels on the machine and in the Guide.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this Guide and on the machine are therefore not all inclusive. If a procedure, tool or work method not specifically recommended by Catepillar is used, you must satisfy yourself that it is safe for you and others and the machine will not be damaged or made unsafe by the procedures you choose.

⚠ WARNING

Do not operate this machine unless you have read and understand the instructions in the "Operation Section." Improper machine operation is dangerous and could result in injury or death.

Perform all maintenance operations, unless otherwise specified, with all equipment lowered, transmission lever in PARK with lock applied and engine stopped with disconnect key removed.

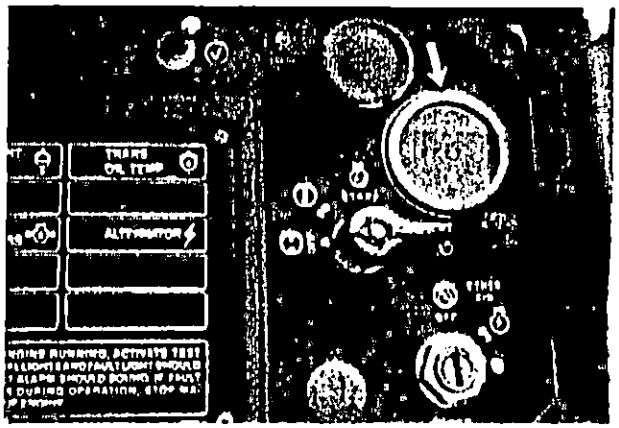
Foreword

Maintenance Section

This section is a guide to equipment care. The illustrated, step-by-step instructions are grouped by servicing intervals; items without specific intervals are listed under "When Required." Items in the "Lubrication and Maintenance Chart" are referenced to detailed instructions that follow.

Use the service meter to determine servicing intervals. Calendar intervals (daily, weekly, 2 weeks, etc.) shown may be used instead of service meter intervals if it provides more convenient servicing schedules; and approximates the indicated service meter reading.

Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the "Lubrication and Maintenance Section" may be necessary.



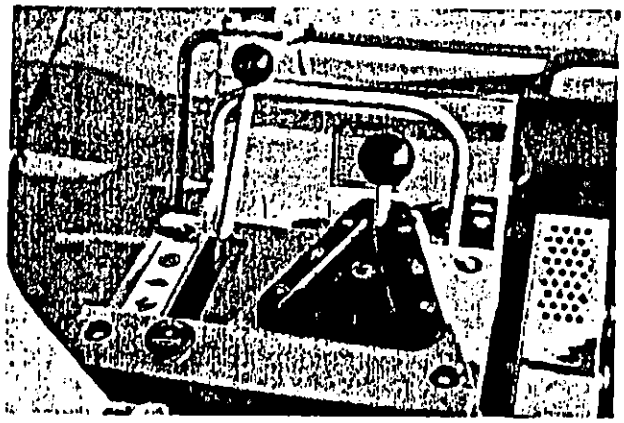
Service Meter

Perform previous interval items at multiples of the original requirement. For example, at Every 250 Service Hours or Monthly, also perform those items listed Every 50 Service Hours or Weekly and Every 10 Service Hours or Daily.

Some photographs in this publication may show details or attachments that may be different from your unit. Also, the ROPS (Roll-over Protective Structure), for some photographs, may have been removed for illustrative purposes. Similarly, photographs sometime show guards or covers removed for photo illustration that need not be removed for routine lubrication and maintenance.

Continuing improvement and advancement of product design may cause changes to your machine which may not be included in this publication. Each publication is reviewed and revised, as required, to update and include these changes in later editions. Contact your Caterpillar dealer for non-routine maintenance that is not covered in this publication.

Safety



⚠ WARNING

Lubrication, maintenance or repair of this machine can be dangerous unless performed properly. Each person must satisfy himself that he has the necessary skill and information, proper tools and equipment, and that his work method is safe and correct. Caterpillar dealers are available to provide this service.

Perform all maintenance operations, unless otherwise specified with all equipment lowered, transmission lever in PARK with lock applied and engine off with disconnect key removed.

There are certain hazards which must be recognized as potential causes of personal injury. Be aware of these hazards and follow the recommendations which are listed below. Good judgment and adherence to the basic guidelines listed below, will ensure the safe accomplishment of periodic maintenance.

Crushing or Cutting

Never attempt adjustments while machine is moving or engine running.

Any implement can fall if a control is moved, or a hydraulic line breaks.

Where there are ripper or bucket linkages, the clearance in the linkage will increase or decrease with movement of the ripper or bucket.

To avoid possible weakening of the ROPS (Rollover Protective Structure), consult a Caterpillar dealer before altering the ROPS in any way. The protection offered by the ROPS will be impaired if it has been subjected to structural damage or has been involved in an overturn incident.

Support equipment when working beneath it. Do not depend on hydraulic cylinders to hold it up.

The fan blades will throw or cut any object or tool that falls or is pushed into them.

Drive shaft and universal joints can catch loose clothing, wipe cloths, or hair.

Wear gloves when handling cable. Do not use kinked or frayed cable, it is weakened.

Wear safety glasses when hammering on steel, drifts, punches or chisels. Chips can fly from steel object or hammer. Never strike a punch, drift, or chisel with a mushroomed end.

Burns

Check coolant level ONLY when engine is stopped, and radiator cap is cool enough to touch with your hand.

Radiator and all lines to heaters or engine contain hot water or steam. Remove radiator cap slowly to avoid burns. Allow coolant system components to cool before draining. Never remove the radiator cap when the coolant is hot.

Lubricants will be hot enough to cause serious burns after machine compartments are up to normal temperature. Allow compartments to cool before draining.

The hydraulic system will be pressurized, by hot air in top of the tank, when at operating temperature.

Remove hydraulic tank cap slowly to relieve tank pressure. Allow tank to cool before draining. Never remove the hydraulic tank cap when the oil is hot.

Fire or Explosion

Diesel fuel and all lubricants are flammable. Do not weld on pipes or tubes that contain oil. Clean them thoroughly with nonflammable solvent before welding on them.

Do not smoke when refueling, or when working in areas containing fuels.

Clean up oil spills, and steam clean machine, to avoid fires.

Loose or damaged lines, tubes, and hoses, which leak, can cause fires.

Do not bend or strike high pressure lines. Do not install bent or damaged lines, tubes, and hoses.

Inspect all lines, tubes, and hoses, carefully. Tighten all connections to the recommended torque. Make sure that all clamps, guards, and heat shields, are installed correctly to prevent vibration, rubbing against other parts, or excessive heat during operation.

Shields, which protect hot exhaust components from oil or fuel spray, in the event of a line, tube, or seal failure, must be installed correctly.

The vapor, hydrogen gas, from a charging battery is explosive. Do not smoke when checking batteries, or working around batteries. Make certain the disconnect switch is off when working around batteries.

See the "Operation Section" for special precautions in jump starting. A spark at a connection near battery can cause explosion.

Fluids

Cooling system conditioners contain alkali, do not drink or get in eyes.

Battery electrolyte is an acid and will harm skin and eyes.

Keep all lubricants stored in properly marked containers and away from children.

Never put maintenance fluids in glass bottles or glasses.

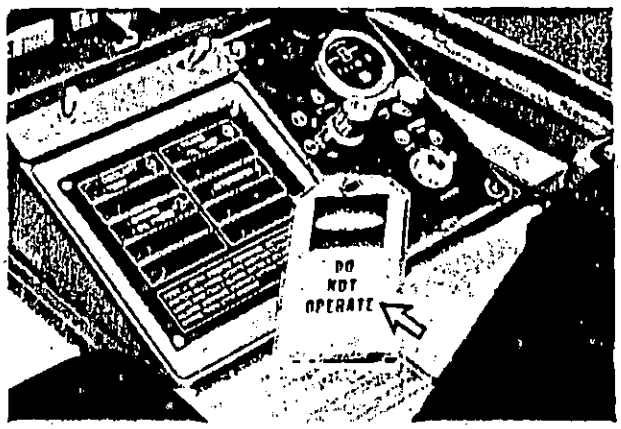
Safety Equipment

Wear hard hat, protective shoes and protective glasses when performing lubrication and maintenance operations.

Limit air pressure to 205 kPa (30 psi) when cleaning with air.

Never point air nozzle toward anyone.

Know rating on cable, chains and slings before using them.



Use "DO NOT OPERATE" tag on machine start switch whenever working on machine if start up could cause injury.

Use steps and grab irons when servicing the machine.

Store rags that have oil, or other flammable material on them, in a safety type container, away from open fires, welding or flame cutting areas.

Operate engine only in a well ventilated area.

Maintenance Recommendations

Cooling System

CAUTION

Never add coolant to an overheated engine; allow engine to cool first.

Check specific gravity of antifreeze solution frequently in cold weather to assure adequate protection.

If machine is to be stored in, or shipped to, an area with below freezing temperatures; the cooling system must be protected to the lowest expected ambient temperature.

Always drain, clean and flush a cooling system in which foaming is present or there is evidence of contamination of the cooling system.

Do not use Caterpillar Cooling System Conditioner with Dowtherm 209 Full-Fill Coolant. Follow instructions provided with the Dowtherm 209 Full-Fill.

Use clean water that is low in scale forming minerals, not softened water. Add Caterpillar Cooling System Conditioner, or equivalent, to the water to provide a 3% to 6% solution for corrosion protection. Follow the recommendations on the container for the quantity required.

When permanent antifreeze and water solutions are used in the cooling system, the solution should be drained and replaced "EVERY 2000 SERVICE HOURS OR 1 YEAR."

When additions of Caterpillar Cooling System Conditioner are made at Every 250 Service Hours as recommended, it is not necessary to change coolant yearly. The drain period may be extended to 4000 Service Hours or 2 Years.

A 3% to 6% concentration of conditioner can be maintained in the cooling system by adding .95 liter (1 quart) when changing coolant and .24 liter (1/2 pint) Every 250 Service Hours. Caterpillar Cooling System Condtioner can be purchased from your Caterpillar dealer in .24 liter (1/2 pint) bottles (Caterpillar Part Number 6V3542), .95 liter (1 quart) bottles (Caterpillar Part Number 3P2044) or 208 liter (55 gal.) drums (Caterpillar Part Number 5P2907).

The engine cooling system is protected to −23°C (−20°F), with a permanent-type antifreeze, when shipped from the factory.

Whenever draining and refilling cooling system, always run the engine, with the radiator cap OFF, until the coolant level stabilizes, then recheck the coolant level.

Filling at over 19 liters (5 U.S. gallons) per minute can cause air pockets in the cooling system.

Premix antifreeze solution to provide protection to the lowest expected ambient temperature. Pure undiluted antifreeze will freeze at −23°C (−10°F).

Operate with a thermostat in the cooling system all year-round. Cooling system problems can arise without a thermostat.

Electrical System

CAUTION

When jump starting machine, follow the instructions in the Operation section to properly start the machine.

When using external electrical source to start machine, turn disconnect switch off and remove key before attaching jumper cables.

Hydraulic System

CAUTION

Make-up oil added to the hydraulic system must mix with the oil already in the tank. Use only petroleum products unless system is equipped for use with special products.

Water or air can cause pump failure. If hydraulic oil becomes cloudy, then water or air is entering the system. Drain fluid, retighten hydraulic suction line clamps, purge and refill system. See your Caterpillar dealer for purging instructions.

Fuel System

CAUTION

Fill fuel tank at the end of each day of operation to drive out moisture laden air and to prevent condensation. Do not fill the tank to the brim. The fuel expands when it gets warm and may overflow.

Check fuel level with dipstick in filler opening.

Drain fuel tank of water and sediment as required by prevailing conditions.

Water and sediment should be drained from the fuel tank at the start of a shift or after the fuel tank has been filled and allowed to stand for 5 to 10 minutes.

After changing fuel filters, always bleed fuel system to remove air bubbles from system.

Drain water and sediment from any fuel storage tank weekly, and before the tank is refilled. This will help prevent water or sediment from being pumped from the storage tank into the machine fuel tank.

Use only fuel as recommended in the "Fuels and Lubricants" Section of this Guide.

Air Intake System

Check precleaner screen daily for accumulation of dust and debris.

Service air cleaners when RED band in indicator locks in visible position.

The primary element can be cleaned up to 6 times before replacement. The element, when cleaned, should be thoroughly checked for rips or tears in the filter material. Replace primary element every year even though it has not been cleaned 6 times.

The secondary filter element has a tab on the outer end of the element to keep a record of when the secondary element should be changed, a section of the tab should be pulled off each time a primary element is serviced. At the time of the third change of a primary element, the secondary element must be replaced.

Scheduled Oil Sampling

Use scheduled oil sampling to monitor machine condition and maintenance requirements. Each oil sample should be taken when the oil is hot and well mixed, to ensure a sample which is representative of the oil in the compartment.

Sampling Interval Chart		
Compartment	**Oil Change**	**Every 500 Hrs.**
Engine Oil	•	
Transmission Oil		•
Hydraulic Oil		•
Final Drives Oil		•

Consult your Caterpillar dealer for complete information and assistance in establishing a scheduled oil sampling program for your equipment.

General

CAUTION

Accumulated grease and oil on a machine is a fire hazard. Remove this debris with steam cleaning or high pressure water, at least every 1000 hours or each time any significant quantity of oil is spilled on a machine.

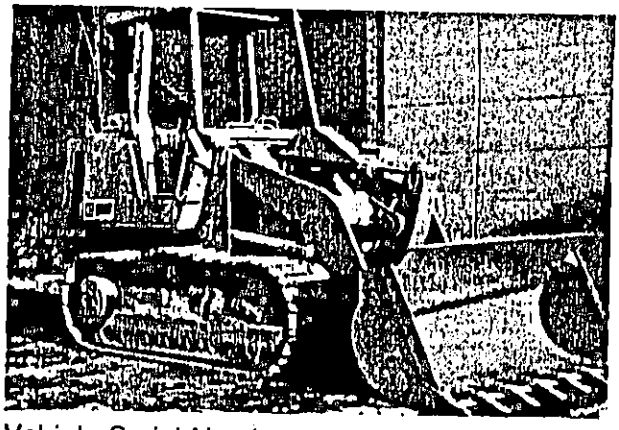
Wipe all fittings, caps and plugs before servicing.

Keep a close watch for leaks. If leaking is observed, find and correct the source of the leak.

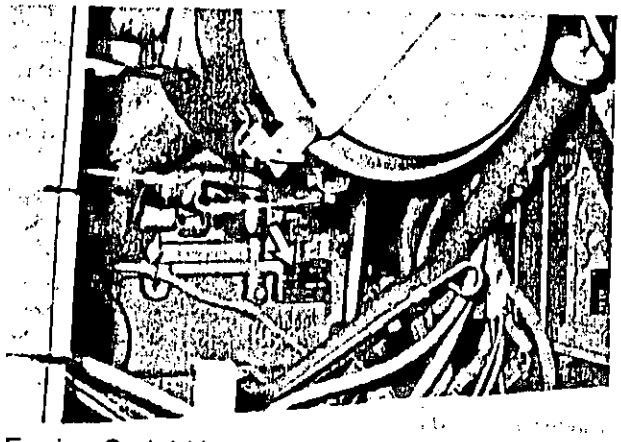
Check the fluid levels more frequently than the recommended periods if leaking is suspected or observed.

Serial Number Locations

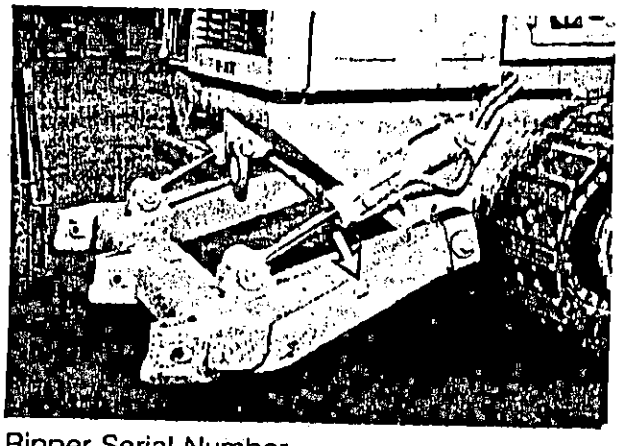
For quick reference, record your machine's serial numbers in the spaces provided below the photographs.



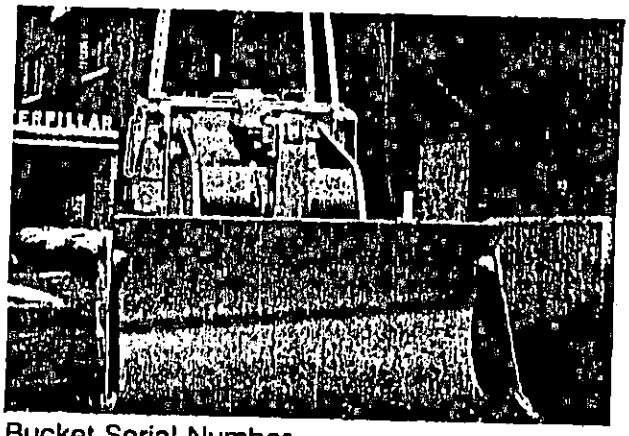
Vehicle Serial Number _____



Engine Serial Number _____



Ripper Serial Number_____



Bucket Serial Number _____

Ground Engaging Tool Bolts and Nuts

Bolt Size		Recommended Torque*	
mm	inch	N·m	lb. ft.
16	5/8	265 ± 35	195 ± 25
19	3/4	475 ± 70	350 ± 50
22	7/8	765 ± 115	565 ± 85
25	1	1220 ± 150	900 ± 110

*These values are applicable only to Caterpillar cutting edge bolts.

Fuels, Coolant, and Lubricant Specifications

Fuel Specifications

Caterpillar Diesel Engines have the ability to burn a wide variety of fuels. These fuels are divided into two general groups, preferred and permissible.

Types of Fuel

The preferred fuels provide maximum engine service life and performance. They are distillate fuels. They are commonly called fuel oil, furnace oil, diesel fuel, gas oil, or kerosene.

The permissible fuels are crude oils or blended fuels. Use of these fuels can result in higher maintenance costs and reduced engine service life.

See Caterpillar Form Number SEHS7067 for a detailed summary of preferred and permissible fuels and their specifications.

Cetane Requirement

The minimum cetane number recommended for the engine is 40.

Fuel Cloud Point

Fuel waxing can plug the fuel filters in cold weather. The fuel cloud point must be below the temperature of the surrounding air to prevent filter waxing and power loss. Fuel heating attachments are available through your Caterpillar dealer to minimize fuel filter waxing.

Fuel Sulphur Content

The percent of fuel sulphur content will effect the engine oil and filter change interval. See the chart below:

CRANKCASE OIL CHANGE INTERVALS	
Fuel Sulphur Content	**Change Interval**
0.0% to 0.4%	250 Service Hours
0.4% to 1.0%	125 Service Hours
1.0% to 1.5%	62 Service Hours

Coolant Specifications

Use a mixture of fill water, antifreeze and cooling system conditioner.

Caterpillar Form Number SEBD0518 entitled "Know Your Cooling System" can provide more detailed specifications.

Fill Water

Always add conditioner to water. Never use plain water only.

Acceptable water for use in the ethylene glycol-type antifreeze and water mixture is shown on the chart below:

Acceptable Water		
Water Content	**50% or More Antifreeze**	**Less Than 50% Antifreeze**
Chlorides	100 ppm or less	50 ppm or less
Sulfates	100 ppm or less	50 ppm or less
Hardness as $CaCo_3$	100 ppm or less	200 ppm or less
Dissolved Solids	500 ppm or less	250 ppm or less
pH	6.5 or higher	6.5 or higher

ppm = parts per million

Antifreeze

Use ethylene glycol-type antifreeze. Use the correct amount to provide freeze protection to the lowest expected outside temperature.

Conditioner

Use Caterpillar Cooling System Conditioner or equivalent. Add enough conditioner to provide a 3% to 6% concentration in the coolant. Follow the instructions on the container.

3% = approximately 1 liter per 33 liters (1 pint per 4 U.S. gal.)

6% = approximately 1 liter per 16 liters (1 pint per 2 U.S. gal.)

Coolant, Fuel and Lubricant Specifications

Lubricant Specifications

The abbreviations listed below follow S.A.E. J754 nomenclature. The classifications follow S.A.E. J183 classifications. The MIL specifications are U.S.A. Military Specifications. These definitions will be of assistance in purchasing lubricants. The recommended oil viscosities are found on the "Lubricant Viscosity Recommendation" chart.

The prefix "SPC" is a general abbreviation used by Caterpillar to identify special oils such as synthetic or semi-synthetic oils.

Engine Oils (CD/SE or CD/SF)

Use oils that meet the Engine Service Classification CD/SE or CD/SF (MIL-L-2104D).

Consult the "EMA Lubricating Oils Data Book," Form SEBU5939, for a listing of oil brands.

The percentage of sulfur in the fuel will affect the engine oil recommendations. If the fuel has over 0.5% sulfur content, the engine oil must have a TBN of 20 times the percentage of fuel sulfur (TBN as measured by the ASTM D-2896 method). If the sulfur content is greater than 1.5% by weight, use an oil with a TBN of 30 and reduce the oil change interval by one half. Consult your Caterpillar dealer for correct engine oil recommendations.

Higher TBN values are essential to retard the corrosive damage to metal engine parts.

Your oil supplier should be able to furnish the correct oils.

Hydraulic and Transmission Oils (HYDO)

Use Engine Service Classification CC (MIL-L-2104B), CC/SF (MIL-L-46152B), CD (MIL-L-2104D) or industrial-type hydraulic oils that are certified by the oil supplier to have antiwear, antifoam, antirust, and antioxidation additive properties for heavy duty use.

Pivot Bar and Final Drives (CC, CD or CD/TO-2)

Use oils that meet Engine Service Classification CC (MIL-L-2104B) or (MIL-L-46152), CD (MIL-L-2104D) or CD/TO-2.

Lubricating Grease (MPGM)

Use Multipurpose-type Grease (MPGM) which contains 3% to 5% molybdenum disulfide. NLGI No. 2 Grade is suitable for most temperatures. Use NLGI No. 1 or No. 0 Grade for extremely low temperatures.

