OPERATING INSTRUCTIONS

FOR

ECONO-FINISH EFR-2636

EMPIRE
ABRASIVE EQUIPMENT CORPORATION
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CONTENTS

INTRODUCTION

This booklet has been designed to assist you in the proper installation, operation and maintenance of your new Empire Econo-Finish System.

Read this booklet carefully and keep it handy for future reference. If, at any time, you have any questions regarding the operation and maintenance of your equipment, contact your Empire Distributor who is best qualified to assist you, with trained service technicians, replacement parts and tools to do the job right in the shortest possible time.

WARRANTY

Empire guarantees all parts and equipment against defects in material and workmanship under normal use and service for ONE YEAR from the date of installation.

Material found to be defective within this ONE YEAR period will be replaced at NO CHARGE.

This warranty does not apply to the normal wear of nozzles, blasting hose or other components exposed to or in direct contact with the blasting operation.

1.0 INSTALLATION

All equipment must be level and well grounded. DO NOT place on a wooden floor, rubber mat, or on a floor subject to wet conditions. Consult a qualified electrician for proper method of electrical grounding.

1.1 DUST COLLECTOR (OPTIONAL)

If your system includes a dust collector, it should be installed prior to installing the cabinet. Place the dust collector on a level surface behind your cabinet. The access door and shaker handle on the dust collector should be easily accessible and the hose inlet should be directed toward the cabinet. Allow space for free operation of the cabinet doors as well as access for removal of dust from the dust collector hopper.

1.2 CABINET

Install the cabinet with sufficient space all around so that components are easily accessible and work pieces can be easily loaded and unloaded through the cabinet door.

1.3 ELECTRICAL CONNECTIONS

The standard cabinet wiring is for a 115/00/1 supply. Cabinets can also be wired for optional 208-240/60/1 or 208-240/50/1 supply.

All cabinets require minimum 15 amp service with minimum 14 gauge copper wire. Consult a qualified electrician for proper methods of wiring, fusing and grounding.

1.4 COMPRESSED AIR SUPPLY

The volume of air required for efficient operation of your Pro-Finish system depends on the size nozzle being used and the desired blast pressure. The chart below shows minimum air requirements in CFM for various nozzles and pressures.

AIR REQUIREMENTS (CFM)

		40 psi	60 psi	80 psi	100 psi
Suction Blast	1/4" nozzle 3/32" air jet	7	10	12	15
	1/4" nozzle 1/8" air jet	12	17	21	26
	5/16" nozzle 5/32" air jet*	19	27	34	42
	7/16" nozzle 7/32" air jet	38	52	66	80

*Unless otherwise specified this combination is supplied.

If the air line from your compressor to your Pro-Finish System is too small, excessive pressure drop through the line may result in inefficient blasting even though the compressor is adequately sized. Use at least a ½ inch ID air line.

IMPORTANT: For proper operation your system requires dry, clean air. Moisture or oil in your compressed air supply can contaminate abrasive and prevent it from flowing freely resulting in inefficient blasting. Your unit is equipped with a moisture trap which will help to remove water which may condense in the connecting air piping during shutdown, however, this trap is not designed to clean grossly contaminated air.

2.0 OPERATION

2.1 SELECTION OF MEDIA

Next to choosing the proper equipment, selection of the proper media is the most important factor in determining how efficient your blasting operation will be. The kind of media selected depends on the kind of job to be done. Cleaning, deburring, smoothing sharp edges, paint removal, preparation for coatings — each job has specific requirements best satisfied by specific medias. The size of media is very important also. Fine media results in more impacts per second over a given area than large media. Large media gives less number of impacts, but each impact has more force. For easy blasting jobs such as the removal of light rust from steel, fine media will give faster cleaning than large media. For difficult jobs such as removal of mill scale, large media gives better results. Sometimes large and fine medias are combined for optimum results.

Your system is designed to operate with a wide range of media. The chart below lists which kinds of media are recommended. Certain media such as sand and slag are not recommended for use in Econo-Finish cabinets since these media will pulverize on impact and cannot be recirculated.

Spherical media such as glass beads are used for general purpose cleaning and finishing where a satin like finish is desired with little dimensional change. Glass beads are effective when used with pressures in the 20-60 PSI range. Above 60 PSI excessive breakdown of beads may occur.