Refill Capacities (Approximate)

943 Track-Type Loader

Compartment or System	Liters	U.S. Gallons	Imperial Gallons
Cooling System	20	5.3	4.4
Transmission	27	7.0	5.8
Implement Hydraulic System	55	15.0	12.5
Final Drives (Each Side)	9.5	2.5	2.1
Fuel Tank	150	40.0	33.0
Engine Crankcase	15	4.0	3.3

953 Track-Type Loader

Compartment or System	Liters	U.S. Gallons	Imperial Gallons
Cooling System	22	5.8	4.8
Transmission	40	11.0	9.2
Implement Hydraulic System	55	15.0	12.5
Final Drives (Each Side)	15	4.0	3.3
Fuel Tank	200	53.0	44.0
Engine Crankcase	15	4.0	3.3

Lubricant Viscosity Recommendations

For Temperature Ranges °C and °F					
Compartment or System	Oil Viscosities	°C		°F	
		Min	Max	Min	Max
Engine Crankcase CD/SE or CD/SF	SAE 5W-20 (SPC)	-30	+10	-22	+50
	SAE 5W-20	-25	+10	-13	+50
	SAE 10W	-20	+10	-4	+50
	SAE 10W-30	-20	+40	-4	+104
	SAE 15W-40	-15	+50	+5	+122
	SAE 30	0	+40	+32	+104
	SAE 40	+5	+50	+41	+122
Hydrostatic Transmission, Pump Drive HYDO	SAE 5W-20 (SPC)	-30	+40	-22	+104
	SAE 5W-20	-25	+10	-13	+50
	SAE 10W	-20	+50	-4	+122
Hydraulic System HYDO	SAE 5W-20 (SPC)	-30	+40	-22	+104
	SAE 5W-20	-25	+10	-13	+50
	SAE 10W	-20	+40	-4	+104
	SAE 10W-30	-20	+40	-4	+104
	SAE 15W-40	-15	+50	+5	+122
	SAE 30	+10	+50	+50	+122
Final Drives and Pivot Shaft CC,CD or CD/TO-2	SAE 5W-20 (SPC)	-30	0	-22	+32
	SAE 10W	-30	0	-22	+32
	SAE 30	-20	+25	-4	+77
	SAE 40	-10	+40	+14	+104
	SAE 50	0	+50	+32	+122

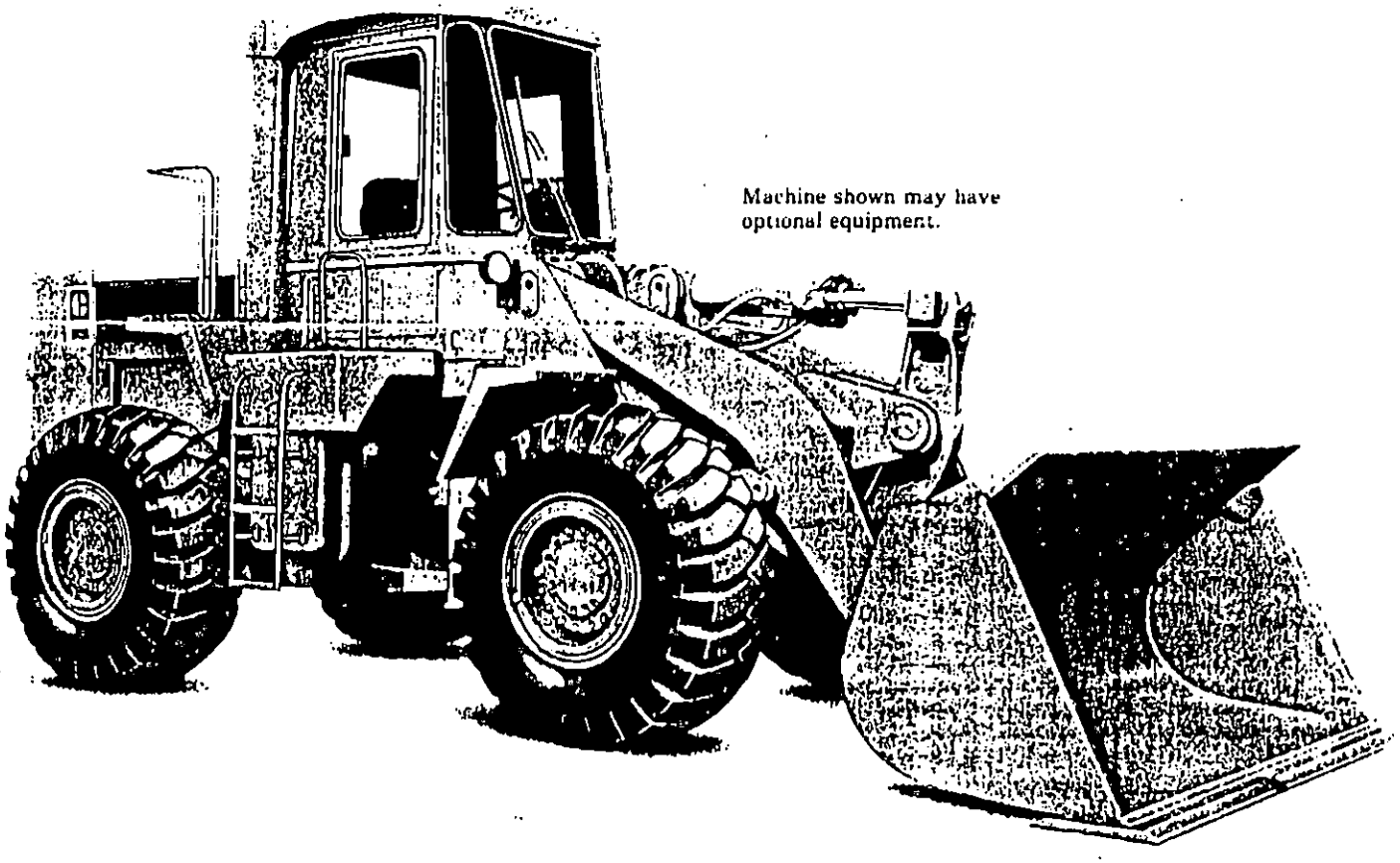
Lubrication and Maintenance Interval Chart

Item	Service	Lube.	Page
When Required			
Engine Cooling System	Drain and clean when engine overheats, solution is dirty or foaming is observed.		60
Engine Air Intake System	Change filters when RED band in indicator locks in visible position or excessive black smoke is observed.		61
Fuel Filter	Change when engine shows an obvious loss of power. Normal change period is 500 Service Hours.		65
Ether Starting Aid	Change ether cylinder when empty.		68
Cab Air Filters	Change when a reduction of air flow is observed.		69
Bucket Teeth	Change if damaged or excessively worn.		70
Ripper Teeth	Change if damaged or excessively worn.		71
Every 10 Service Hours or Daily			
Engine Crankcase	Measure oil level.	CD/SE or CD/SF	72
Engine Cooling System	Observe coolant level – check for leaks or trash build-up.		72
Hydrostatic Transmission	Measure oil level – check for leaks.	HYDO	73
Implement Hydraulic System	Observe oil level – check for leaks.	HYDO	73
Fuel Tank	Drain water and sediment.		74
Engine Air Pre-Cleaner	Inspect for dirt accumulation.		74
Track	Inspect for proper adjustment – look for excessive wear.	MPGM	75
Final Drives	Inspect for leaks.	CC, CD or CD/TO-2	75
Cover and Guards	Inspect for damage, loos or missing parts.		76
Seat Belt	Inspect for damage, wear – replace at least once every 3 years.		77
Every 50 Service Hours or Weekly			
Bucket Pivot Pins	Lubricate 2 fittings.	MPGM	78
Batteries	Observe electrolyte level.		78
Every 100 Service Hours 2 Weeks			
Loader Linkage Pins	Lubricate 11 fittings.	MPGM	80

Lubrication and Maintenance Interval Chart

Item	Service	Lube.	Page
Every 250 Service Hours or Monthly			
Fan Drive Bearing	Lubricate 1 fitting.	MPGM	81
Alternator and Water Pump Belts	Inspect, adjust if necessary.		81
Fan Belt	Inspect, adjust if necessary.		82
Refrigerant Compressor Belt	Inspect, adjust if necessary.		82
Tracks	Adjust track. Adjust track more frequently when operating in abrasive conditions.	MPGM	83
Final Drives	Check oil level. Check more frequently if operating in abrasive conditions.	CC, CD or CD/TO-2	84
Equalizer Bar End Bearings	Lubricate fittings.	MPGM	85
Engine Crankcase	Change oil and filter.	CD/SE or CD/SF	85
Engine Cooling System	Add Caterpillar cooling system conditioner.		86
Every 500 Service Hours or 3 Months			
Pivot Bar	Check oil level.	CC, CD or CD/TO-2	87
Engine Crankcase Breather	Clean breather.		87
Fuel Filter	Change filter.		65
Every 1000 Service Hours or 6 Months			
Hydrostatic Transmission	Change filter.	HYDO	88
Implement Hydraulic System	Change filter.	HYDO	93
Engine Valve Lash	Adjust valve lash.		95
Every 2000 Service Hours or 1 Year			
Final Drives	Change oil in each final drive.	CC, CD or CD/TO-2	96
Cooling System	Change antifreeze solution.		97
Implement Hydraulic System.	Change oil, clean strainer.	HYDO	98
Hydrostatic Transmission	Change oil, clean strainer.	HYDO	100

CATERPILLAR 950B Wheel Loader



Machine shown may have optional equipment.

Summary of features

- **Rated load** . . . 9300 lb.-4200 kg.
- **Operator comfort and convenience** is provided by the sound-suppressed, pressurized cab, suspension seat, pilot operated controls and advanced critical function monitoring system.
- **Cat 3304 turbocharged diesel Engine** . . . with 425 cu. in 7.0 liter displacement and 24% torque rise.
- **High breakout force** . . . excellent loadability.
- **Single lever power shift** . . . fast, easy speed and direction changes . . . four speeds forward, four reverse.
- **Z-bar linkage design** has increased breakout force and metered bucket dump speed.
- **Sealed loader linkage** . . . with ground level lube stations reduce maintenance time.
- **Servicing ease** . . . daily service performed from the ground at service areas.
- **CAT PLUS services** . . . from your Caterpillar Dealer . . . the most comprehensive, total customer support system in the industry.

Caterpillar Engine

Flywheel power @ 2200 RPM 155 hp/117 kW

(Kilowatts (kW) is the International System of Units equivalent of horsepower.)

The net power at the flywheel of the vehicle engine operating under SAE standard ambient temperature and barometric conditions, 85° F/29° C and 29.38" Hg/995 mbar, using 35 API gravity fuel oil at 60° F. 15.6° C, and after deductions for fan, air cleaner, water pump, lubricating oil pump, alternator, fuel pump, and muffler. No derating is required up to 5000 ft./1500 m altitude.

Caterpillar four-stroke-cycle, 3304 turbocharged diesel Engine with four cylinders, 4.75" 120 mm bore, 6.0"/152 mm stroke and 425 cu. in./7.0 liters displacement.

Direct injection Cat fuel system with individual, adjustment-free injection pumps and valves.

Cam-ground and tapered aluminum alloy pistons with three-ring design: both compression rings ride in iron band cast into the piston. Piston undersides are cooled by oil spray. Steel-backed aluminum alloy bearings. Hardened high-carbon steel alloy crankshaft. Pressure lubrication with full-flow filtered oil and heat exchanger oil cooler. Dry-type air cleaner with primary and safety elements, and service indicator.

Two 24-volt direct electric starting systems, standard or low temperature. Optional ether starting aid available. (Ether canister not included.)

950B

Wheel Loader

transmission

Full power shift in four forward and four reverse speeds. Provides on-the-go shifting for greater operator efficiency and machine productivity.

Single lever on left side of steering column controls both speed and direction. Rotate the handle for four speed ranges in each direction. Move the lever forward or back for directional change. Separate lever locks the transmission control in neutral.

Single-stage, single-phase torque converter.

Maximum speeds with 20.5-25, 12 PR (L-2) tires:

	1st	2nd	3rd	4th
Forward, MPH:	4.4	7.8	13.8	22.6
Km/h:	7.1	12.6	22.2	36.4
Reverse, MPH:	4.8	8.6	15.1	24.5
Km/h:	7.8	13.9	24.3	39.4

axles

Front axle fixed, rear axle oscillates ± 15°, total of 30°, for greater machine stability. One rear wheel can drop or rise a total of 19.4"/493 mm with all wheels remaining on the ground for maximum traction. Free-floating axle shafts carry torque, not machine weight, for long life. Axle shafts can be removed independently of wheels and planetaries for servicing ease.

Conventional differentials. NoSPIN differential, recommended for slippery underfoot conditions only, is optional.

final drives

All-wheel drive with planetary reduction in each wheel. Torque is developed at the wheel, putting reduced stress on axle shafts. Planetary units may be removed independently of wheels and brakes for servicing ease.

brakes

(System meets OSHA regulations.)

Service — Caliper discs on all four wheels, air hydraulic actuated. Fade-resistant, less affected by weather than drum-and-shoe brakes. Separate brake circuits for front and rear axles. Two brake pedals; right pedal brakes only; left pedal brakes while neutralizing transmission.

Parking — Mechanical shoe-type, mounted on the rear of the loader frame. Operator applies manually.

Emergency — Uses parking brake. When air pressure drops, an audible warning sounds. Drive line brake then automatically applies to bring machine to a controlled stop. Operator can also apply manually.

tires

Tubeless, nylon, loader-dozer design.

Choice of:

20.5-25, 12 PR (L-2)
20.5-25, 16 PR (L-2)
20.5-25, 16 PR (L-3)
23.5-25, 12 PR (L-2)
20.5-25 XRA
20.5-25 XRDNA

steering

Center-point frame articulation. Rear and front wheels track. Full hydraulic power with flow amplified system. Flow to steering cylinders is controlled by a steering wheel-operated metering pump. Full-flow filtering. Adjustable steering column.

Minimum turning radius (over tires) (§) 22'0"/6.706 mm
Steering angle (each direction) 35°

Hydraulic system: — two 3.5"/89 mm bore, double-acting cylinders powered by a vane-type pump.
Output @ 2092 RPM and 1000 psi/69 bar/6890 kPa 38 gpm/142 liters/min
Relief valve setting 2495 psi/172 bar/17 200 kPa

bucket controls

Lift circuit — Pilot operated. Positions: Raise, hold, lower and float. Automatic kickout adjustable from horizontal to full lift.

Tilt circuit — Pilot operated. Positions: Tilt back, hold and dump. Automatic fork positioner adjustable to desired loading angle. No visual spotting required.

lift arm pins

Sealed pins in lift arms and bucket hinge points for long pin and bushing life, lower maintenance costs. Grease once every 100 service meter units, except lower bucket hinge pins, which need grease every 50 SMU.

loader hydraulic system

Full flow filtering, sealed valves located in front of loader frame for easy service.

Pump output @ 2288 RPM and 1000 psi/69 bar/6890 kPa, with SAE No. 10 oil @ 150° F/66° C 64 gpm/242 liters/min
Relief valve setting 2750 psi/190 bar/19 000 kPa
Cylinders (double-acting):
Lift — bore and stroke 6.0" × 29.7"/152.4 × 751 mm
Tilt — bore and stroke 7.0" × 21.1"/177.8 × 536 mm

Hydraulic cycle time, rated load in bucket, in seconds (§):

Raise	Dump	Lower (empty, float down)	Total
6.6	2.2	3.0	11.8

service refill capacities

	U.S. Gallons	Liters
Cooling system	8.8	34
Crankcase	5.7	22
Transmission and torque converter	8.4	34
Differentials and final drives:		
Front	8.6	33
Rear	9.9	38
Hydraulic system	39.8	153
Hydraulic tank	21.6	83
Fuel tank	57.7	222

Specifications and ratings conform to all applicable standards recommended by the Society of Automotive Engineers SAE Standard J732c (1969) and SAE Standard J742b (1969) govern loader ratings, denoted in the text by (§).

Operating Specifications

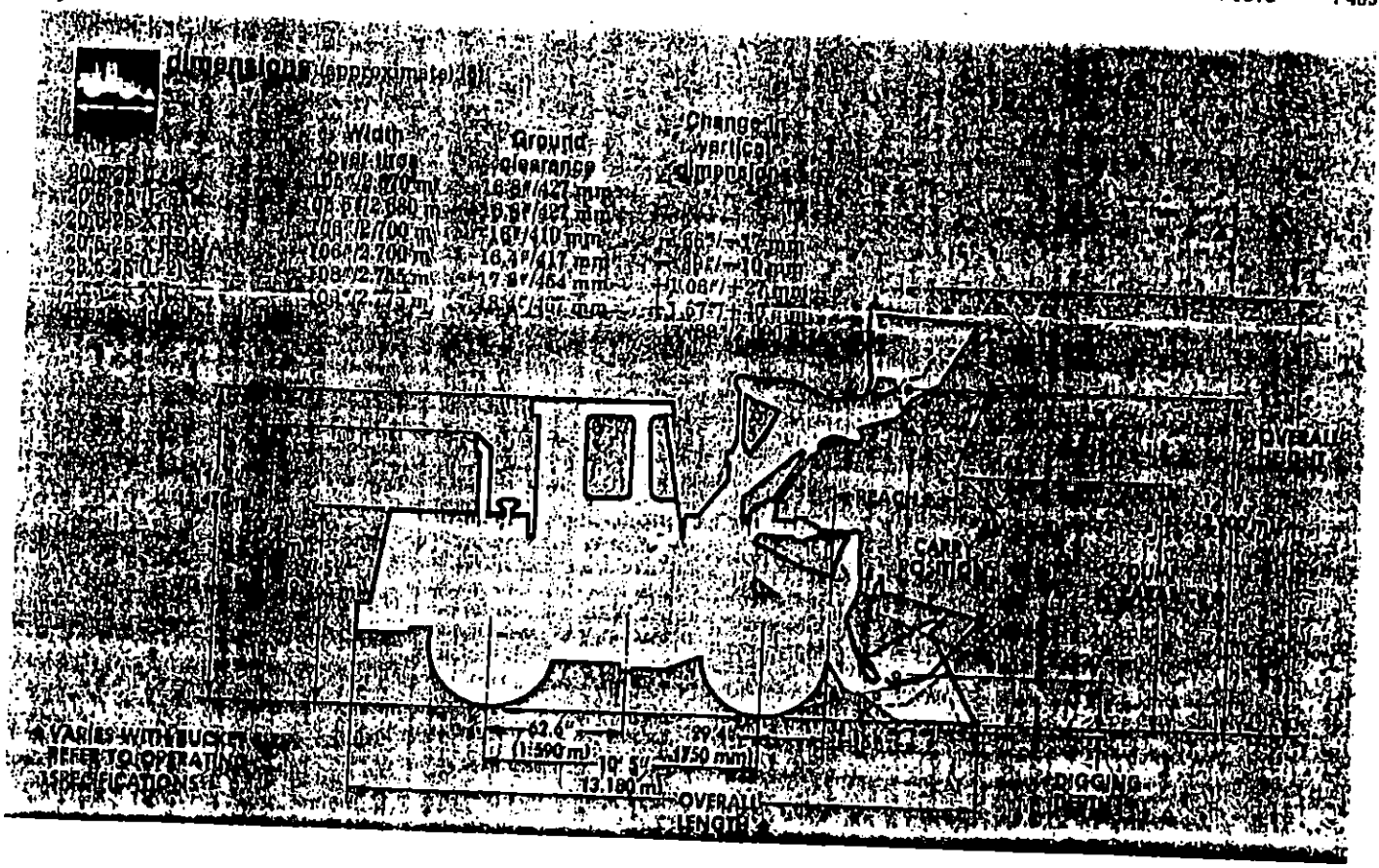
Bucket Type	General Purpose	Light Material
Rated Load (§)	9300 lb/4200 kg	9300 lb/4200 kg
Capacity, heaped (§)	3.0 cu. yd./2.4 m^3	3.5 cu. yd./2.68 m^3
Capacity, struck (§)	2.66 cu. yd./2.03 m^3	3.02 cu. yd./2.32 m^3
Width (§)	108"/2744 mm	108"/2744 mm
Dump clearance @ full lift and 45° discharge (§)	9'6"/2.900 m	9'2"/2.800 m
Reach at 45° discharge angle, 7'0"/2130 mm clearance (§)	7'8"/2.325 m	8'3"/2.505 m
Reach at full lift and 45° discharge (§)	3'5"/1.040 m	3'9"/1.150 m
Reach with arms horizontal and bucket level	7'8"/2.325 m	8'3"/2.505 m
Digging depth (§)	2.95"/75 mm	3.9"/100 mm
Overall length (§)	23'9"/7.244 m	24'5"/7.445 m
Overall height (bucket @ full raise) (§)	16'9"/5.100 m	17'2"/5.220 m
Loader clearance circle (bucket in carry position) (§)	45'1"/13.740 m	45'8"/13.950 m
Static tipping load**		
Straight (§)	22,840 lb/10 360 kg	21,780 lb/9900 kg
Full 35° turn (§)	21,058 lb/9550 kg	20,304 lb/9210 kg
Breakout force* (§)	36,228 lb/16 430 kg	30,246 lb/13 720 kg
Operating weight**	32,414 lb/14 700 kg	32,782 lb/14 870 kg

*Measured 4.102 mm behind lip of cutting edge with bucket hinge pin as pivot point in accordance with SAE J732c (1969)

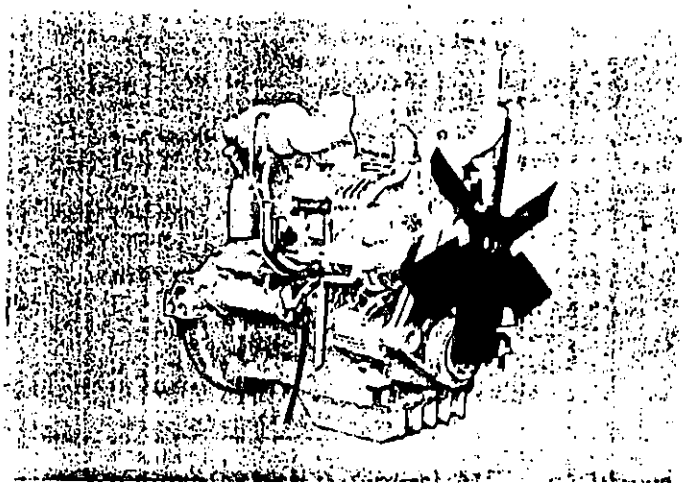
**Static tipping load and operating weight include lubricants, coolant, full fuel tank, 20.5-25, 12 PR (L-2) tires, ROPS cab and operator, and 1600 lb/818 kg Ballast. Machine stat... affected by tire size, ballast and attachments. For changes in... add the following to machine operating weight and static tipping load:

	Change in Operating Weight Lb	Change in Operating Weight Kg	Change in Articulated Static Tipping Load Lb	Change in Articulated Static Tipping Load Kg
20.5-25, 16 PR (L-2) tires with 75% $CaCl_2$	+99	+45	+68	+31
20.5-25, 16 PR (L-3) tires with 75% $CaCl_2$	+604	+274	+516	+234
20.5-25, XRDNA tires with 75% $CaCl_2$	+648	+294	+441	+200
20.5-25, XRA tires with 75% $CaCl_2$	+516	+234	+353	+160
23.5-25, 12 PR (L-2) tires with 75% $CaCl_2$	+2381	+1080	+2159	+979
23.5-25 XRA tires with 75% $CaCl_2$	+3035	+1376	+2715	+1232

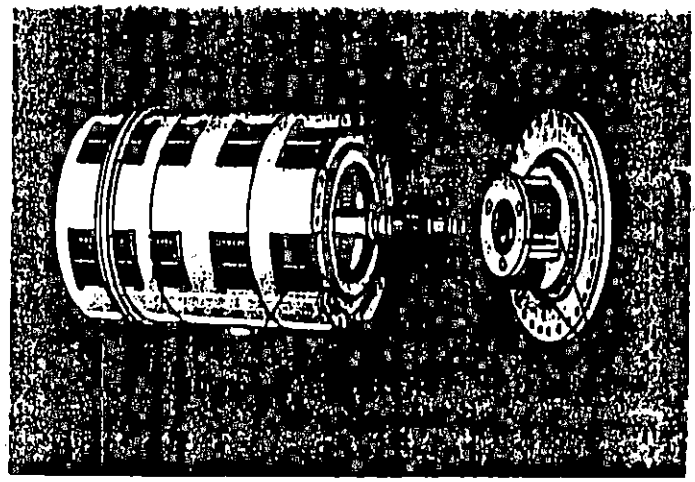
	Change in Operating Weight Lb	Change in Operating Weight Kg	Change in Articulated Static Tipping Load Lb	Change in Articulated Static Tipping Load Kg
Remove ROPS canopy and cab	−1270	−576	−741	−336
Remove cab only	−549	−249	−461	−209
Remove ROPS canopy only	−721	−327	−280	−127
Counterweight in place of ballast				
with 20.5-25 tires (L-2)	−600	−272	–	–
with 20.5-25 tires XRA	−84	−38	+340	+154
with 23.5-25 tires	+999	+453	+1078	+489



Reliable Cat power train — power you can depend on.