Angular aggressive media such as aluminum oxide, steel grit and garnet generally provide faster cleaning and produce a duller finish than glass beads. Aluminum oxide and steel grit are suitable for use at pressures up to 100 PSI. Garnet breaks down quickly at pressures greater than 40 PSI.

Walnut shells or plastic media are sometimes used for delicate parts or when a polished finish is desired. Pressures from 20-100 PSI may be used with these media depending on the application.

When changing from one type media to another it is necessary to thoroughly clean out the cabinet interior and media hoses to avoid cross contamination.

MEDIA	RECOMMENDED SIZES
Glass Beads	25 - 200 Mesh
Aluminum Oxide Garnet Silicon Carbide	45 - 200 Mesh
Steel Grit	G-125 to G-200
Steel Shot	Not Recommended
Walnut Shells or Plastic	Any Size

2.2 MEDIA LOADING

Use a small container to load media through the reclaimer door. Total capacity for various media is shown below:

Glass Beads _____ 10 lb.

Aluminum Oxide, Garnet or Silicon Carbide _____ 15 lb.

Steel Grit _____ 20 lb.

Walnut Shells or Plastic _____ 5 lb.

2.3 EQUIPMENT START-UP

A. After checking all piping and hose connections to be certain they are all tightly fastened — turn on plant compressed air and open manual valve(s) controlling flow of air to system.

B. Turn on power switch.

C. Place parts to be blast treated in the cabinet. Parts must be free of oil, grease and moisture. Close cabinet door(s) and reclaimer door.

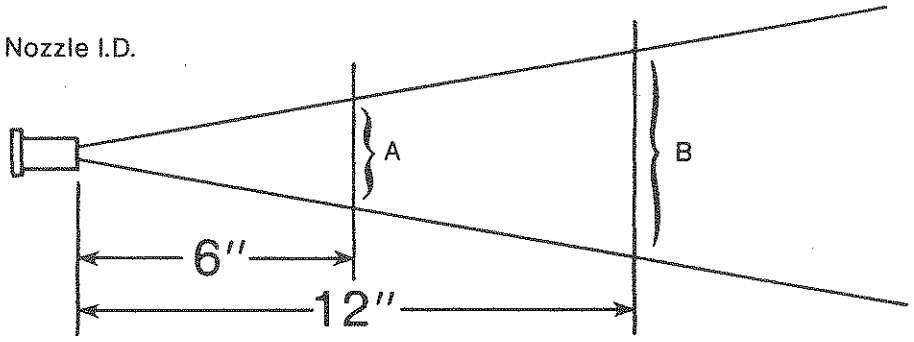
D. Set the operating air pressure gauge for the desired pressure. Recommended operating pressure range for various medias are listed below:

	SUCTION BLAST
Glass Beads	30 - 60 PSI
Aluminum oxide or silicon carbide	30 - 100 PSI
Steel shot or grit	80 - 100 PSI
Walnut shells or plastic	20 - 100 PSI
Garnet	30 - 40 PSI

E. Gripping the gun assembly firmly, press down the foot control to activate — after a few seconds abrasive flow will stabilize.

F. Hold nozzle at a distance producing the fastest cleaning action. This distance may vary from 3 to 12 inches, depending on work piece and finish desired. Avoid pumping the foot control. This will result in decreased efficiency and premature wear of components.

The size of effective blasting pattern varies with the type and length of the nozzle, air pressure and nature of the workpiece. The chart below shows approximate pattern diameters, but exact diameters can only be determined by considering each case individually.



BLAST PATTERN DIA. AT DISTANCE* LISTED		
NOZZLE ID	A	B
1/4	3/4"	1 1/4"
5/16	1"	1 1/2"
7/16	1 1/8"	1 3/4"

* Suction blast at a distance greater than 12" is usually not effective.

2.4 EQUIPMENT SHUTDOWN

A. Turn cabinet switch to "off."

B. Shut off plant air supply.

2.5 EQUIPMENT ADJUSTMENTS

2.5-1 VENTILATION FLOW ADJUSTMENT — SYSTEMS WITH RECLAIMERS

All Empire reclaimers are "Tunable." This means that they can be adjusted to control the average size of media retained in the reclaimer. This adjustment is accomplished as described below.

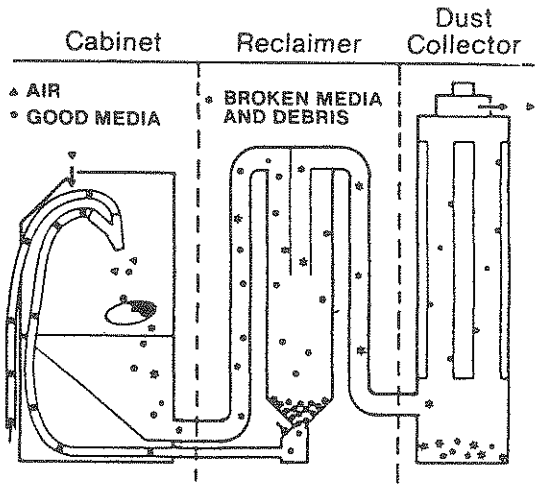
A. Secondary air inlet closed — All particles except the very finest dust will drop into the media storage hopper. Normally if these dust particles are allowed to build up in the media, blasting efficiency is decreased.

B. Secondary air inlet opened slightly — Some particles will be carried to dust collector — adjust so that only useful media is retained.

C. Secondary air inlet completely open — Most if not all media will be carried to dust collector.

2.5-2

At right is schematic diagram of cabinet, reclaimer and dust collector showing basic operation of system as well as flow of air and media before and after blasting.



IMPORTANT

Too little secondary air entering the inlets will cause a dusty condition in the cabinet and inefficient blasting. Too much secondary air will cause useful media to be carried to the dust collector and wasted. Adjust the tuning band to meet your specific blasting requirements. When your system is new it may be necessary to periodically readjust the tuning band.

2.5-3 Media Flow

The flow of media to suction blast guns is controlled by the amount of air which enters through the inlet port in the media regulator. The amount of air entering is controlled by how far the blast hose is inserted within the regulator. For normal operation, all but ¼" of the inlet port is blocked by the blast hose. With fine media the ¼" dimension may be varied slightly to give uniform flow.

Note that it can easily be determined if media is flowing properly by observing through the media regulator air inlet while the gun is operating.

3.0 DAILY MAINTENANCE

A. Check condition of media. If media is contaminated or broken down into dust, clean out system and reload (see Section 2.2). Adjust tuning band if dusty condition is found (see Section 2.5-1).

B. Clean filter bag or shake dust collector bags after every 4 hours of operation. For single dust bag, this is accomplished by removing bottom bag clip and shaking accumulated dust through bag bottom opening into appropriate container. For dust collectors, dust is removed from bags by shaking the bags 10 to 15 times with the fan motor off.

C. Remove accumulated dust from dust collector hopper.

D. Check light bulb and gloves.

E. Remove debris from reclaimer screen.

F. Open the drain on the manual moisture separator in the cabinet piping and drain accumulated moisture. Close drain.

G. Open the drain valve on the air compressor receiver tank to drain any water which may have accumulated.

H. Check media level. For most efficient operation media level should not decrease to less than ½ of recommended capacity (see Section 2.3). Media level can be observed in the reclaimer hopper.

4.0 WEEKLY MAINTENANCE

A. Repeat daily maintenance procedures.

B. Inspect all media carrying hoses for wear by feeling along hose length for soft spots. If soft spots are found, hoses should be replaced.

C. Check air jet for wear. This is easily accomplished by loosening set screw in side of gun body and removing jet. If air jet shows wear, rotate it 90° from original position, reinsert in gun and retighten set screws.

IMPORTANT

If an air jet is allowed to wear completely through, premature wear of mixing head body and nozzle will occur.

D. Check nozzle adapter and mixing head body for wear — replace if necessary.

E. Check your spare parts inventory for replacement items.

5.0 STORAGE OR TEMPORARY NON-USE

If unit is not to be used for a period of several days or more, the following steps should be taken in order to prevent media from caking inside the machine.