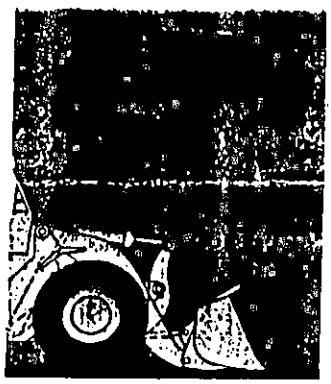


Cat 3304 turbocharged diesel Engine packs 155 flywheel horsepower/ 117 kW. That's real work power delivered at the flywheel — not a theoretical rating achieved only in a lab. High torque rise gives you strong lugging ability for crowding the bank and penetrating tough materials. Cam-ground and tapered aluminum alloy pistons expand during the heat of combustion to fit snugly in the cylinders for smooth, even power flow. The fully pressurized and filtered lubrication system means long engine life — and spin-on fuel and oil filters make maintenance easy.

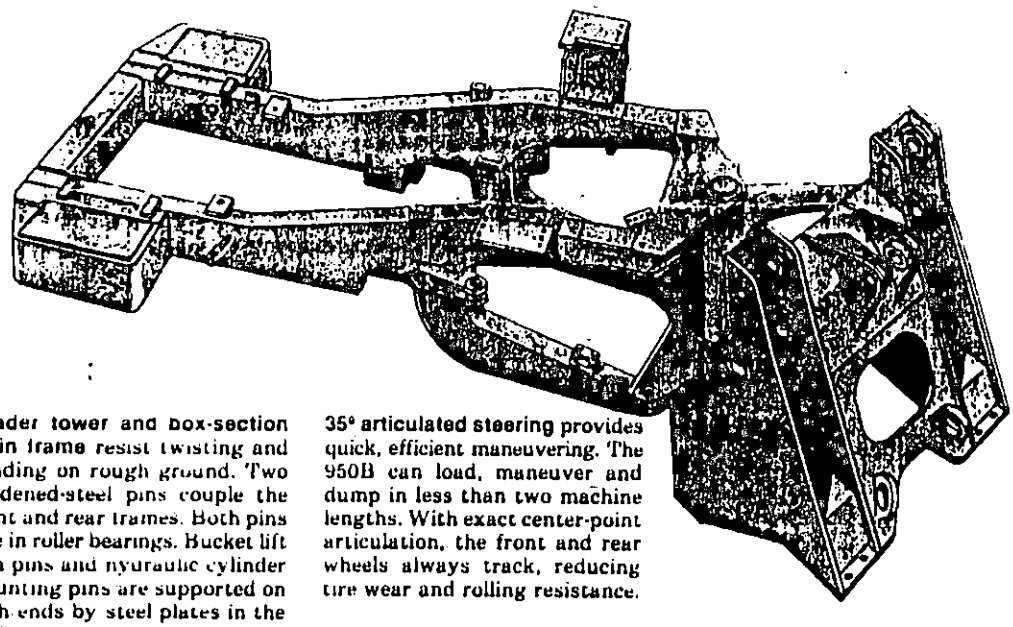


Power shift transmission provides quick on-the-go speed and direction changes. Torque loads are spread through planetary gear sets rather than being concentrated on a single gear. Big clutch packs surround each gear set and engage with special hydraulic modulation for smooth, cushioned shifting. Clutch plates and gears are continuously cooled by oil for dependable performance and long life.

Designed for strength and performance.



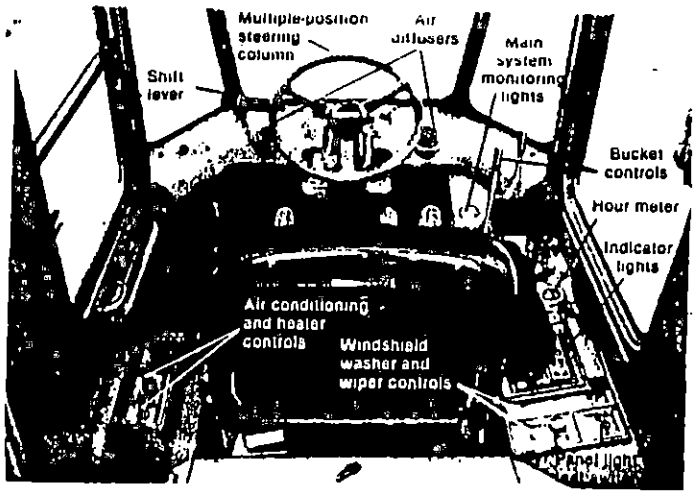
Z-bar linkage geometry provides high breakout force, fast dump speed while decreasing bucket dump velocity near the end of the dump motion. The results are large loads, coupled with excellent dump control. Increased rack back angle increases material retention and reduces spillage over the back of the bucket. Single tilt cylinder and Z-bar design allow 50% fewer linkage parts and no daily maintenance points.



Loader tower and box-section main frame resist twisting and bending on rough ground. Two hardened-steel pins couple the front and rear frames. Both pins ride in roller bearings. Bucket lift arm pins and hydraulic cylinder mounting pins are supported on both ends by steel plates in the loader tower rather than on a single end as with cantilever mounting.

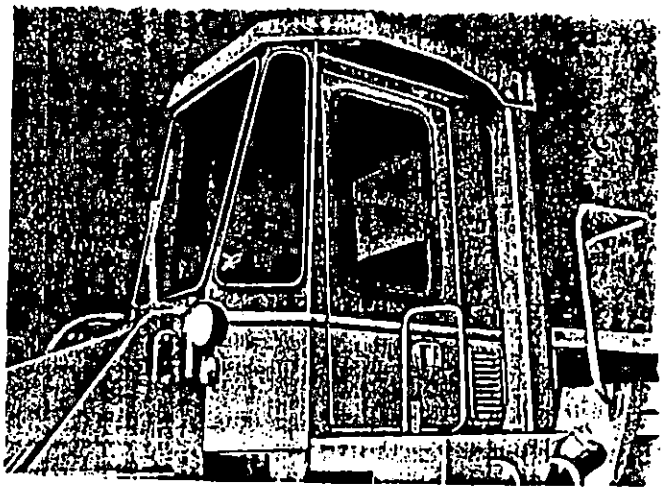
35° articulated steering provides quick, efficient maneuvering. The 950B can load, maneuver and dump in less than two machine lengths. With exact center-point articulation, the front and rear wheels always track, reducing tire wear and rolling resistance.

Built in efficiency and protection.



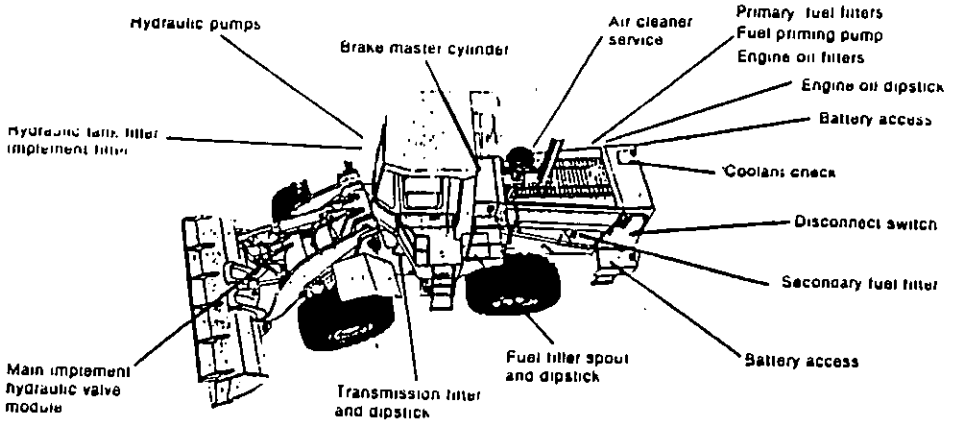
Operator's compartment features a multiple-position tilt steering column and full adjustable seat with seat belt. Instrument panel mounted to right of seat contains hour meter, start switch, windshield washer and wiper controls, light switches and an advanced warning system that constantly monitors the operating condition of important machine components and systems. A red light mounted ahead of the bucket controls flashes when any critical malfunction occurs alerting operator to check instrument panel for specific problem. An audible alarm also sounds for low engine oil or brake pressure and if transmission is engaged while parking brake is applied. This entire system allows operator to concentrate on work without constant gauge monitoring.

Pilot-operated bucket controls with short throw and easy actuation are mounted to operator's right. When the levers are engaged, pilot hydraulic pressure actuates the main valve to meter oil flow to the corresponding lift or tilt cylinders, while the remote pilot valve maintains a constant pressure. This means easy operation with no reaction delay. Lift arms and bucket can be inched and controls feathered with accuracy.



Sound-suppressed cab plus ROPS contains many standard operator comfort features. ROPS structure is isolated from operator's station which enables the cab to be resiliently mounted to the vehicle chassis. When properly installed and maintained, cab meets OSHA and MSHA requirements for operator sound exposure limits in effect at date of manufacture. Cab features include EMS (electronic monitoring system), tinted glass, windshield washer/wiper, dome lights, pressurized and filtered air circulation system, inside mounted rear view mirrors, coat hook, cigarette lighter, ash tray, floor mat and lockable entry door all standard. Cab air conditioner and heater are optional.

Serviceability — reduced time on maintenance, increased time on the job.

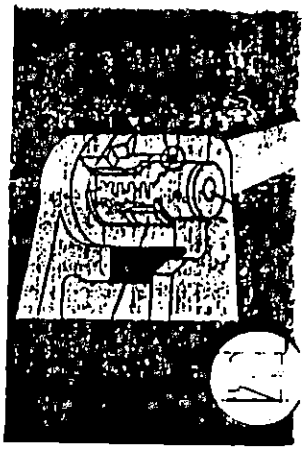


Servicing ease is designed into the 950B.

• Doors on both sides of the engine compartment provide easy access to engine oil filler, dipstick, filter, and air cleaner indicator on the right hand, main electrical box, grease fitting manifold, and electrical disconnect switch (on left). Complete engine compartment access is provided by opening the top hinged door and removing the lower panel on both sides.

• A lockable service door behind the operator's compartment opens to provide access to the hydraulic brake reservoirs, master cylinders, tool box, and ether starting aid cartridge. Hydraulic filters are located in the top of the hydraulic tank and are easily reached from ground level. Fuel filler and dipstick are accessible from the ground at the rear of the left platform. Main implement control valves are located on front of loader tower for easy access.

• Grease fittings are grouped to save time and are easily accessible from ground level.

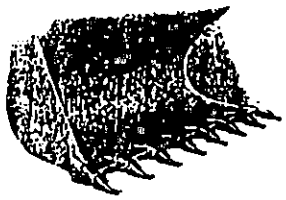


Sealed linkage reduces regu greasing of lift arm pivot poi to once every 100 service ma units. (Lower bucket hinge p need grease every 50 SMU.) type seals on each pin hold lubricant in and hold out we causing grit. Pins and bushi last a long time. Time and mo spent for routine maintena are reduced.

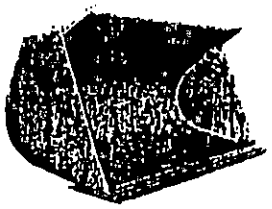
CATERPILLAR

950B buckets provide flexibility in matching the machine to job conditions. All are welded construction with abrasion-resistant steel cutting edges. They feature a tapered floor design of approximately 7°, with box-sectioned reinforcing material placed under the floor for increased structural strength. Optional corner guard system allows quick conversion from teeth to a bolt-on edge for clean-up and floor work while absorbing critical bucket corner wear. Available on General Purpose and light material buckets.

General Purpose bucket, for use in most applications, is designed to accept bolt-on teeth, or a bolt-on cutting edge. Integral spill plate helps reduce spillage and weld-on bottom wear plates for extended life.



Light material bucket is designed for loading stockpiled aggregates or other material weighing 2700 lb./yd.^{3}/1600 kilograms per cubic meter or less. It has standard bolt-on cutting edges and includes weld-on bottom wear plates for long life.



standard equipment

24-volt direct electric starting. 35-amp alternator. Muffler. Automatic bucket positioner. Automatic lift kickout. Backup alarm. Fenders. Hitch. Horn. Front and rear working lights. Rear view mirrors. Front windshield washer and wiper. Sound-suppressed cab plus ROPS. Suspension seat. Seat belt. Service, parking and emergency braking system. Hydraulic tank sight gauge. EMS (electric monitoring system). Common key for engine access doors and cab. Blower fan.

Indicators: Air cleaner service. Alternator. Fuel level. Parking brake applied. Main warning light for system monitoring.

Functions monitored by EMS:

Temperatures: Hydraulic oil. Coolant. Transmission oil.

Pressures: Engine oil. Brake air. Brake oil.

optional equipment

(with approximate change in operating weight)

	Lb	Kg
Air conditioning/heating system	94	43
Alternator, 50-amp	15	7
Altitude normalizing	0	0
Buckets:		
General Purpose	3760	1706
Light Material	4580	2077
Bucket corner guard system (G.P. or light material)		
Teeth (8) includes corner adapters	330	150
Cutting edge and end bits (4 pieces)	380	172
Cab, sound-suppressed (removed)	−511	−232
Canopy, ROPS (removed)	−1120	−508
Counterweight (for use without Ca Cl_2)	1213	550
Differential, NoSPIN (rear only)	0	0
Fire extinguisher	35	16
Gauge group	4	1.8
Guard:		
Crankcase	90	41
Power train	215	98
Heaters, cab	9	4
Hydraulic arrangement, 3 valve	165	75
Lighting system, two front flood lights	15	7
Mirrors, outside mounted	70	32

	Lb	Kg
Starting aids:		
Engine coolant heater	3	1.4
Ether	6	2.7
Heavy duty batteries	105	47
Receptacle, 110V	8	3.6
Static seat	−30	−14
Seat covers, fabric	1	.5
Supplemental steering	190	86
Tires:		
20.5-25, 16 PR (L-2)	99	45
20.5-25, 16 PR (L-3)	114	52
20.5-25, XRDNA	529	240
20.5-25 XRA	129	59
23.5-25, 12 PR (L-2)	186	84
23.5-25, XRA	313	142
Tool kit	18	8
Vandalism protection:		
Instrument panel guard (for use without cab)	3	1.4
Cab locks for:		
Hydraulic tank & 6 padlocks for access doors	5	2.3
Windshield wiper and washer (for rear window)	11	5

Materials and specifications are subject to change without notice.

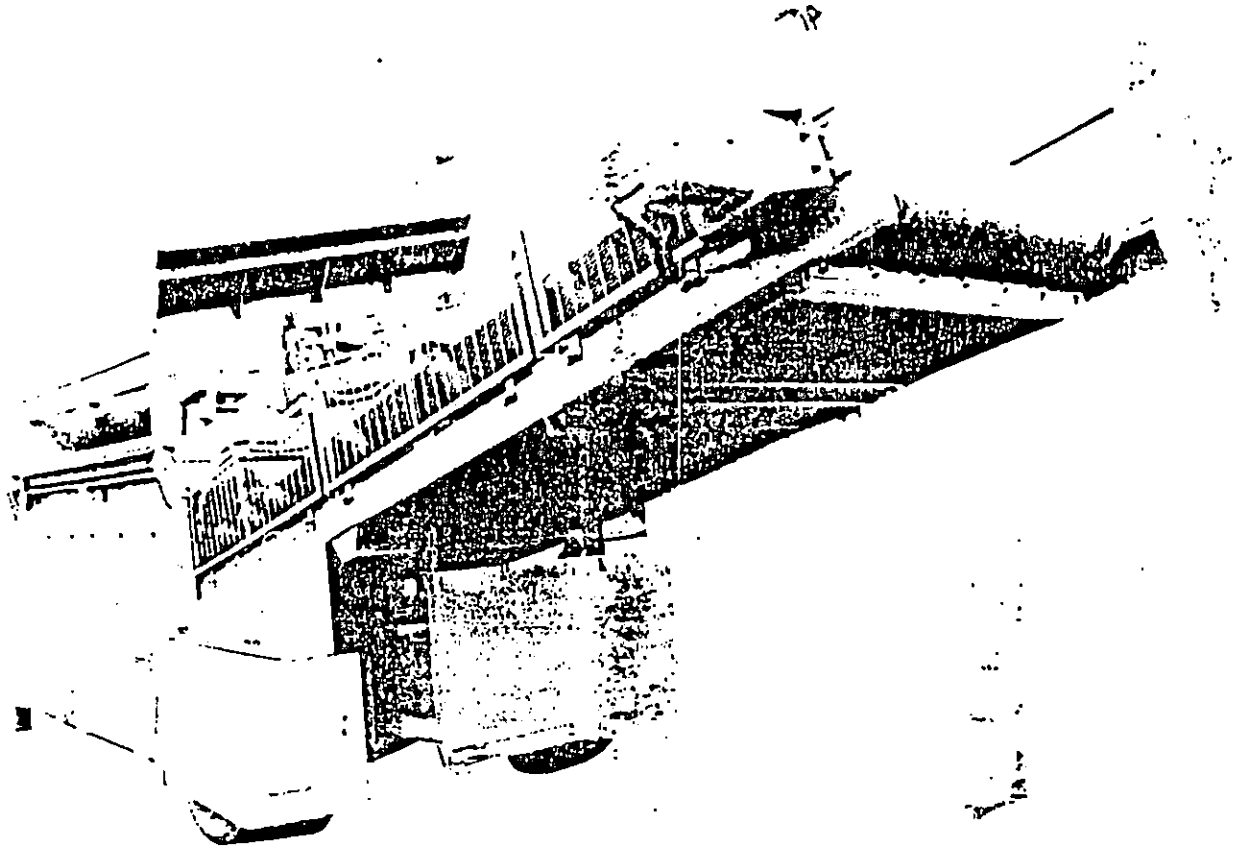
AEHQ9461 (4-81)
(Replaces AEHQ9260)

Printed in U.S.A.

SCREENS

OPERATION AND MAINTENANCE

POWERSCREEN



Powerscreen Powergrid Mk 2

Maintenance & Spare parts

POWERSCREEN

Powerscreen Powergrid Mk. 2

MAINTENANCE & SPARE PARTS

Ref. No. P.72/Issue 1/April 1989

Owner's Name

Machine serial no.

Engine/Electric Motor Serial No.

Engine Agent

Tel. No.

Machine supplied by

Tel. No.

Contents

Powerscreen International Distribution Ltd.

Dungannon, Co. Tyrone, N. Ireland.

Telephone: Coalisland 40701 Telegrams: Powerscreen, Dungannon Telex: 74136 Fax: (08687) 47231

Powerscreen of America Inc

Introduction

The machine which you have now received, has been manufactured, assembled and tested with utmost care and was built with first-class materials. Close attention has been paid to all detail in assembly, running tests and final inspection. We are confident that you have received a machine which will give you every satisfaction over a long period.

To be assured of faultless operation we would ask you to carefully read the following paragraphs and give the required time and attention to essential maintenance, cleaning and inspection. The machine is simple to operate, adjustments are easy to make, and expert assistance is seldom required provided that ordinary care is extended in daily use.

If in doubt please contact our authorised distributors quoting machine serial number, which can be taken from the machine plate or this manual.

General Description

The machine is designed as a self contained, mobile, scalping and conveying unit for rejecting oversized material. The material is deposited on a heavy duty screening unit mounted over a hopper, which screens out oversize material. The screened material is delivered by the conveyor for stockpiling, loading into a dump truck or further processing plant.

Specification

Towing/Working length	9.8m (32ft. 2ins.)
Width	2.4m (7ft. 11ins.)
Working Height	3.5m (11ft. 6ins.)
Towing Height (0.8m high tow-bar)	3.96m (13ft.)
Screen Width (Nominal)	3.05m (10ft.)
Screen Length (Nominal)	2.2m (7ft. 3ins.)
Approx. Weight	11,000Kg. (24,200 lbs.)
Conveyor Belt Width	1520mm (5ft.)
Conveyor Belt Speed (Loaded)	80m/min. (270ft/min.)
Engine Size	28Kw (38 H.P.)
Hydraulic System Capacity	336 litres (74 gals.)
Diesel Tank Capacity	110 litres (25 gals.)
Tyre Size	825 x 17 x 10 ply.
Tyre Pressure	6.5 Bar (94 P.S.I.)

Operating instructions & maintenance

TOWING THE MACHINE ON THE HIGHWAY — Before the machine is towed on the highway please ensure that screen transport straps (Item 55. Fig. 1) and conveyor transport stays (Item 55, Fig. 4) are in place. This is **most** important to prevent damage to the machine.

INSTALLATION

Before the machine is put into operation it must stand perfectly level on a firm foundation. Level the machine with a precision spirit level. Ensure the axle, the towing end of the machine and the screen unit are all level.

On your general inspection of the machine, and before starting the engine the following should be checked :

1. Engine fuel and lubrication oil levels (see engine handbook).
2. Hydraulic tank oil level (Item 14. Fig. 6)
3. Control valve levers are in neutral position.
4. All personnel are clear of the Powergrid.
5. All guards are in position.

TO START THE ENGINE

1. To start the engine turn the ignition key (Item 33. Fig. 8) to "start" position and then hold in the start button (Item 38. Fig. 8) until engine starts.
2. A speed control spring (Item 44. Fig. 9) ensures that engine maintains full working speed at all times. The engine will normally start at full speed but it may be started at "tick over speed" by moving the speed control lever on the engine injection pump against the action of the spring and holding it in position while the start button is held in.
4. For further instructions see engine handbook.

RAISING THE SCREEN

Note : Before raising or lowering the screen make sure that the screen is free of material.

The screen is raised as follows :

1. Remove the safety pin (Item 5. Fig. 7) from the screen control valve (Item 3. Fig.7)
2. Move the lever of the control valve up and raise the screen enough to allow the support arm pins (Item 40. Fig. 1) to be removed.
3. With support arm pins removed, raise the screen to the required position and move control valve lever to the neutral position.
4. Insert support arm pins, replace spring pins (VERY IMPORTANT) and move control valve lever down so that weight of screen rests on support arm pins.

Note : The control valve safety pin must be kept in position at all times (except when raising the screen) to prevent the operator inadvertently raising the screen with the support arm pins in position.

Important : The Powergrid must never be moved with the screen in the raised position.

Important : Before screen is put into operation the screen transport straps (Item 55, Fig. 1) must be disconnected.

Always start the conveyor first. This is done by moving the conveyor control valve lever (Item 19. Fig. 7) downwards to the end of its stroke. Move the screen motor control valve lever (Item 3. Fig. 7) downwards to the end of its stroke to run the screen motor.

LOWERING THE SCREEN

To lower the screen reverse the procedure for raising, noting that the screen is lowered by moving the control valve lever downwards.

STOPPING THE MACHINE

1. The conveyer belt and screen should be free of material before the machine is stopped.
2. Always stop the screen first, by moving the screen control valve lever (Item 3. Fig. 7) to the neutral position.
3. Move the conveyor control valve lever (Item 19. Fig. 7) to the neutral position to stop the conveyor.
4. Stop the engine by pulling the stop cable (Item 39. Fig. 9) on the control panel.
5. Always switch off ignition key (Item 33. Fig.9)

RAISING MACHINE FOR TOWING

The machine is raised, for towing, by a hydraulic jacking leg (Item 44. Fig. 3) which is operated as follows :

1. Move the lever of the four way valve (Item 31. Fig.7) up.
2. Remove safety pin (Item 5. Fig. 7) from the conveyor control valve (Item 19. Fig. 7)
3. Move the lever of the conveyor control valve (Item 19. Fig. 7) up and raise the machine to the required height.
4. When machine is hitched up to the tow truck, lower the machine and retract the jacking leg by first moving the lever of the four way valve (Item 31. Fig. 7) down and then moving the lever of the conveyor control valve (Item 19. Fig. 7) up.
5. When jacking leg is fully retracted move the lever of the four way valve (Item 31. Fig. 7) back to the central (neutral) position. — This is MOST IMPORTANT as the jacking leg will fall down during towing unless the four way valve is kept in the neutral position.
6. Replace safety pin in conveyor control valve (Item 19. Fig.7) (VERY IMPORTANT) To lower the machine after towing reverse the procedure for raising, remembering that the machine is lowered by moving the lever of the four way valve (Item 67. Fig.6) down.

Note : The control valve safety pin must be kept in position at all times.

TENSIONING CONVEYOR BELT

Correct conveyor belt tension should be maintained at all times. Adjustment may be carried out by means of the belt adjusters. (Item 13. Fig. 4)

HYDRAULIC SYSTEM

Keep a constant check on the level of oil in the hydraulic tank by observing the indicator (Item 14. Fig. 6) regularly. If the oil in the tank falls below the level of the red line on the indicator it should be topped up immediately.

The oil in the hydraulic system should be changed at 1500 hour intervals and it is recommended that the filter elements between the tank and the hydraulic pumps should be changed when an oil change is being carried out.

The return line filter element (Item 19. Fig. 6) should be changed when the needle on the small pressure gauge crosses the lower edge of the red indicator fixed to the face of the gauge.

Important : When changing or topping up the oil in the hydraulic system or when checking the filter element the utmost cleanliness should be observed at all times as impurities in the oil will ruin the system.

Note : If the hydraulic system requires any major repairs contact an agent approved by Powerscreen International Distribution Ltd. immediately. Hydraulic pumps, motors, valves etc. must not be tampered with, otherwise the guarantee will be invalidated.

The filling cap of the hydraulic tank should be cleaned every 250 hours. The air vents in the cap must be kept open to allow the hydraulic system to "breathe" — IMPORTANT.

Check the condition of all parts of the hydraulic system regularly.

SCREEN MAINTENANCE

The screen should always be run at the correct speed, for optimum operation, i.e. 1100 to 1150 r.p.m. empty.

Regular checks should be carried out on screen meshes and all screen bolts.

When renewing screen meshes check the condition of rubber cushions.

Safety First

1. All guards must be in position when machine is in operation.
2. Always wear a safety helmet when in vicinity of machine when it is in operation.
3. Stay clear of reject side of screen and end of the conveyor when in operation.
4. Do not carry out any maintenance on machine when it is in operation.
5. Never make any adjustments (e.g. tensioning conveyor belts) when the machine is in operation.
6. Never clean around any moving parts (e.g. conveyor end drums) when machine is in operation.
7. Never operate the hydraulic jacking leg (Item 44, Fig. 3) without first ensuring that all personnel are clear of the Powergrid.

Lubrication

ENGINE LUBRICATION

For details of engine lubrication see engine handbook.

GREASING SCHEDULE

The following greasing schedule should be observed :

Item	Description	Frequency	Grease Gun Strokes
6. Fig. 4.	Tail drum bearings	100 hours	2
4. Fig. 5.	Drive drum bearings	100 hours	2
11. Fig. 2.	Screen bearings	100 hours	2

RECOMMENDED OILS AND GREASES

Engine

Below 0°C
Shell Rotella S 10W
Essolube HDX 10W
Gulflube HD 10W
Mobil Delvac 1210-10W
B.P. Vanellus SAE 10W
Castrol Deusol CRB-10W
Caltex Delo 200-10W

Between 0° and 30°C
Shell Rotella S 20/20W
Essolube HD 20/20W
Gulflube HD 20/20W
Mobil Delvac 1220-20/20W
B.P. Vanellus SAE 20W
Castrol Deusol CRB-20
Caltex Delo 200-20/20W

Above 30°C
Shell Rotella SX 30
Essolube HD 30
Gulflube HD 30
Mobil Delvac 1230-30
B.P. Vanellus SAE 30
Castrol Deusol CRP-30
Caltex Delo 200-30

Hydraulic System

Between 0°C and 30°C
Shell Tellus 37 (32)
Esso Nuto HP 32
Gulf Harmony 44
Mobil DTE 24
B.P. Energol HLP 32
Castrol Hyspin AWS 32
Caltex Regal Oil AR and O

Above 30°C
Shell Tellus 100
Esso Nuto HP 100
Gulf Harmony 66
Mobil DTE Heavy
B.P. Energol HLP 100
Castrol Hyspin AWS 100
Caltex Rando Oil B

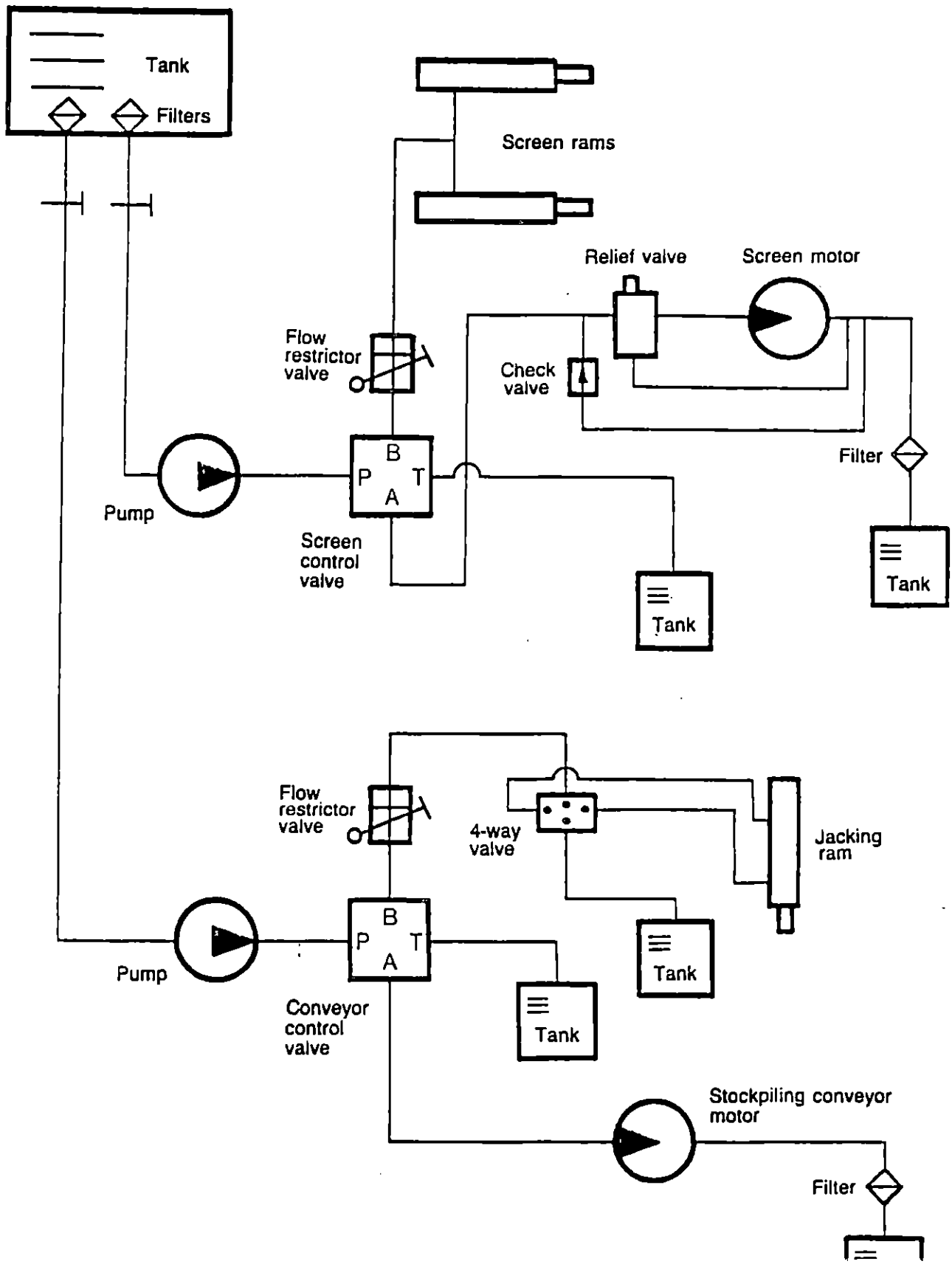
Screen Bearings

Shell Alvania EP2
or equivalent.

All Grease Points
(except screen bearings)

Shell Alvania RA Grease
Esso Beacon 3 Grease
Gulf Crown Grease No. 3
Mobilux 3 Grease
B.P. Energrease LS 3
Castrol Spherol Grease AP 3
Caltex Regal Starfak
Premium 3 Grease

Hydraulic circuit diagram



Spare parts ordering procedure

When ordering spare parts, the following must be carefully observed.

1. State the type of machine and the machine serial number. The serial number may be found on the machine plate or on the first page of this manual.
2. State clearly the Item No. the description and the Fig. No. for the part required.
3. State the quantity required of each part being ordered.
4. State name and address clearly as well as method of delivery required.
5. Engine spare parts should be obtained from your nearest Engine Agent. His Name, Address and telephone No. may be found on the first page of this manual.

N.B. Left & Right Hand of Machine

Left and Right Hand of the machine is obtained by viewing the machine from the tow bar end.

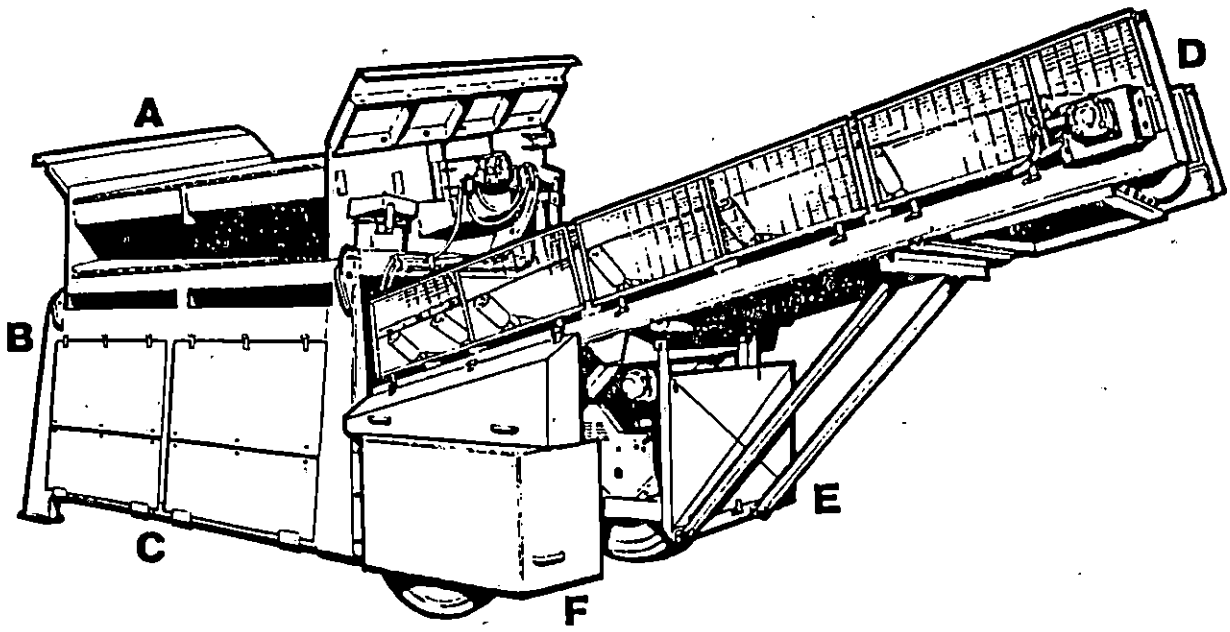
N.B. Left & Right Hand of Screenbox

Left and Right hand of the screenbox is obtained by viewing the screenbox from the reject side.

When purchasing parts customers should, in their own interest, always use genuine Powerscreen International parts.

Parts that have not been supplied by Powerscreen International Distribution Ltd., or Powerscreen of America Inc. cannot be relied upon for correct material, dimensions or finish. Powerscreen International Distribution Ltd., or Powerscreen of America Inc. cannot therefore be responsible for any damage arising from the use of any such parts and the Guarantee will be invalidated.

Index to Spare Parts



Section	Description	Fig. No.
A	Screen box and sub-frame.	1
A	Screen shaft assembly, bearings, flywheels, screen motor.	2
B	Main frame and feeder assembly, jacking leg.	3
C	Conveyor assembly, tail drum	4
D	Conveyor drive, drive drum, hydraulic motor, belt cleaner.	5
E	Power Unit : Hydraulic tank, filters.	6
E	Power Unit : Hydraulic control valves, Hydraulic hoses.	7
E	Power Unit : Hydraulic pump, switch panel, battery, battery leads.	8
E	Power Unit : Frame, engine, diesel tank.	9
E		

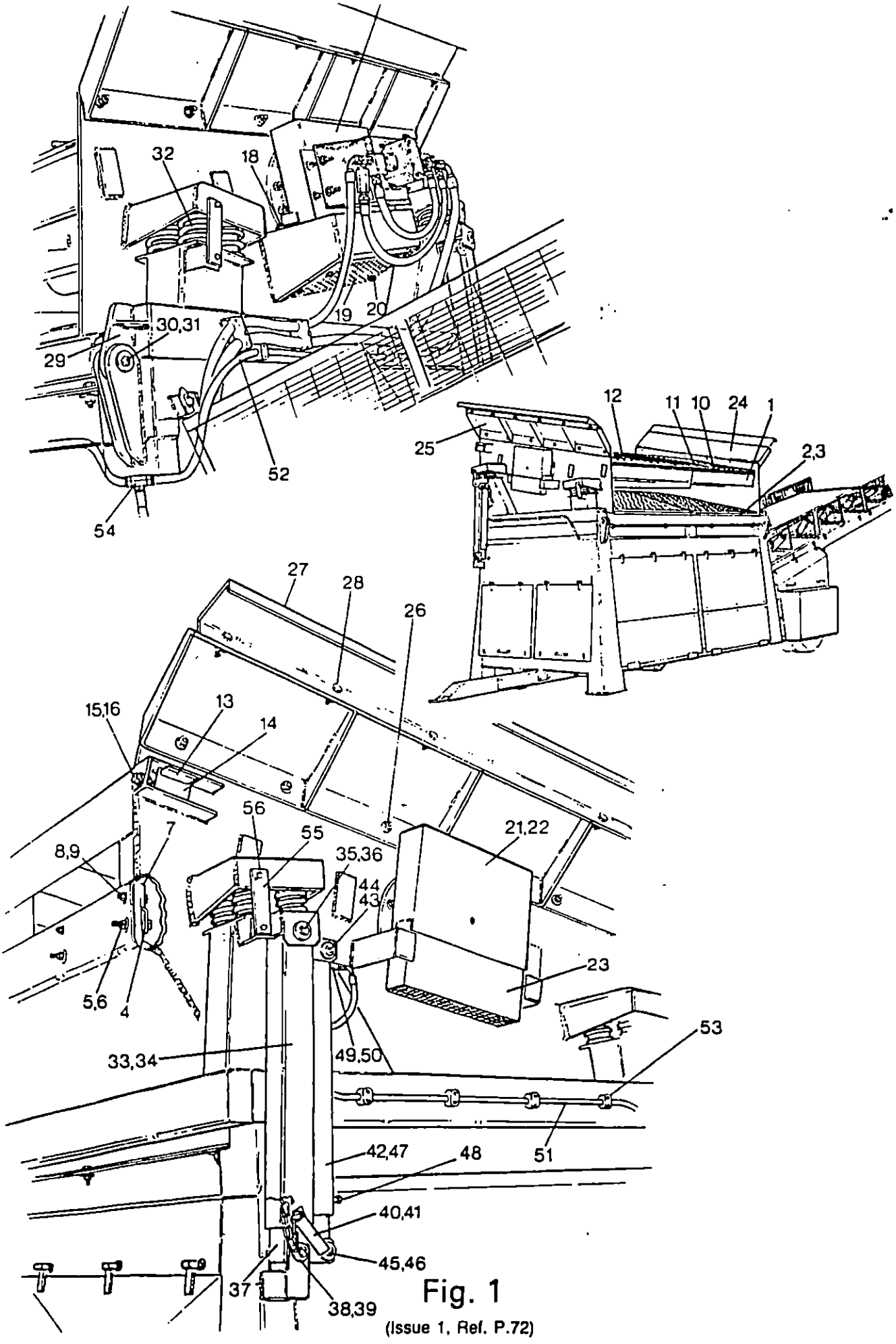


Fig. 1

(Issue 1, Ref. P.72)

KEY TO FIG. 1 (Issue 1, Ref. P.72)