A. Empty media from cabinet hopper or reclaimer storage.

B. Using compressed air, blow out cabinet interior and media supply hose.

C. Disconnect electrical power and compressed air supply.

D. Empty and shake off dust bag or shake dust collector bags and empty dust hopper.

E. Drain moisture separator. Keep drain valve closed.

6.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Good media carried to dust collector	New bag(s)	Continue use until bag "cake" forms (approximate 8 hrs. operation)
	Tuning band open too far	Adjust tuning band — see Section 2.5-1
	Insufficient media in hopper allows secondary air to enter	Add media to maintain recommended media level
	Media too fine	Use coarser media — see Section 2.1
Media escaping to work area from dust collector	Hole in dust bag(s) or loose bag(s)	Replace leaking bag(s) Refasten bag(s)
Poor visibility during blasting	Clogged dust bag(s)	Shake dust bag or dust collector bags
	"Blinded" dust bags (reduced air flow due to age of bag)	Over a period of years dust may penetrate the dust bag fibers to the extent that normal air flow is restricted even when bags are shaken regularly — when this condition is reached, bags should be replaced
	Media has high dust content	Replace media — adjust tuning band — see Section 2.5-1
	Return hose blocked	Remove return hose and inspect for obstruction
	Cabinet air inlet plugged	Blow filter clean with air line
	Air jet too large	Max. air jet size 7/32" ID
	Operating air pressure too high	Decrease pressure to within recommended range
No air or media flow	Compressed air line closed	Open all air valves from compressor
	Door not tightly closed (cabinets with optional interlock)	Close door
	Regulator adjusted to zero	Adjust regulator — see Sect. 2.3
	Nozzle clogged	Disassemble and clean nozzle
Poor production rate	Low air pressure	Increase pressure within the range specified.
	Nozzle too small	The smaller the nozzle, the smaller the blasting pattern. Install larger nozzle and air jet to accommodate your production needs.
		See Section 2.1

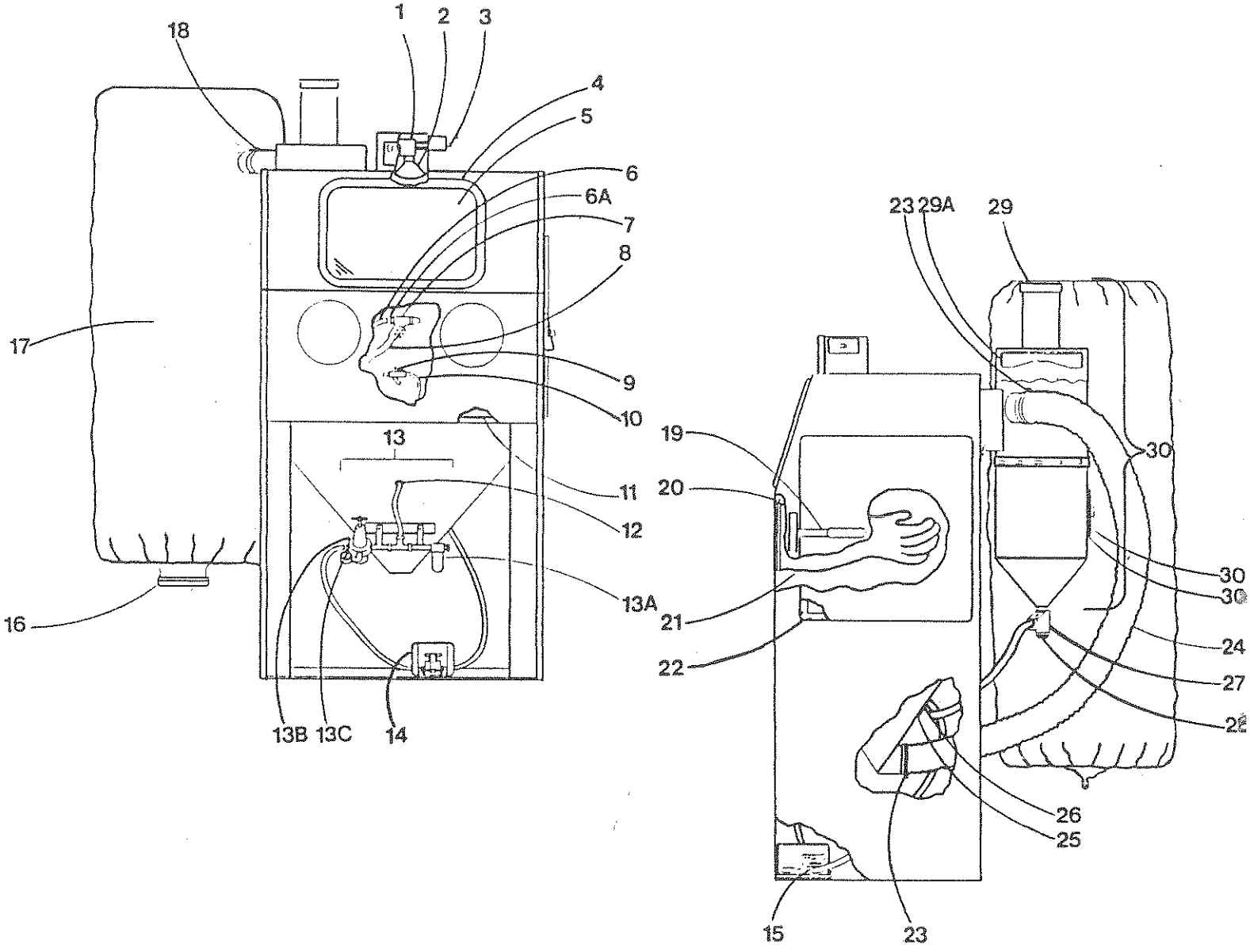
TROUBLE	PROBABLE CAUSE	REMEDY
Improper media	Improper media feed	See Section 2.5-3
	Low media level	Add media to maintain recommended level.
	Part to be blasted is oily or wet	Parts to be processed must be absolutely dry and free of any oil, grease, etc.
	Media has high dust count	Blasting media breaks down and must be changed on a regular basis, remove old media and replace. Adjust tuning band — see Section 2.5-1.
Static charge build-up annoys operator	"Cheap" blast hose (i.e., poor conductor of static charge)	Static charges can build up by the action of air and media moving at high velocity through blast hose. Hose should be replaced with high quality blast hose. Inferior substitutes can amplify static problem.
	Machine improperly grounded	Ground machine
	Low ambient humidity	Static build-up can be very troublesome if ambient humidity is very low even though above precautions are taken, optional Empire static strap will reduce problem
Air flow, but intermittent or no media flow	Low media level	Add media to maintain recommended level.
	Operating air pressure too low	Maintain air pressure within the recommended range.
	Clogged nozzle	Disassemble and clean nozzle.
	Media damp	If media will form ball when squeezed in palm of hand, it is too damp to flow properly. Replace media. Air compressor is discharging excessive moisture or work pieces are wet or oily.
	Improper jet/nozzle combination	Nozzle orifice size must be at least twice the air jet orifice size: ⅛" diameter air jet requires at least ¼" diameter nozzle.
	Media hose improperly installed	Adjust media hose — see Section 2.5-3.
	Clogged media hose	Place your glove protected hand firmly over the end of the nozzle so no air can escape. Depressing the foot control will force obstruction out of hose.

7.0 Parts List

EFR CABINET (W/DUST BAG)