Item	Description	No. Off	Notes
1	Screenbox	1	
2	Bottom deck rubber cushion	8	
3	Bottom deck mesh	2	State Aperture
4	Clamp plate	2	
5	Bolt, nut	8	
6	Hardened washer	8	
7	Clamp plate stopper	8	
8	Nut	8	
9	Washer	8	
10	Top deck rubber cushion	6	
11	Top deck mesh — RH	1	State Aperture
12	Top deck mesh — LH	1	State Aperture
13	Tension bar	2	
14	Tensioner	4	
15	Tension bolt	4	
16	Washer	4	
17	Flywheel guard (motor side)	1	
18	Bolt, nut, washer	4	
19	Lower flywheel guard (motor side)	1	
20	Bolt, washer	4	
21	Flywheel guard — LH	1	
22	Bolt, nut, washer	4	
23	Lower flywheel guard — LH	1	
24	Wing plate — RH	1	
25	Wing plate — LH	1	
26	Bolt, nut, washer	12	
27	Wing plate extension	2	
28	Bolt, nut, washer	12	
29	Screen subframe	1	
30	Hinge pins	2	
31	Spring cotter pins	2	
32	Screen springs	16	
33	Outer support arm — RH	1	
34	Outer support arm — LH	1	
35	Pin	2	
36	Spring pin	2	
37	Inner support arm	2	
38	Pin	2	
39	Spring pin	2	
40	Support arm pin & chain	2	
41	Spring pin	2	
42	Hydraulic cylinder	2	
43	Hyd. Cyl. upper pin	2	
44	Spring pin	2	
45	Hyd. Cyl. lower pin	2	
46	Spring pin	2	
47	Hyd. cylinder seal kit	2	
48	Hyd. Cyl. breather	2	
49	Adaptor	2	
50	Seal	2	
51	Hydraulic hose	1	
52	Hydraulic hose	1	
53	Hose clamp	8	
54	Tee piece	1	
55	Screen transport straps	4	
56	Bolt, nut, washer	8	

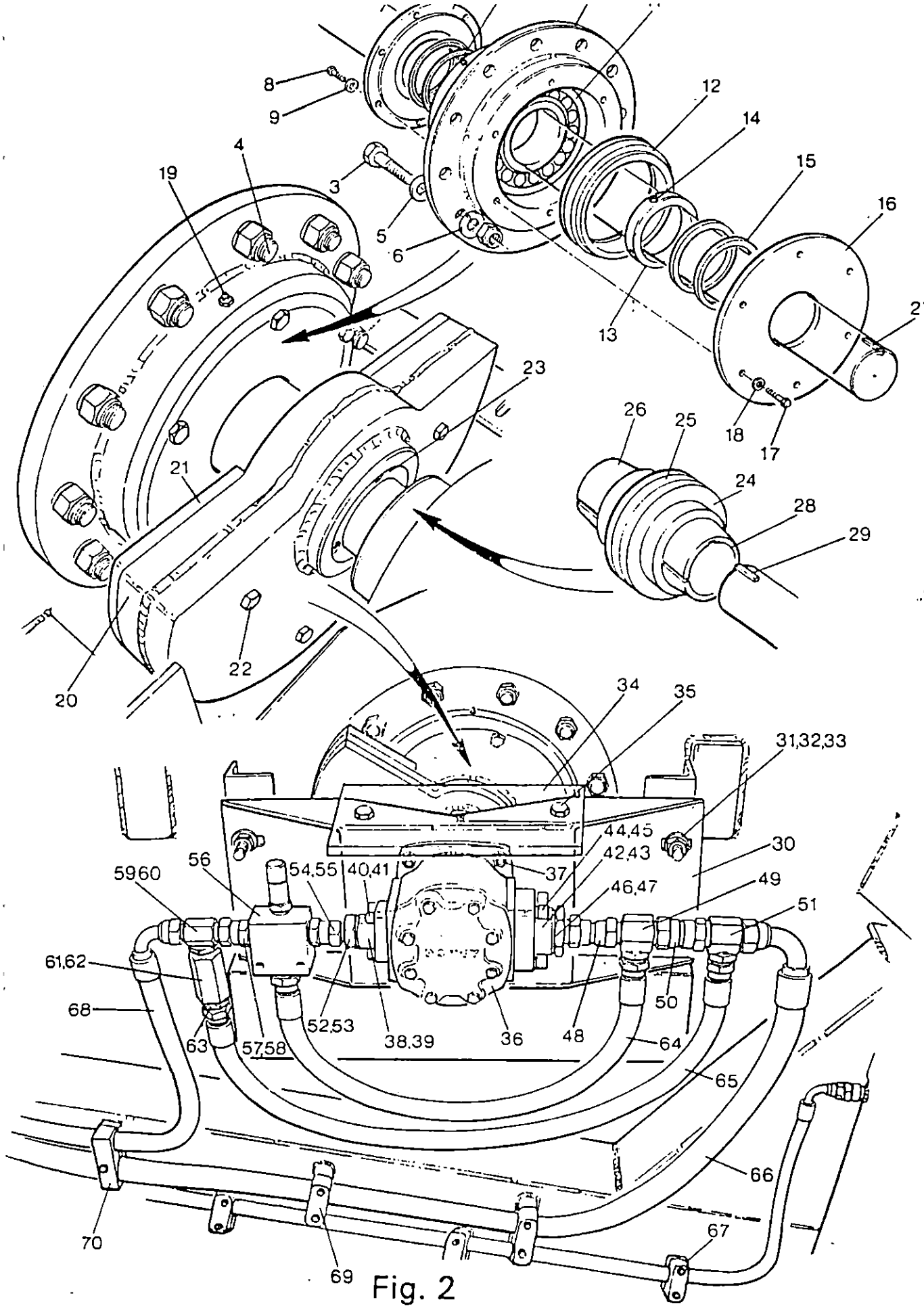


Fig. 2

(Issue 1, Ref. P.72)

KEY TO FIG. 2 (Issue 1, Ref. P72)

Item	Description	No. Off.
1	Screen shaft	1
2	Bearing housing	2
3	Bolt, nut	16
4	Bolt, nut	8
5	Hardened washer	24
6	Spring washer	24
7	Inner bearing cap	2
8	Bolt	12
9	Spring washer	12
10	Inner seal	4
11	Bearing	2
12	Bearing spacing ring	4
13	Bearing retaining ring	1
14	Grub screws	3
15	Outer seal	4
16	Outer bearing cap	2
17	Bolt	12
18	Spring washer	12
19	Grease nipple	2
20	Flywheel	2
21	Half flywheel	2
22	Bolt, nut, washer	8
23	Taperlock centre	2
24	Coupling steel flange	2
25	Coupling centre disc	1
26	Taperlock centre (Screen shaft)	1
27	Key (Screen shaft)	1
28	Taperlock centre (motor)	1
29	Key (motor)	1
30	Motor mtg bracket	1
31	Bolt	4
32	Nut	12
33	Washer	16
34	Coupling guard	2
35	Bolt, washer	4
36	Hydraulic screen motor	1
37	Bolt, nut, washer	4
38	Motor inlet adaptor	1
39	O—ring	1
40	Screws	4
41	Spring washer	4
42	Motor outlet adaptor	1
43	O—ring	1
44	Screws	4
45	Spring washers	4
46	Seal	1
47	Adaptor	1
48	Swivel adaptor	1
49	T—Junction	1
50	Swivel adaptor	1
51	T—Junction	1
52	Seal	1
53	Adaptor	1
54	Swivel adaptor	1
55	Seal	1
56	Pressure relief valve	1
57	Seal	1
58	Swivel adaptor	

Item	Description	No. Off.
59	T—Junction	1
60	Seal	1
61	Check valve	1
62	Seal	1
63	Adaptor	1
64	Hydraulic hose	1
65	Hydraulic hose	1
66	Hydraulic hose	1
67	Hose clamp	4
68	Hydraulic hose	1
69	Hose clamp	2
70	Hose clamp	2

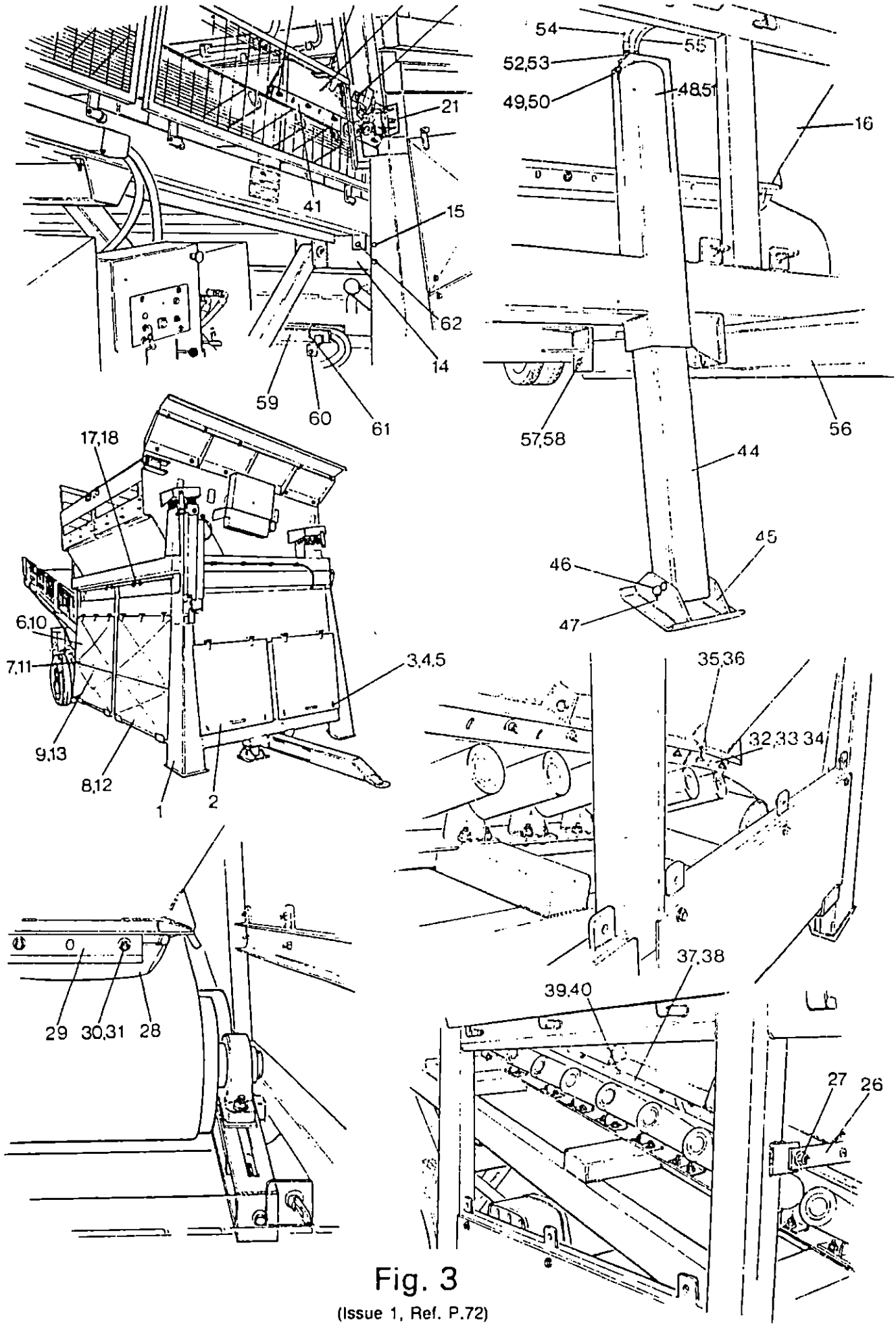


Fig. 3

(Issue 1, Ref. P.72)

KEY TO FIG. 3 (Issue 1, Ref. P72)

Item	Description	No. Off.	Notes
1	Feeder frame	1	
2	Back guard door	2	
3	Door fastener	4	
4	Nut	4	
5	Washer	4	
6	Top side door RH	2	
7	Bolt, washer	6	
8	Bottom side door RH	2	
9	Bolt, washer	6	
10	Top side door LH	2	
11	Bolt, washer	6	
12	Bottom side door LH	2	
13	Bolt, washer	6	
14	Conveyor support channel	1	
15	Bolt, nut, washer	4	
16	Hopper	1	
17	Bolt, nut	14	
18	Tapered washer	14	
19	Hopper extension RH	1	
20	Hopper extension LH	1	
21	Bolt, nut, washer	4	
22	Bolt, nut, washer	2	
23	Guard fastener	2	
24	Nut	2	
25	Washer	2	
26	Hopper side stay	4	
27	Bolt, nut, washer	8	
28	Back rubber	1	
29	Back clamp plate	1	
30	Nut	6	
31	Washer	6	
32	Side rubber	2	
33	Square back side clamp plate RH	2	
34	Square back side clamp plate LH	2	
35	Nut	20	
36	Washer	20	
37	Sloped back side clamp plate RH	2	
38	Sloped back side clamp plate LH	2	
39	Nut	4	
40	Washer	4	
41	Hopper extension clamp plate	2	
42	Nut	8	
43	Washer	8	
44	Jacking leg—inner	1	
45	Jacking leg foot	1	
46	Pin	1	
47	Spring pin	1	
48	Jacking leg hyd. cylinder	1	
49	Upper hyd. cyl. pin	1	
50	Spring pin	1	
51	Hyd. cyl. seal kit	1	
52	Seal	2	
53	Adaptor	2	
54	Hydraulic hose	1	
55	Hydraulic hose	1	
56	Towbar	1	
57	Towbar pin	2	
58	Spring pin	2	

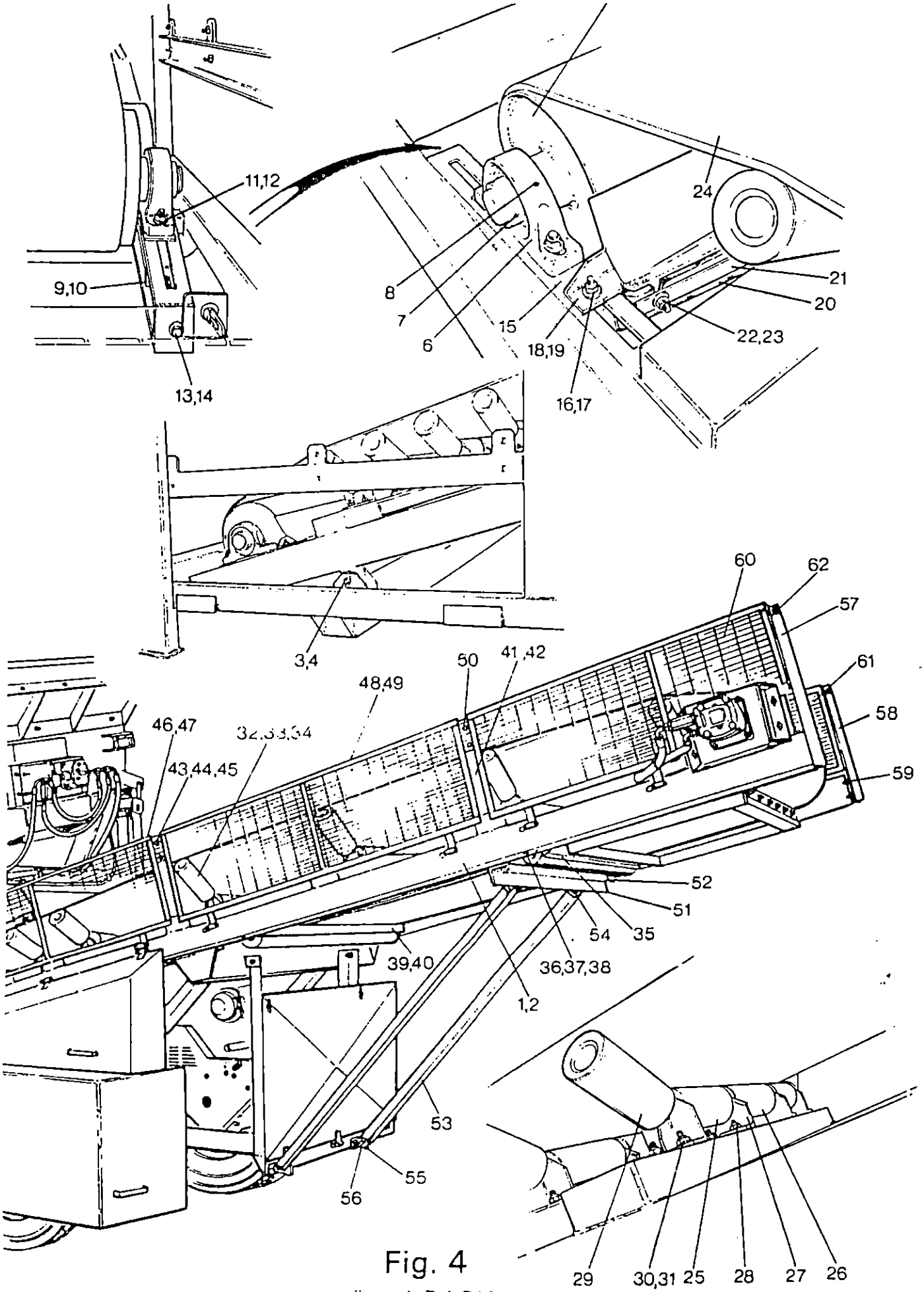


Fig. 4

(Issue 1. Ref. P.72)

KEY TO FIG. 4 (Issue 1, Ref. P72)

Item	Description	No. Off.	Notes
1	Conveyor assy. complete	1	
2	Conveyor main frame	1	
3	Pin	2	
4	Spring pins	2	
5	Tail drum	1	
6	Tail drum bearing	2	
7	Bearing grub screw	4	
8	Bearing grease nipple	2	
9	Bearing adjuster shoe — RH	1	
10	Bearing adjuster shoe — LH	1	
11	Nut	4	
12	Washer	4	
13	Adjuster bolt	2	
14	Washer	2	
15	Drum scraper mtg. plates	2	
16	Nut	2	
17	Washer	2	
18	Drum scraper (complete)	1	
19	Drum scraper frame	1	
20	Drum scraper rubber strip	1	
21	Drum scraper clamp plate	2	
22	Nut	6	
23	Washer	6	
24	Conveyor belt	1	
25	Centre roller — outer	36	
26	Centre roller	18	
27	Centre roller bracket	36	
28	Bolt, nut, washer	72	
29	30° bracket with side roller	32	
30	Nut	64	
31	Washer	64	
32	45° bracket with side roller	6	
33	Nut	12	
34	Washer	12	
35	Return roller	4	
36	U-bolts	8	
37	Nut	16	
38	Washer	16	
39	Cleaning angle	4	
40	Bolt, nut, washer	8	
41	Guard fastener mtg. channel	2	
42	Bolt, nut, washer	2	
43	Guard fastener	2	
44	Nut	2	
45	Washer	2	
46	Conveyor lower guard — RH	1	
47	Conveyor lower guard — LH	1	
48	Conveyor centre guard — RH	1	
49	Conveyor centre guard — LH	1	
50	Bolt, nut, washer	4	
51	Transport stay mtg. angle	1	
52	Bolt, nut, washer	2	
53	Transport stays	2	
54	Bolt, nut, washer	4	
55	Stay mtg. bracket	2	
56	Bolt, nut, washer	2	
57	Guard support angle — RH	1	
58	Guard support angle — LH	1	

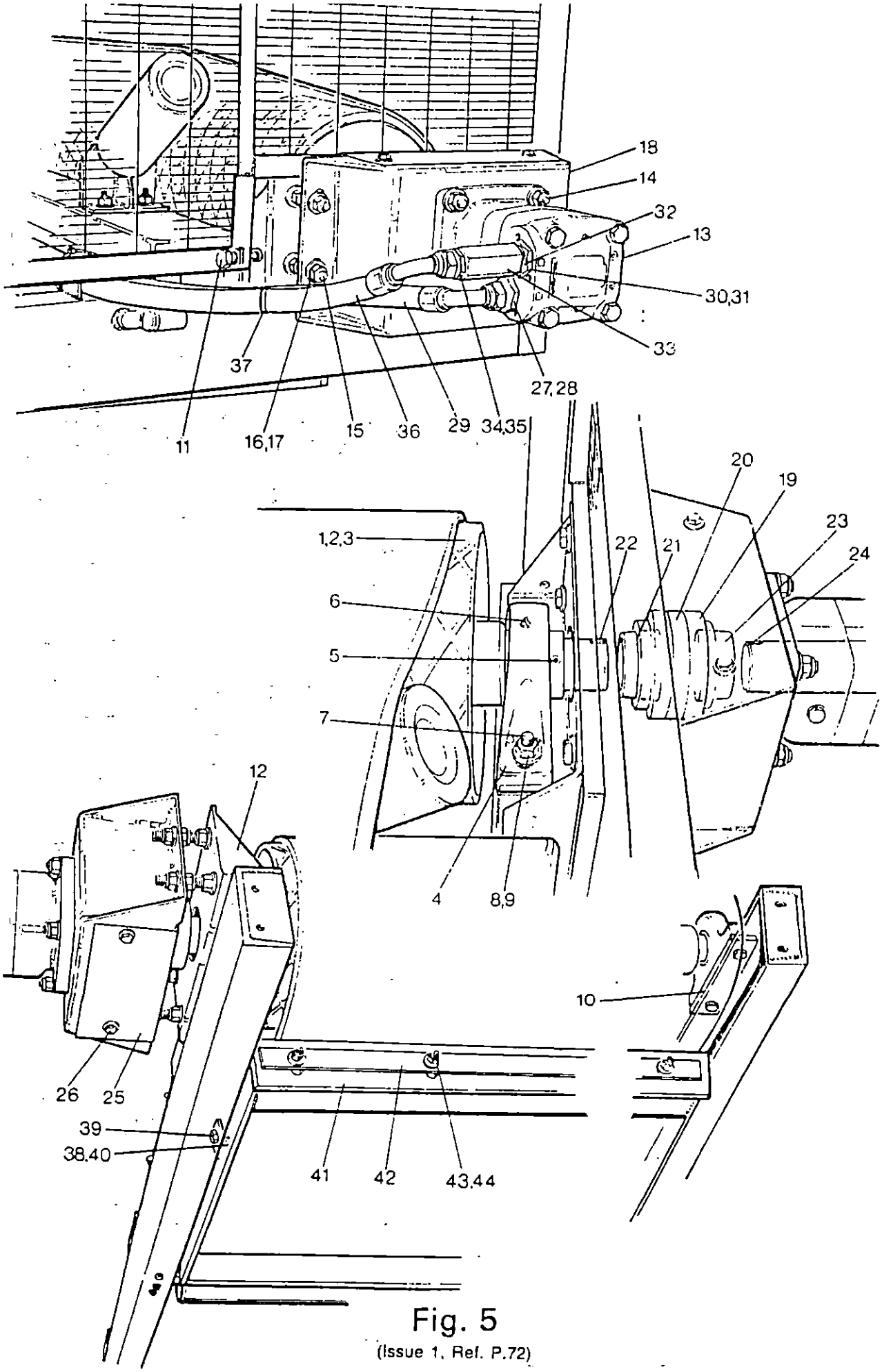


Fig. 5

(Issue 1, Ref. P.72)

KEY TO FIG. 5 (Issue 1. Ref. P72)

Item	Description	No. Off.	Notes
1	Drive drum (lagged)	1	
2	Drive drum lagging	1	
3	Lagging solution	1	
4	Bearing	2	
5	Bearing grub screw	4	
6	Bearing grease nipple	2	
7	Bearing plate	2	
8	Nut	4	
9	Washer	4	
10	Bearing spacing plate	1	
11	Adjuster bolt	2	
12	Mounting Bracket	1	
13	Hydraulic motor	1	
14	Bolt, nut, washer	4	
15	Bolt	4	
16	Nut	12	
17	Washer	16	
18	Hydraulic motor mtg. brk.	1	
19	Coupling steel flange	2	
20	Coupling centre disc	1	
21	Taperlock centre (drum)	1	
22	Key (drum)	1	
23	Taperlock centre (motor)	1	
24	Key (motor)	1	
25	Coupling guard	2	
26	Bolt, washer	4	
27	Seal	1	
28	Adaptor	1	
29	Hydraulic hose	1	
30	Seal	1	
31	Adaptor	1	
32	Seal	1	
33	Non-return valve	1	
34	Seal	1	
35	Adaptor	1	
36	Hydraulic hose	1	
37	Plastic clip	4	
38	Belt cleaner (complete)	1	
39	Bolt, nut, washer	2	
40	Belt cleaner frame	1	
41	Belt cleaner plastic strip	1	
42	Clamp plate	1	
43	Nut	7	
44	Washer	7	

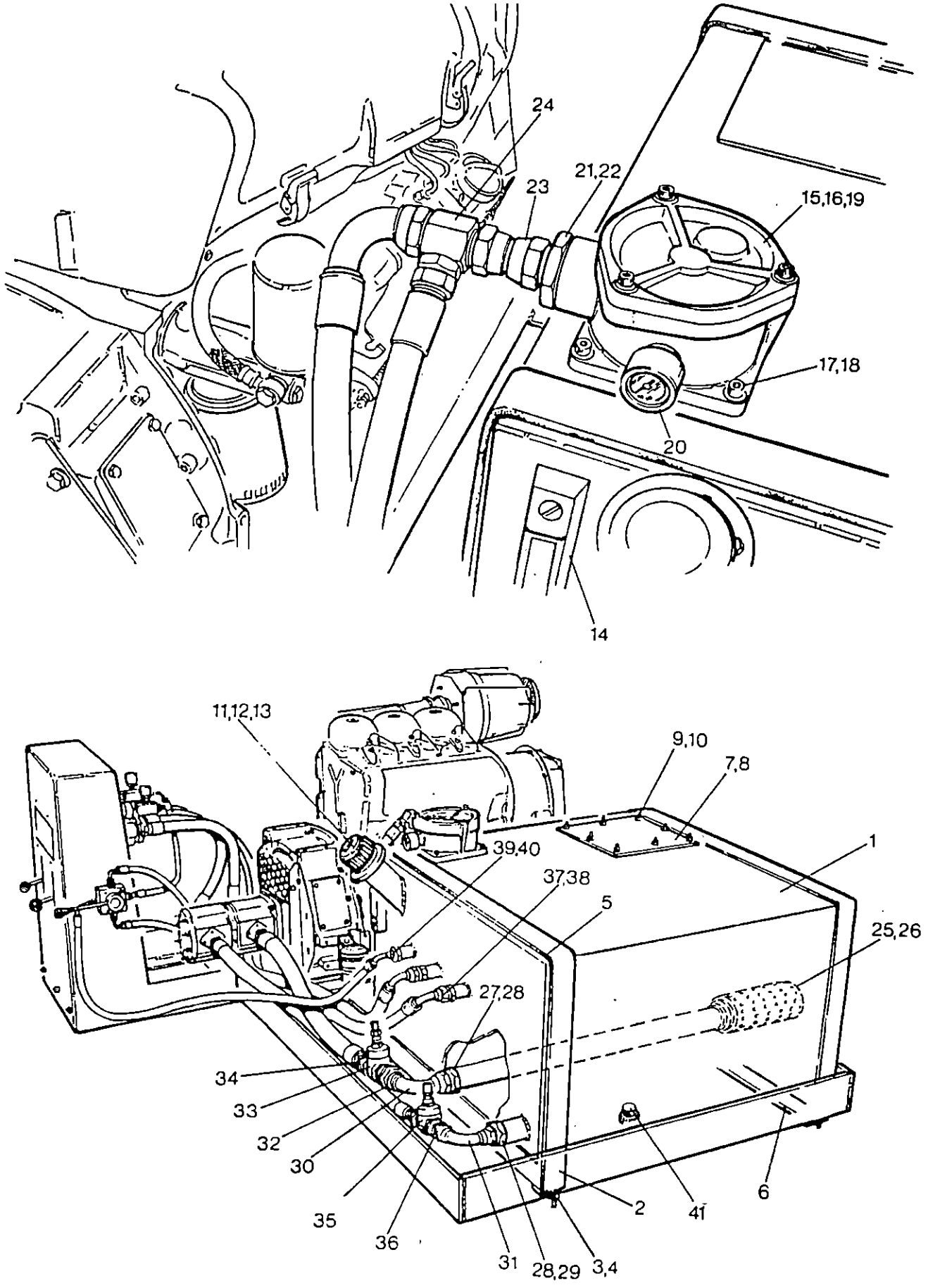


Fig. 6

(Issue 1, Ref. P.72)

KEY TO FIG. 6 (Issue 1, Ref. P.72)

Item	Description	No. Off.	Notes
1	Hydraulic tank	1	
2	Steel holding strap	2	
3	Nut	4	
4	Washer	4	
5	Top rubber spacer	2	
6	Bottom rubber spacer	2	
7	Tank cover plate	1	
8	Sealer	1	
9	Nut	8	
10	Washer	8	
11	Filler cap	1	
12	Gasket	1	
13	Bolt, nut	6	
14	Hydraulic oil indicator	1	
15	Tank top filter	1	
16	Gasket	1	
17	Nut	4	
18	Washer	4	
19	Filter element	1	
20	Filter gauge	1	
21	Adaptor	1	
22	Seal	1	
23	Swivel adaptor	1	
24	T—junction	1	
25	Suction filter	2	
26	Adaptor	2	
27	Adaptor	1	
28	Seal	2	
29	Adaptor	1	
30	Elbow (1¼")	1	
31	Elbow (1")	1	
32	Adaptor	1	
33	Gate valve (1¼")	1	
34	Adaptor	1	
35	Gate valve (1")	1	
36	Adaptor	2	
37	Adaptor	2	
38	Seal	2	
39	Adaptor	1	
40	Seal	1	
41	Stopper	1	

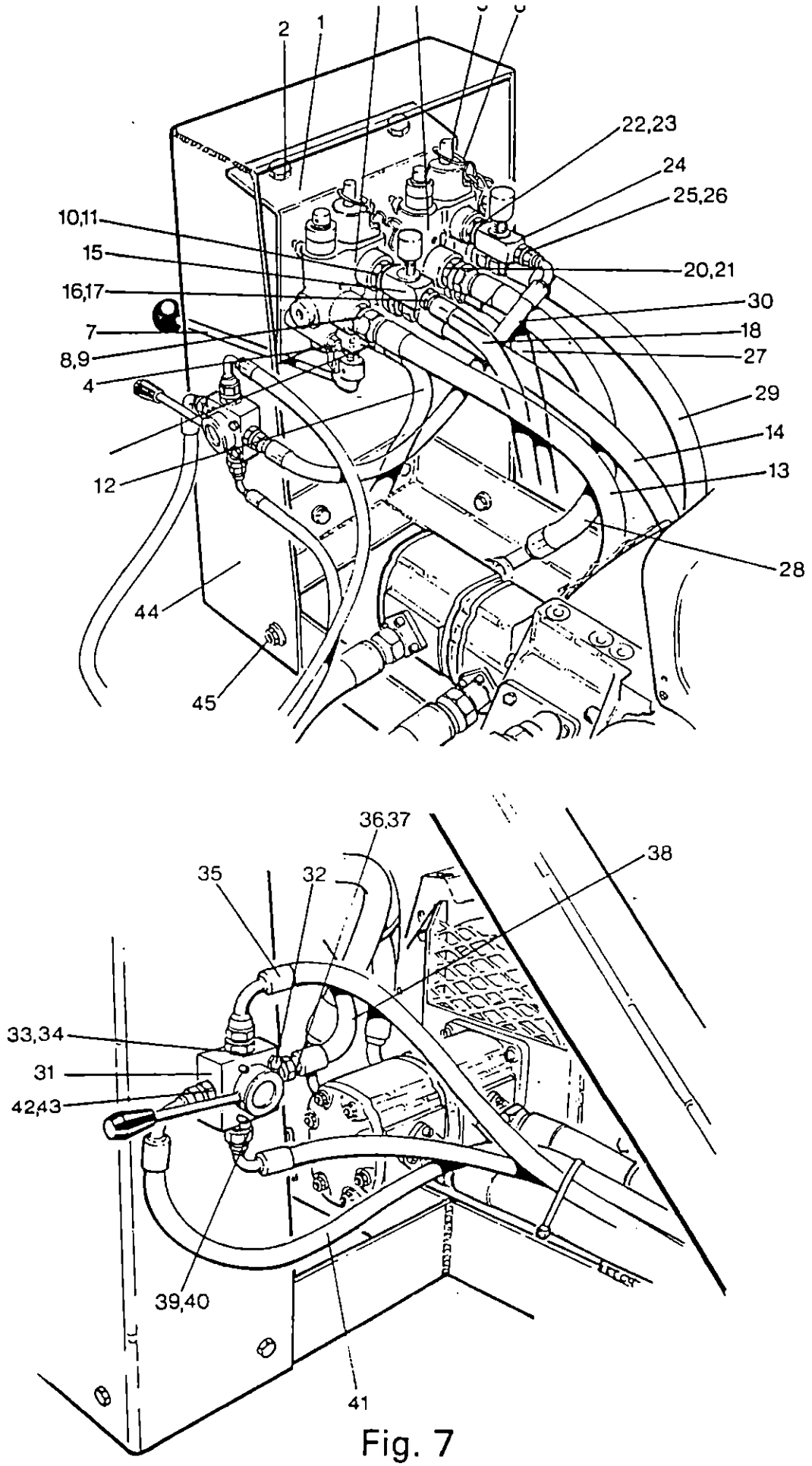


Fig. 7

(Issue 1, Ref. P.72)

KEY TO FIG. 7 (Issue 1, Ref. P.72)

Item	Description	No. Off	Notes
1	Control valve base plate	1	
2	Bolt, nut, washer	4	
3	Screen motor control valve	1	
4	Bolt, nut, washer	6	
5	Safety pin	2	
6	Pin retaining chain	2	
7	Control valve handle	2	
8	Adaptor	3	
9	Seal	3	
10	Adaptor	1	
11	Seal	1	
12	Hydraulic hose	1	
13	Hydraulic hose	1	
14	Hydraulic hose	1	
15	Flow restrictor valve	1	
16	Adaptor	1	
17	Seal	1	
18	Hydraulic hose	1	
19	Conveyor control valve	1	
20	Adaptor	3	
21	Seal	3	
22	Adaptor	1	
23	Seal	1	
24	Flow restrictor valve	1	
25	Adaptor	1	
26	Seal	1	
27	Hydraulic hose	1	
28	Hydraulic hose	1	
29	Hydraulic hose	1	
30	Hydraulic hose	1	
31	Four way valve	1	
32	Bolt, nut, washer	2	
33	Seal	1	
34	Adaptor	1	
35	Hydraulic hose	1	
36	Seal	1	
37	Adaptor	1	
38	Hydraulic hose	1	
39	Seal	1	
40	Adaptor	1	
41	Hydraulic hose	1	
42	Seal	1	
43	Adaptor	1	
44	Control Panel stand	1	
45	Bolt, nut, washer	5	

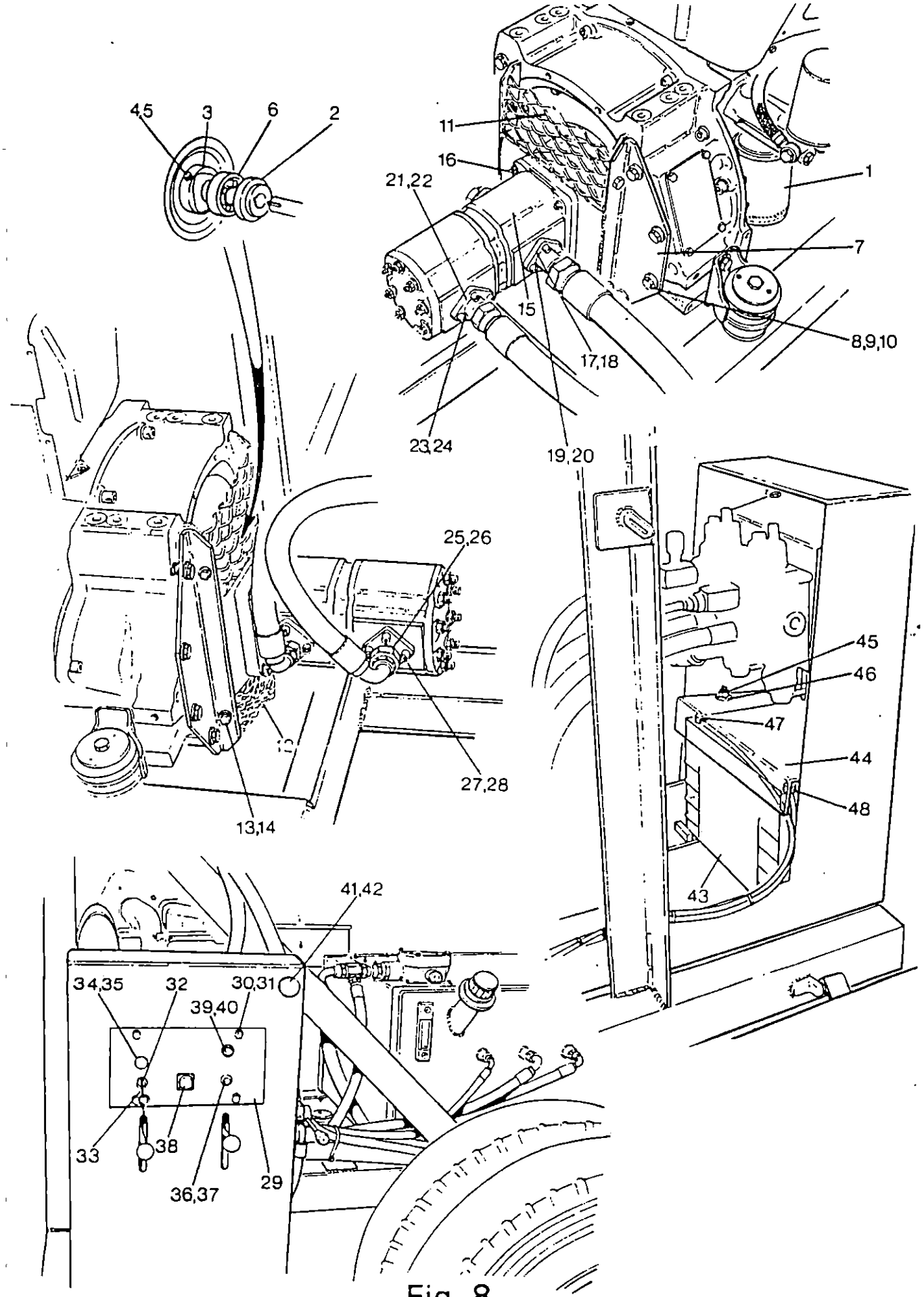


Fig. 8

(Issue 1, Ref. P.72)

KEY TO FIG. 8 (Issue 1, Ref. P.72)

Item	Description	No. Off.	Notes
1	Oil filter element	1	
2	Coupling steel flange (pump)	1	
3	Flywheel coupling	1	
4	Bolt	4	
5	Spring washer	4	
6	Coupling centre disc	1	
7	Hydraulic pump mtg. bracket	1	
8	Bolt	8	
9	Washer	8	
10	Spring washer	8	
11	Upper mesh guard	1	
12	Lower mesh guard	1	
13	Bolt, washer	4	
14	Spring washer	4	
15	Hydraulic pump	1	
16	Bolt, nut, washer	4	
17	Inlet adaptor	1	
18	O-ring	1	
19	Screw	4	
20	Spring washer	4	
21	Inlet adaptor	1	
22	O-ring	1	
23	Screws	4	
24	Spring washer	4	
25	Outlet adaptor	2	
26	O-ring	2	
27	Screw	8	
28	Spring washer	8	
29	Switch panel (complete with wiring loom)	1	
30	Bolt	4	
31	Spring washer	4	
32	Ignition switch (complete)	1	
33	Ignition key	1	
34	Ignition light (complete)	1	
35	Ignition light bulb	1	
36	Engine oil pressure light	1	
37	Oil pressure light bulb	1	
38	Starter switch (complete)	1	
39	Fuse holder	1	
40	Fuse	1	
41	Stop cable	1	only from m/c 7200154
42	Stop cable clamp	1	only from m/c 7200154
43	Battery	1	
44	Battery box lid	1	
45	Nut	2	
46	Washer	2	
47	Battery lead—positive	1	
48	Battery lead—negative	1	

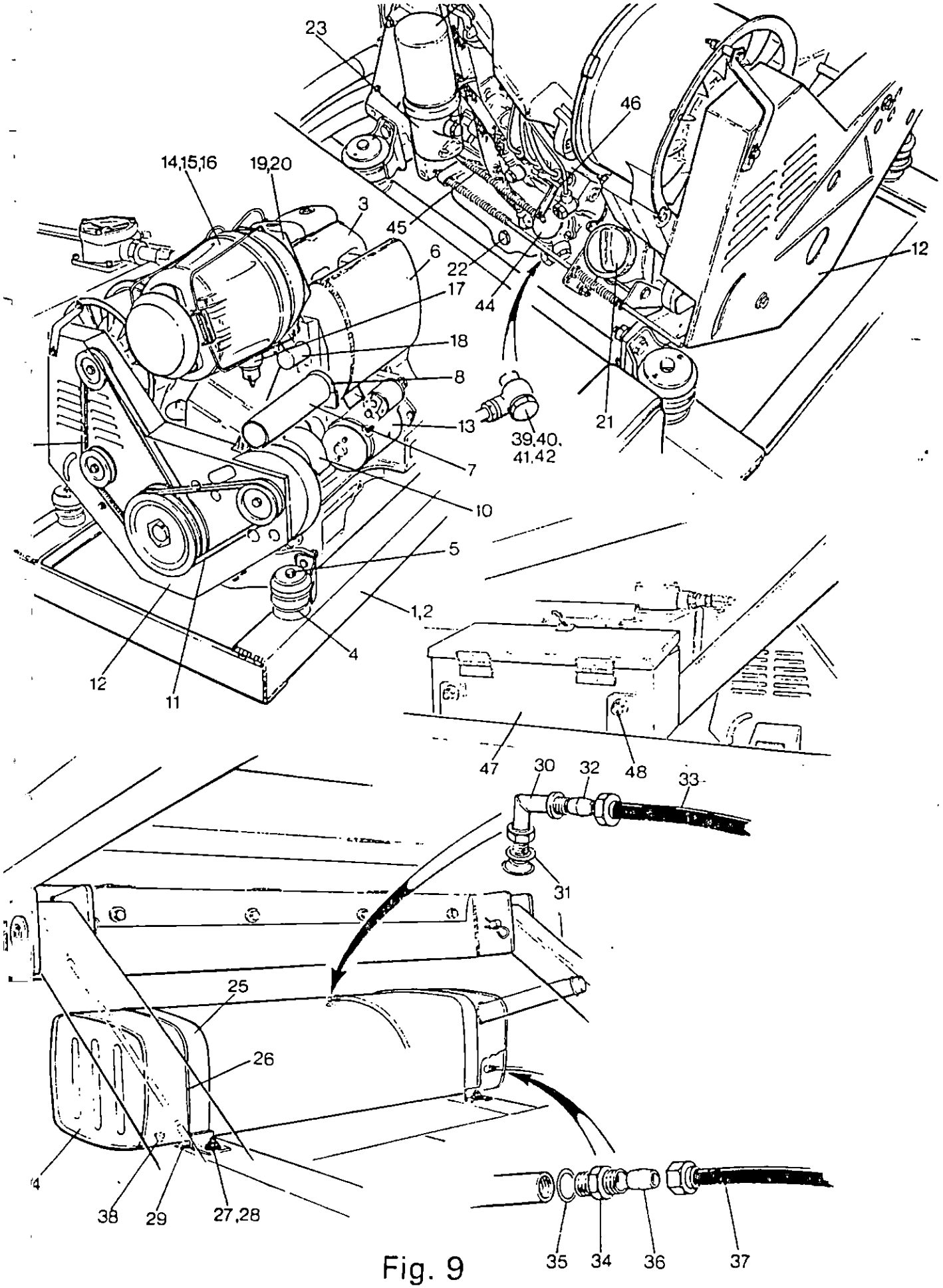


Fig. 9

(Issue 1, Ref. P.72)

KEY TO FIG. 9 (Issue 1, Ref. P.72)