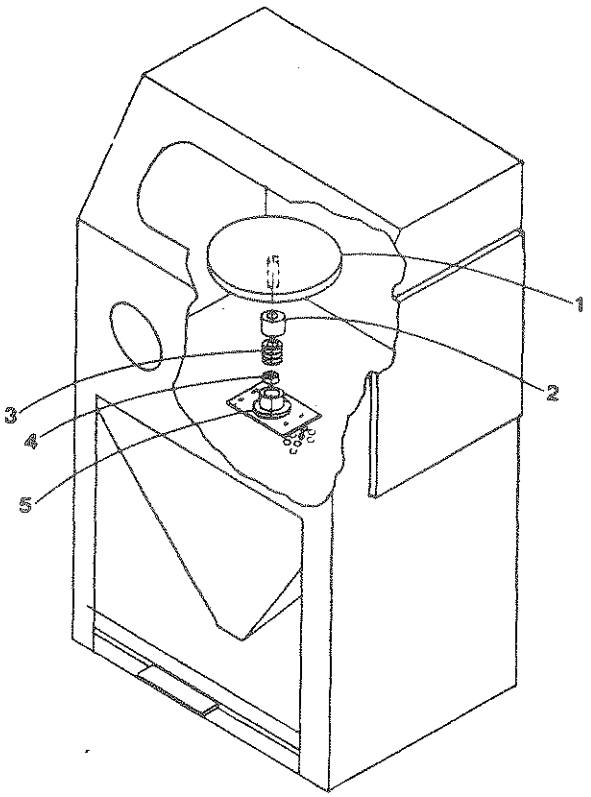
PART NUMBER	DESCRIPTION
(1) 537711	Light Fixture
(2) 532701	Spotlight
(3) 534571	Electrical Switch
(4) 524521	Window Gasket
(5) 510401	Window (Safety Glass) 14"x 22"
(6) 522831	Air Hose w/Fittings
(6A) 520502	Adjustable Air Hose Clamp
(7) See Below	MH-2 Media Gun
(8) 522571	Blast Hose Section
(9) 509821	Dust-Off Gun
(10) 522631	Dust-Off Gun Air Hose
(11) 767561	Floor Section (2/cabinet)
(12) 524431	Air Hose Grommet ½" ID
(13) 140517	Piping String Assy ⅜" ID
(13A) 504592	Air Filter ⅜"NPT
(13B) 517301	Pressure Regulator ⅜"NPT
(13C) 550242	Air Gauge
(14) 518651	Foot Treadle (complete)
518661	Air Valve for Foot Treadle
(15) 518671	Repair Kit for Foot Treadle Valve

PART NUMBER	DESCRIPTION
(16) 520461	Dust Bag Closure Clamp
(17) 515841	Dust Bag
(18) 520531	Adjustable Clamp 4"
(19) 760361	Door Handle
(20) 520561	Adjustable Clamp 8"
(21) 509891	Rubber Gloves, Pair
(21A) 510821	Rubber Glove (left hand only)
(22) 525671	Door Gasket
(23) 520521	Adjustable Clamp 3"
(24) 515581	Conveying Hose 3" ID x 6'
(25) 523931	Media Hose Grommet 1" ID
(26) 523921	Air Hose Grommet ¾" ID
(27) 290156	Media Regulator Assembly
(28) 560031	Clean Out Plug Assembly
(29) 549911	Motor ½ HP
(29A) 754531	Fan Blade (9¾" DIA)
(30) 140518	Reclaimer Ass'y (complete w/fan & motor)
140519	Reclaimer Assembly (less fan & motor)
(30A) 760721	Reclaimer Door
(30B) 524331	Reclaimer Door Gasket