Item	Description	No. Off.	Notes
1	Power unit base frame	1	
2	Bolt, nut, washer	4	
3	Engine	1	
4	Engine rubber mounting	4	
5	Bolt, nut, washer	4	
6	Exhaust silencer	1	
7	Exhaust pipe	1	
8	Exhaust clamp	1	
9	Air blower V-belt	1	
10	Alternator	1	
11	Alternator V-belt	1	
12	V-belt guard	1	
13	Starter motor	1	
14	Air cleaner	1	
15	Air cleaner element	1	
16	Air cleaner safety element	1	
17	Vacuator valve	1	
18	Restriction indicator	1	
19	Air cleaner hose	1	
20	Jubilee clip	2	
21	Oil filler cap	1	
22	Oil drain plug	1	
23	Oil Filter element	1	
24	Diesel tank	1	
25	Steel holding straps	2	
26	Nut	4	
27	Washer	4	
28	Top rubber spacer	2	
29	Bottom rubber spacer	2	
30	90° male stud coupling	1	
31	Copper washer	1	
32	Ferrule	1	
33	Fuel return pipe	1	
34	Stud coupling	1	
35	Copper washer	1	
36	Ferrule	1	
37	Fuel supply pipe	1	
38	Drain cap	1	
39	Coupling	1	
40	Ferrule	1	
41	Banjo unit	1	
42	Banjo eye	1	
43	Fuel filter element	1	
44	Fuel lift pump	1	
45	Speed control spring	1	
46	Spring mounting bracket	1	
47	Tool box	1	
48	Bolt, nut, washer	2	

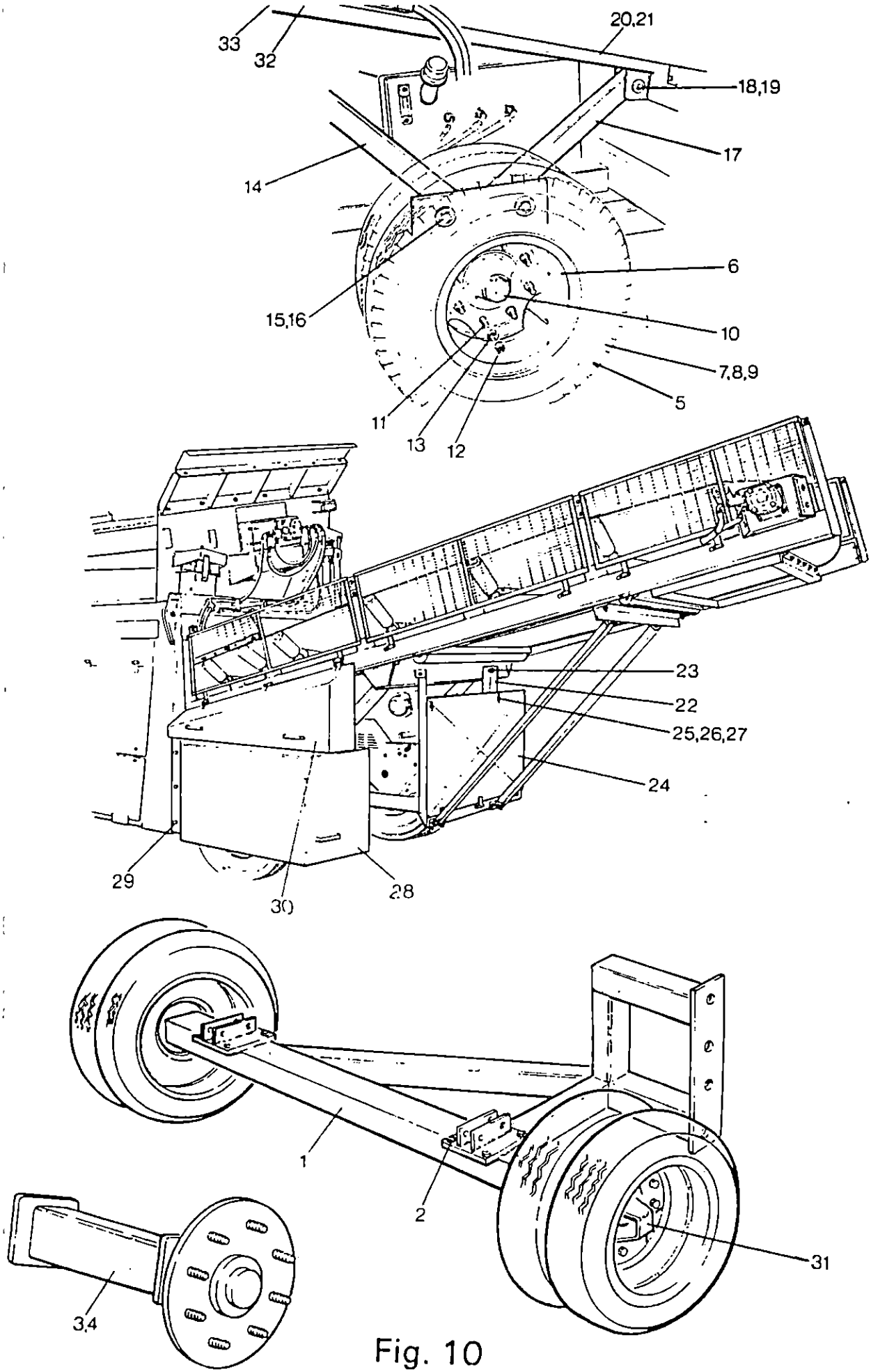


Fig. 10

(Issue 1, Ref. P.72)

KEY TO FIG. 10 (Issue 1, Ref. P.72)

Item	Description	No. Off.	Notes
1	Axle (without brakes)	1	
2	Bolt, nut, washer	8	
3	Wheel hub (complete)	2	
4	Wheel hub bearing (set)	2	
5	Wheel (complete)	4	
6	Wheel rim	4	
7	Tyre	4	
8	Tube	4	
9	Wheel rim rubber flap	4	
10	Hub cap	2	
11	Wheel stud	16	
12	Wheel nut	16	
13	Cone washer	16	
14	Long strut	2	
15	Pin	4	
16	Spring pin	4	
17	Short strut	2	
18	Pin	4	
19	Spring pin	4	
20	Engine cover plate	1	
21	Bolt, nut, washer	8	
22	Front engine guard frame	1	
23	Bolt, nut, washer	4	
24	Power unit guard door	1	
25	Guard fastener	2	
26	Nut	2	
27	Washer	2	
28	Wheel guard	1	
29	Bolt, nut, washer	7	
30	Upper wheel guard	1	
31	Wheel buffer brkt.	1	
32	Plastic clips	3	
33	Hose channel lid	1	

IMPACTOR CRUSHER

OPERATION AND MAINTENANCE

Telsmith Impactor Crusher

Provides high production crushing with high reduction ratios.

A Telsmith Impactor is an excellent choice for primary crushing when a high ratio of reduction (to 40 to 1), cubical product, and a percentage of fines are desired, and the material to be crushed is relatively non-abrasive. Product size as small as 3"x0" or as large as 12"x0" at capacities up to 3500 tph can be obtained.

Like all crushers of this type, Telsmith Impactors are generally not suitable for crushing highly silicious rock or hard igneous material. It is important to note that proper application is critical with impact type crushers. Certain facts must be studied *prior* to selection of an impactor for any particular application. The criteria includes the Work Index, Abrasion Index and Total Silicate Equivalent of the material to be crushed.

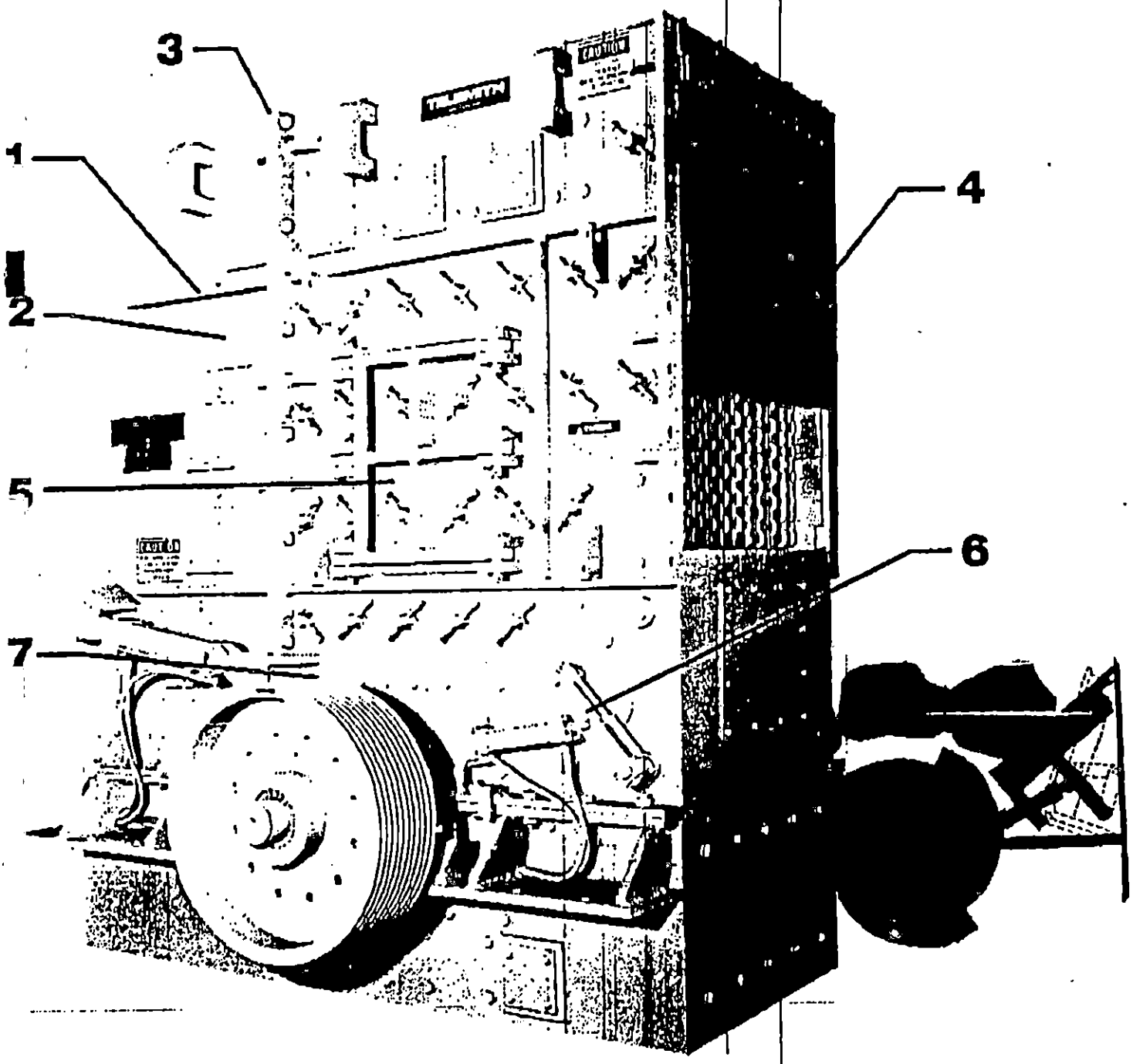
By their very nature, impactors can be high maintenance machines. Our engineers recognized this from the beginning, and designed the Telsmith Impactor line to utilize materials to extend the life of wear items. Fatigue stress analysis has been performed on the shaft and other key components to assure they meet design requirements. In addition, excellent access and design features have been provided to make necessary servicing as easy and convenient as possible. The result: when properly applied, a Telsmith Impactor will offer greater flexibility, have significantly less maintenance requirements and lower operating costs than are usually associated with this type of machine.

The following are features found in every Telsmith Impactor:

- Electrically-welded steel frame is ribbed in critical stress areas.
- Half of upper section of crusher opens hydraulically.
- Access doors on each side of machine allow easy entry for small maintenance jobs.
- Hydraulically-movable feed plate permits quick unlocking of low-bridged rock.
- Manganese steel plate liners are 80 to 85% interchangeable. Wedge/Spud lock speeds removal and replacement of liners.
- Spira-Sleeve breaker bar sleeves are all manganese steel. Spiral ribs promote rotation when struck by rock, prevent freezing on bar.
- Adjustable breaker bar controls size of end product.
- Largest impact chamber in the industry, size for size.
- Rotor assembly has high crushing inertia.
- Cast manganese impeller bars are rigidly fixed and supported on back side by massive fabricated steel rotor.
- Rotor is fabricated from alloy steel plate. Rotor is statically and dynamically balanced at factory to prevent vibration.
- Ring-fedder locking rings lock rotor to shaft ... permit easy removal of shaft or rotor.
- High alloy heat treated shaft.
- Split bearing housing permits removal of bearings without taking rotor out of machine.

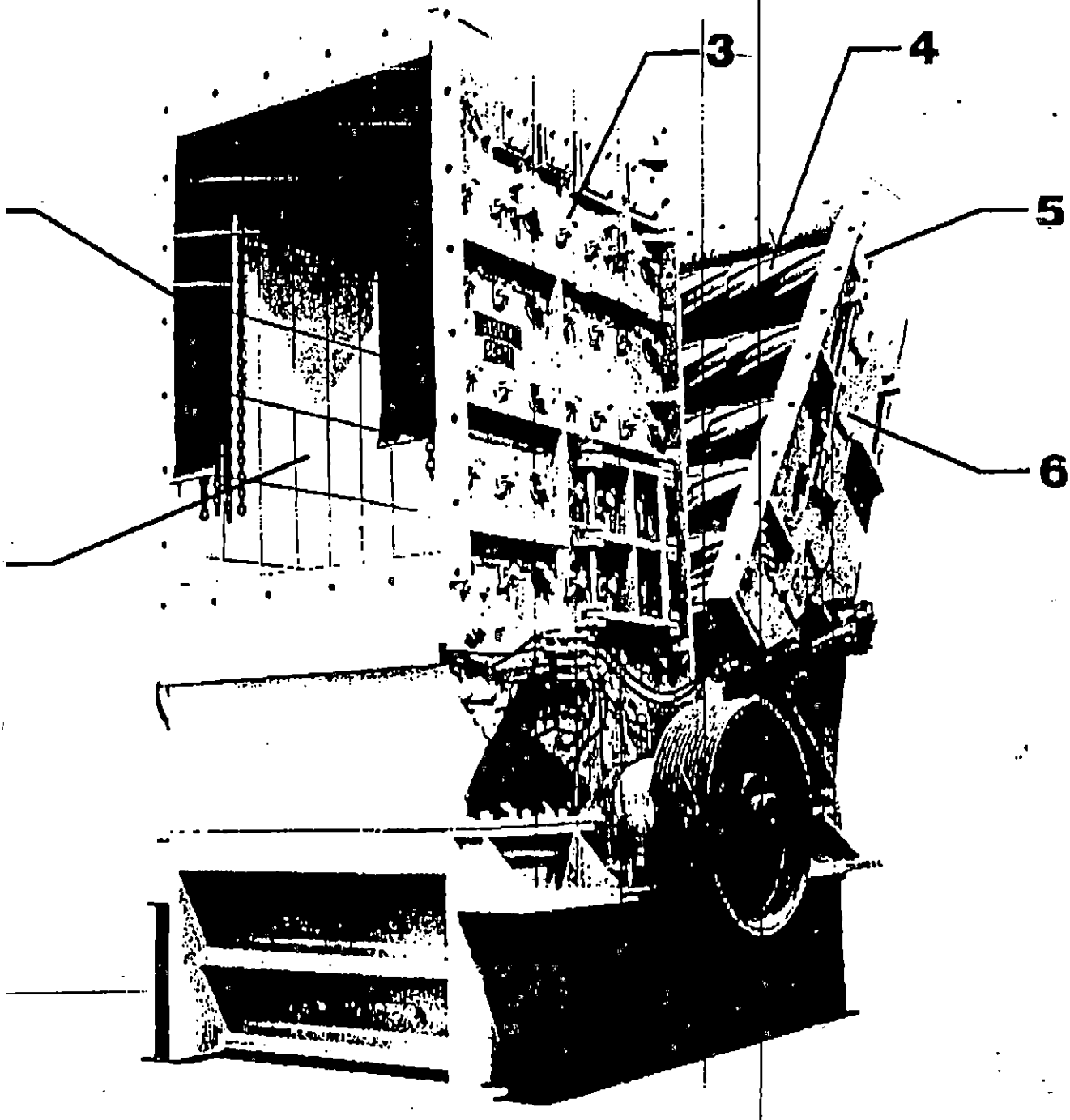
TH OUTSIDE STO Y

Easy access and design features slash maintenance time.



HE IMPACT CHAMBER

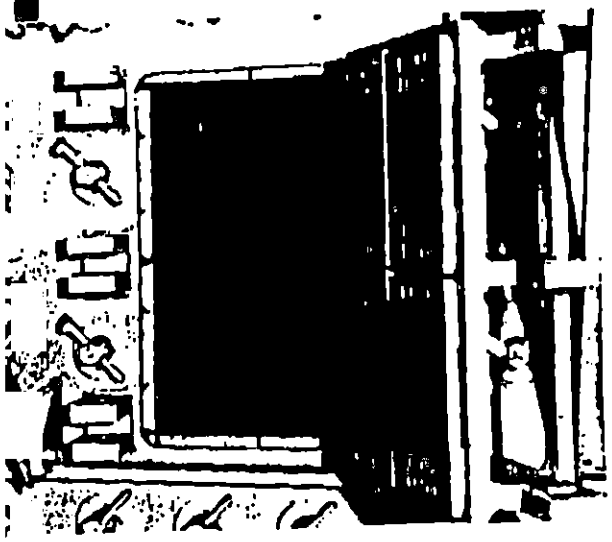
components made of materials that
tard wear. Components are designed for
asy removal and replacement.



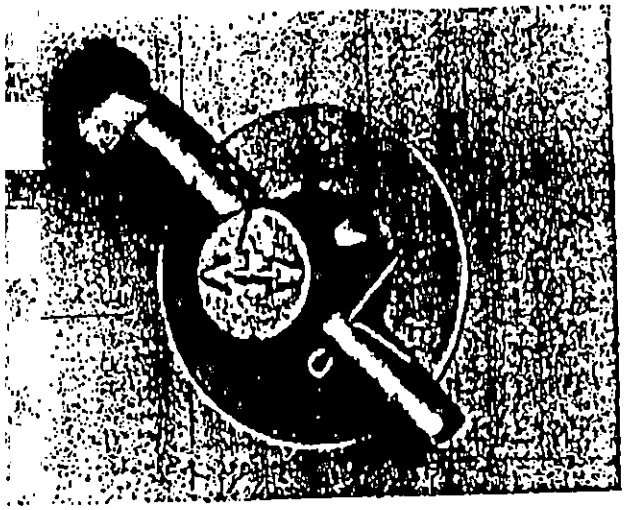
'elsmith Impactors feature the largest im-) t chamber in the industry.

Crusher liners are made of cast manganese ; el. This material has a Brinnell index of) to 220, but when impacted will work ıarden up to 300.

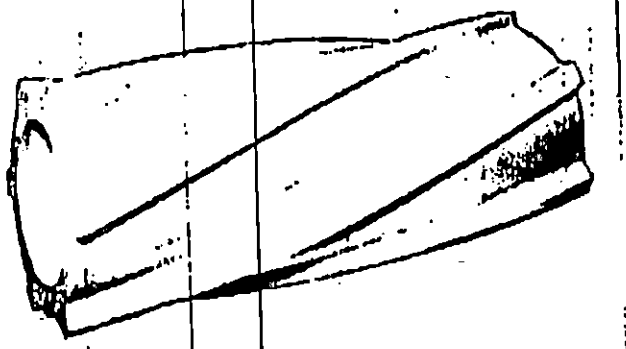
ajority of the liners (up to 85%) are the ıe size and shape for interchangeability. ; is such that one man can handle a liner. ; design eliminates the need for exposed heads, and drilled or tapped holes. There's isk of a bolt breaking off and falling into the ne.



Wedge/Spud lock design makes it easy to move or replace liners. The wedge that cks the liner to the crushing chamber wall is keyed so that it prevents liner from dropping into the machine. The wedge is designed to provide maintenance personnel with a good surface to strike with a hammer to tighten the liner. There's only one way wedge can fit into the spud. Ring-felt seal around hole in crushing chamber wall minimizes dust leakage from chamber.



4 Spira-Sleeve breaker bar sleeves are also constructed of cast manganese steel. Spiral design with raised ribs promotes turning of the sleeve when struck by stone. The rotational movement tends to clear fines, eliminating build-up between bar and sleeve. This prevents "freezing" of the sleeve on the bar. The result is more even wear on the sleeve, longer sleeve life. In addition, since the raised ribs take the brunt of the wear, the ribs can be built up periodically to further extend life.



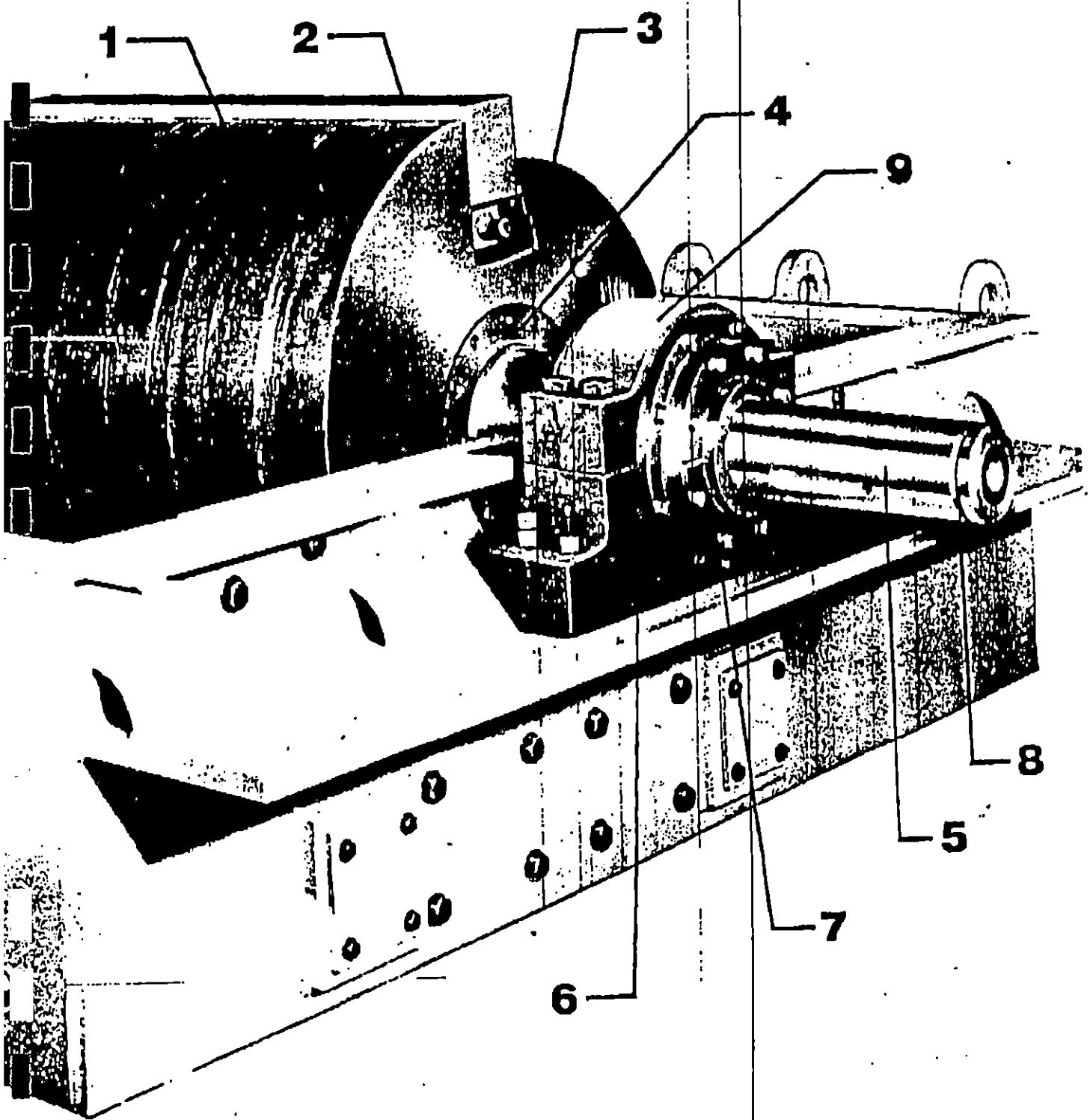
NOTE: Liners, sleeves and impeller bars may be cast of material other than manganese steel. For example, a high chrome moly alloy might be used to construct liners, sleeves and impeller bars for a coal crushing application.

5 Supporting bars or sleeves are in diameter in the major portion of the chamber. Sleeves are longer than most in the industry to further reduce breakage.

6 Adjustable breaker bar controls the size of the end product. The bar is adjusted easily by the addition or deletion of shims.

THE ROTO ASSEMBLY

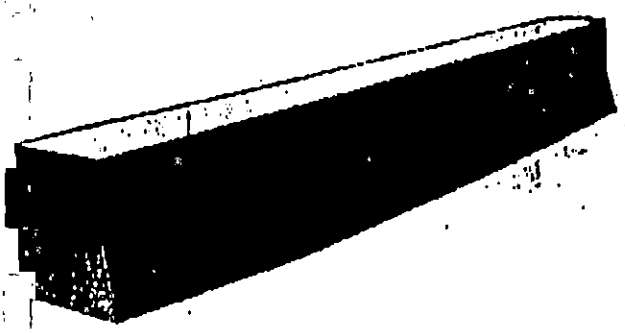
High energy capacity reduces horsepower requirements. Perfectly balanced for vibration-free operation.



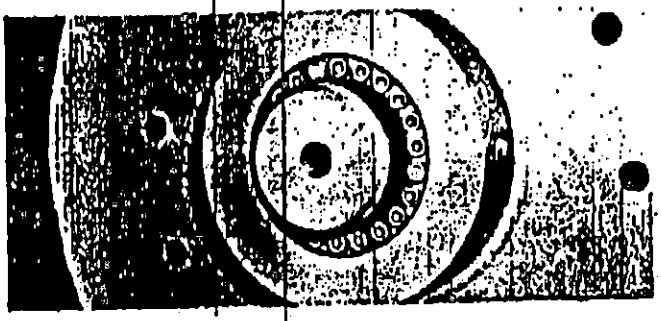
Telsmith Impactor rotor assemblies have a high energy capacity (inertia), so you can feed a maximum size rock and knock it down without losing rotor speed. Impactors with lighter rotors require more energy under a similar situation to bring the rotor back up to speed. Horsepower requirements for a Telsmith unit are less, initial cost is lower and less energy is required, result ...more product per horsepower.

2 Impeller bars are made from cast manganese steel; other materials, however, are optionally available. The bars are completely supported across the back by the massive steel rotor. **Bars are centrifically locked at high speeds, plus wedge locked for slower-speed applications.** The bars are weighed and balanced prior to installation on the rotor, so rotor balance is perfectly maintained.

3 The elliptically-shaped, two- or three-impeller rotor is fabricated of alloy steel plate. It is statically balanced at the factory with shaft and bearings in place, then dynamically balanced to assure the machine will operate within prescribed engineering tolerances at operating speed under full load. **Each machine is test run prior to shipping.**

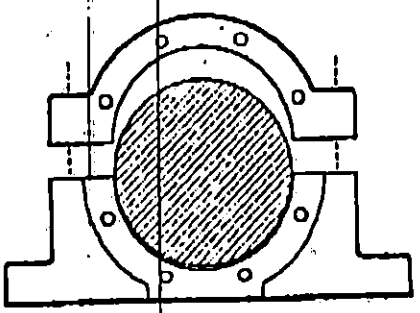


4 Four ring-fedder multi-tapered locking rings lock rotor to shaft. Ring-fedders are also used to hold sheaves to drive shaft. These devices never work loose, yet they are simple to remove thus permitting removal of shaft and rotor for in-field servicing.



5 The shaft is made of high alloy, heat treated steel. Tapered bearing seat accepts standard spherical bearings.

6 The split bearing housing is made of high alloy cast steel. This design permits the rotor to be "jacked up" 1/8" so **bearings, bearing housing and sleeves can be removed without taking the rotor out of the machine.**

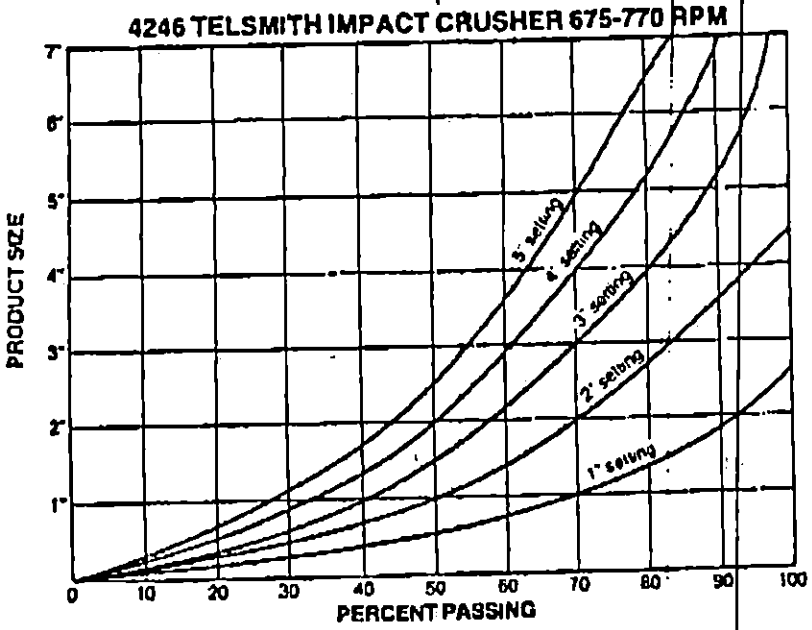


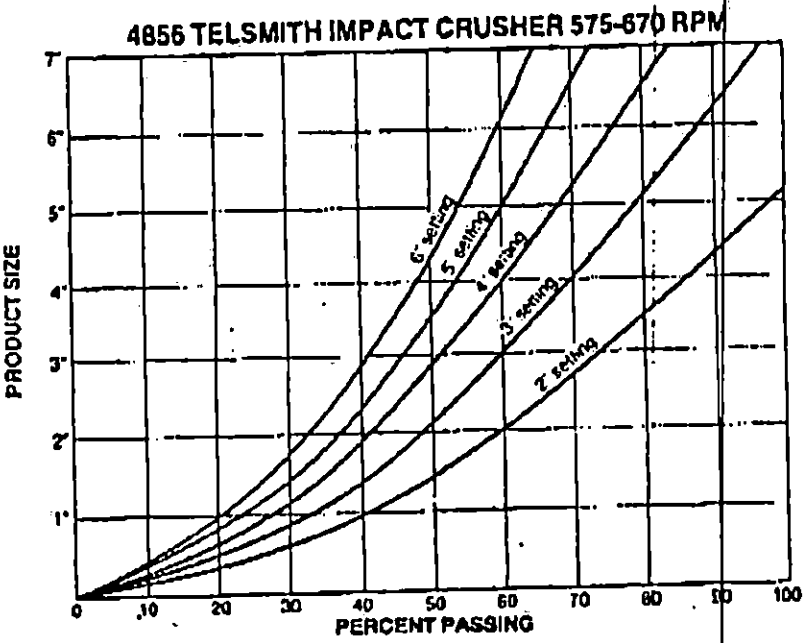
7 Concentric tapered labyrinth ring seals and grease lubrication fully protect the spherical roller bearings.

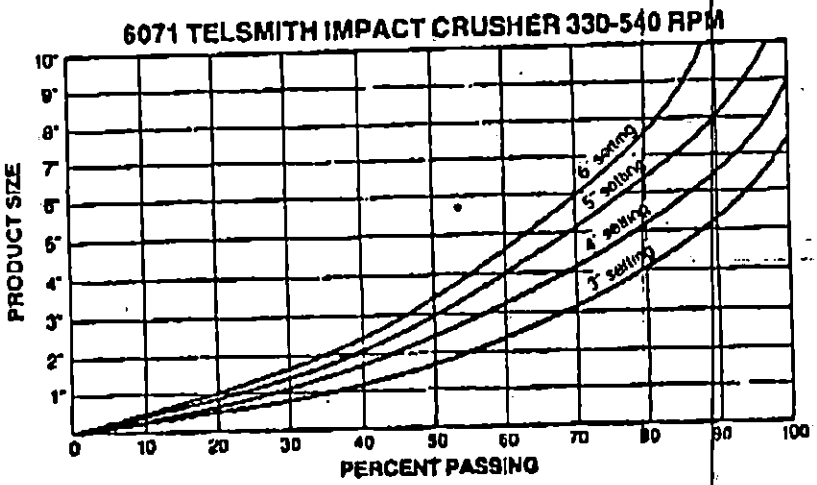
8 V-groove at end of shaft provides for installation of optional zero speed switch or other sensing device to cut off feed as rotor slows down.

9 Provisions have been made in each bearing for mounting a thermocouple to monitor the temperature of each bearing independent...

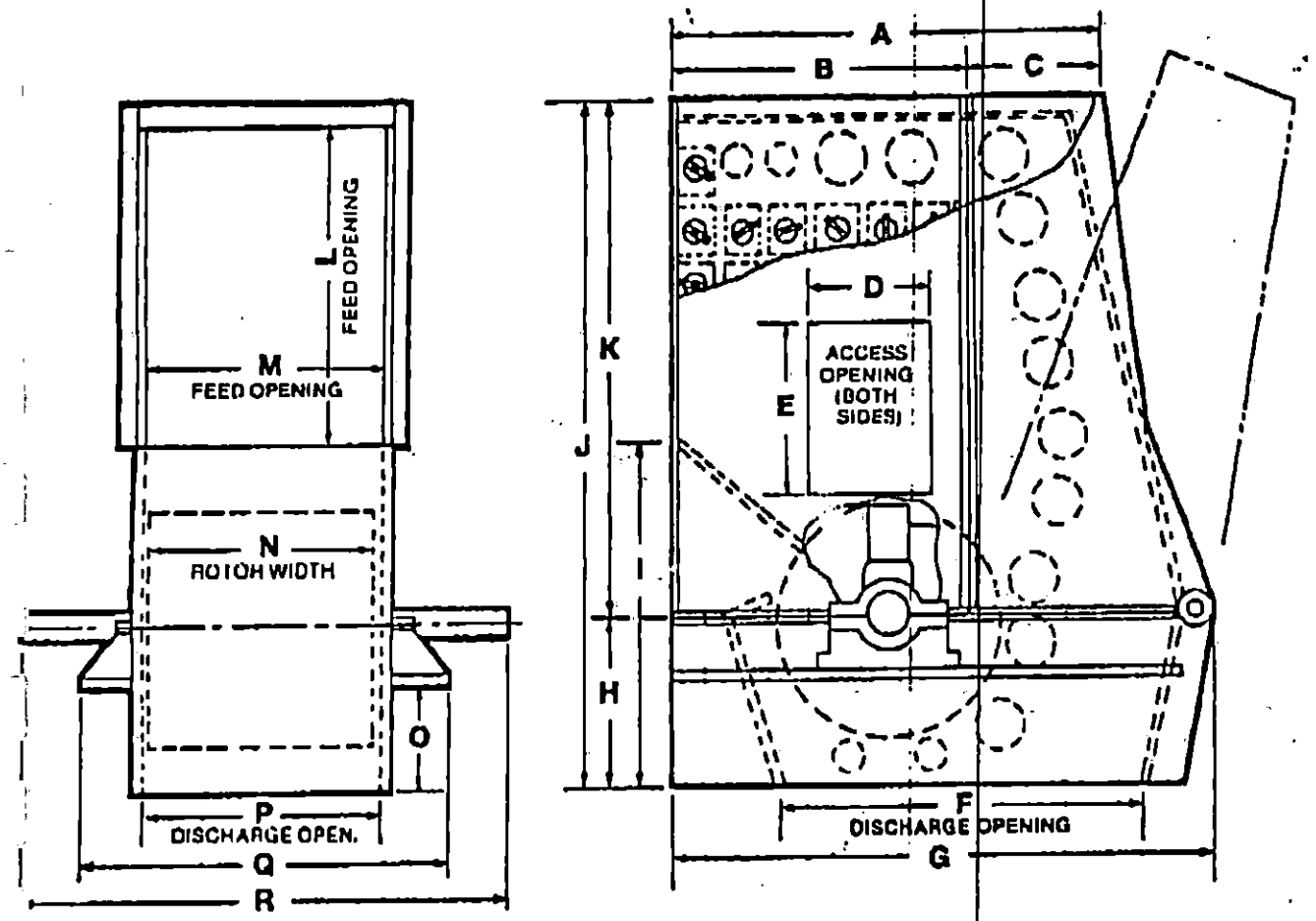
GREEN ANALYSIS







CRUSHER DIMENSIONS



Shown in inches

MODEL	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
3246	92⅞	64½	27¼	20	32	98	111	30	64	131	101	59¼	46	45	19¼	46	76	114⅛
4856	108⅛	75½	32¾	26	38	125⅞	139⅛	30	71	169¼	139¼	91	56	55	16¾	56	92	132⅛
6071	131⅛	85½	46⅛	26	38	113¾	169¾	48	94	206	158	100½	71	70	33	71	110	150⅞

CRUSHER SPECIFICATIONS

Shown in inches and pounds

MODEL	FEED OPENING WxH	MAXIMUM FEED SIZE	WEIGHT	SIDE PLATE THICKNESS	CAPACITY TPH (U.S.) (See Note 1)	RECOMMEND. H.P.	RPM RANGE	NOMINAL PRODUCT RANGE	CRUSHING CHAMBER VOLUME	DISCHARGE OPENING WxL	LINER THICKNESS	LINER MATERIAL
3246	46 x 59¼	36	59,500	1"	250-600	300-500	480-770	2-5	150 ft³	46 x 98	1	MANG. STL. ABR. STL.
4856	56 x 85	46	94,170	1½	600-1100	400-700	420-670	2-6	300 ft³	56 x 125	1½	MANG. STL. ABR. STL.
6071	71 x 100⅛	60	195,000	2	1000-2100	800-1500	330-540	4-8	400 ft³	71 x 113	1½	MANG. STL. ABR. STL.

MODEL	ROTOR					ROTOR SHAFT				IMPELLERS					
	MATERIAL	DIA.	WIDTH	WEIGHT W/ HAMMERS	WR² (lb-ft²)	MATERIAL	DIA. THRU ROTOR	DIA. AT BEARING	DIA. AT SHEAVE	NO. OF IMPELLERS	MATERIAL	SWING DIA.	WIDTH	WEIGHT EACH	NO. OF WEAR FACES
3246	FAB. STL.	38	45	12,180	17,628	4140 HT STEEL	9¼	6.31	5½	2	MANG. STL.	42	45	460	1
4856	FAB. STL.	43	55	22,968	40,620	4140 HT STEEL	11	7.88	7½	2	MANG. STL.	48	55	922	1
6071	FAB. STL.	57	70	42,077	128,046	4140 HT STEEL	14	10.25	9½	3	MANG. STL.	60	70	1,621	1

NOTE 1: Capacities shown are average for medium hard limestone and are to be used as a guide only. Actual capacity will vary with the nature and hardness of the feed, size and gradation, motor horsepower, operating speed, etc.

DRAWINGS

PHOTOGRAMMETRY BY:

GEOMAPS INTERNATIONAL

235 East Jericho Turnpike Mineola, N.Y. 11501
Telephone (516) 742-7373 FAX (516) 746-1599

Scale 1 inch = 50 feet
Contour Interval: 2'
Photo Date: FEB. 8, 1990
SCHLEIDER CONTRACTING CORP.

OLD NORTHPORT ROAD

SUNKEN MEADOW PARKWAY

RECYCLING & PROCESSING BUILDING

RECYCLING & PROCESSING BUILDING

STOCKPILE

CURING AREA

MATERIAL BLENDING AREA

WINDROWS

SEE DWG. NO. 4A FOR SECTIONS (TYP.)

HYDRANT (TYP.)

WATER SERVICE (TYP.)

WATER SUPPLY WELL

RECHARGE BASIN

3% SLOPE (TYP.)

ROCKS

PIPE

R.E. PUSTORINO, P.C.

Consulting Engineers

2171 Jericho Turnpike
Commack, New York 11725

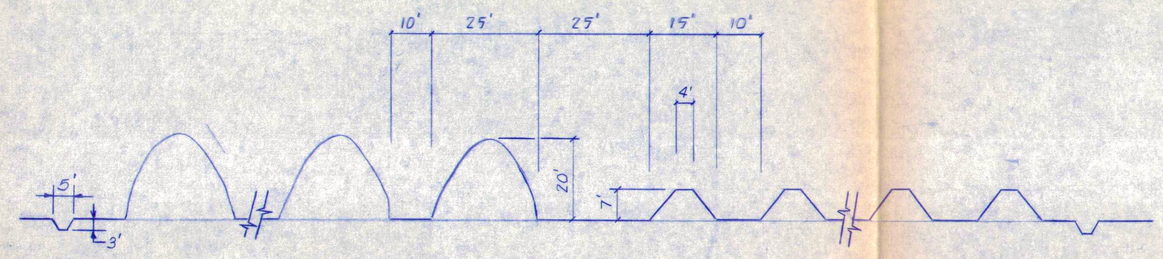
ENGINEERING REPORT

EXISTING
MATERIALS RECOVERY, PROCESSING AND RECYCLING FACILITY
R. SCHLEIDER CONTRACTING CORP.
OLD NORTHPORT ROAD
(WEST OF SUNKEN MEADOW PARKWAY)
"PARCEL – A"
KINGS PARK
SUFFOLK COUNTY, NEW YORK

YARD WASTE FACILITY SITE FEATURES

DRAWN: V. R. R.	SCALE: 1" = 50'	DATE: APRIL 1990	
PROJECT NO. 89093		DWG. NO. 3A	

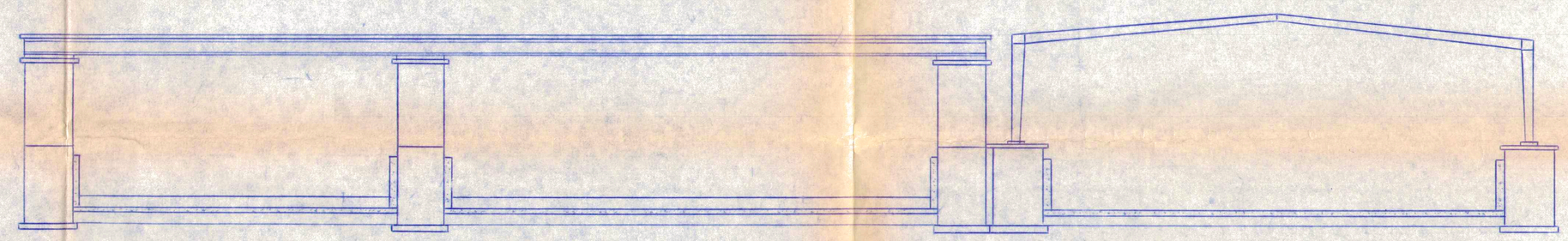
90134\9013



CURING AREA (TYPICAL)

WINDROWING AREA (TYPICAL)

SECTION B-B
SCALE: 1" = 20'



SECTION A-A
SCALE: 3/32" = 1'-0"

R.E. PUSTORINO, P.C.
Consulting Engineers

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Commack, New York 11725

DATE	REVISION

ENGINEERING REPORT

EXISTING
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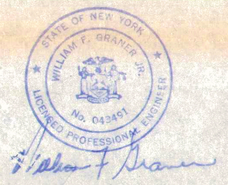

SITE DETAILS

DRAWN: K. C. CHECKED: W. F. G.

DATE: APR. 1990 SCALE: AS SHOWN

DWG. No: 4A

PROJECT No: 89093

SUNKEN MEADOW PARKWAY

ROAD

NORTHPORT

OLD

N

R.E. PUSTORINO, P.C.

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ENGINEERING REPORT

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KINGS PARK
SUFFOLK COUNTY, NEW YORK

AERIAL PHOTOGRAPH

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PROJECT № 89093		DWG. № 1A	

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OLD NORTHPORT ROAD

SUNKEN MEADOW PARKWAY

ROCKS

CONC. DEBRIS

PIPE

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OLD NORTHPORT ROAD
(WEST OF SUNKEN MEADOW PARKWAY)
"PARCEL – A"
KINGS PARK
SUFFOLK COUNTY, NEW YORK

EXISTING TOPOGRAPHY AND SITE FEATURES

DRAWN: V. R. R.	SCALE: 1" = 50'	DATE: APRIL 1990
PROJECT NO 89093		DWG. NO 2A

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