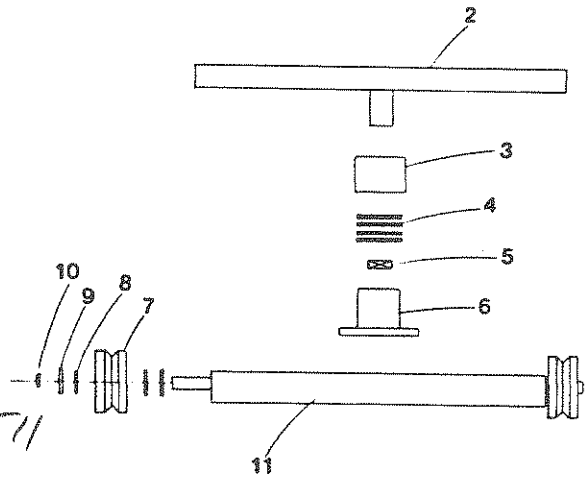
INSIDE MANUAL TURNTABLE

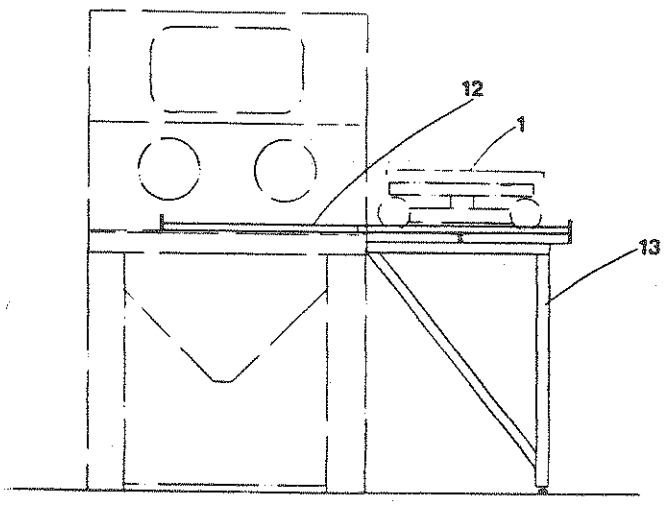
PART NUMBER	DESCRIPTION
(1) 761051	Turntable, 18" diameter
(2) 761081	Bearing Cover
(3) 524781	Bearing Seals (Qty. of 4)
(4) 570091	Thrust Bearing
(5) 570141	Bearing



MOVEABLE MANUAL TURNTABLE

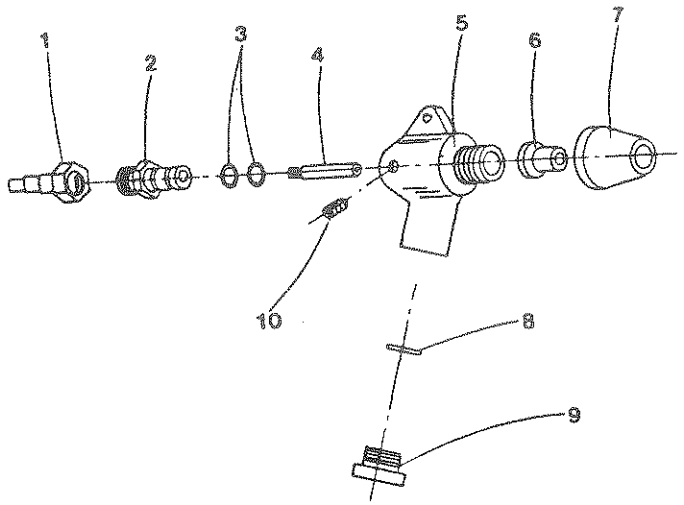
PART NUMBER	DESCRIPTION
(1) 140456	18" Turntable Assembly
(2) 761051	Turntable, 18" diameter
(3) 761081	Bearing Cover
(4) 524781	Bearing Seals (Qty. of 4)
(5) 570091	Thrust Bearing
(6) 570141	Bearing
(7) 509841	V-Groove Wheel
(8) 524771	Felt Washer
(9) 553451	Washer
(10) 553002	Cotter Pin, 3/16" x 1 1/4"
(11) ~~761091~~	Cart for use with 18" diameter table 768511
761041	Cart for use with 24" diameter table
(12) 760991	Inside Track for 2636 Cabinet
(13) 760951	Outside Track for 2636 Cabinet





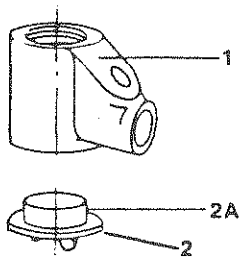
MEDIA GUN

PART NUMBER	DESCRIPTION
505501	Gun with 1/4" Di-Carb Nozzle
505441	Gun with 5/16" Di-Carb Nozzle
505451	Gun with 7/16" Di-Carb Nozzle
505511	Gun with 1/4" Boron Nozzle
505461	Gun with 5/16" Boron Nozzle
505471	Gun with 7/16" Boron Nozzle
505521	Gun with 1/4" Ceramic Nozzle
505481	Gun with 5/16" Ceramic Nozzle
505491	Gun with 7/16" Ceramic Nozzle
(1) 520402	Barbed Fitting
(2) 505621	Connector
(3) 523912	"O" Ring
(4) 505651	Air Jet, 3/32"
505661	Air Jet, 1/8"
505671	Air Jet, 5/32"
505691	Air Jet, 7/32"
(5) 753551	Gun Body (Long)
(6) 501331	Di-Carb Nozzle, 1/4"
501341	Di-Carb Nozzle, 5/16"
501351	Di-Carb Nozzle, 7/16"
502071	Boron Nozzle, 1/4"
502081	Boron Nozzle, 5/16"
502091	Boron Nozzle, 7/16"
502421	Ceramic Nozzle, 1/4"
502431	Ceramic Nozzle, 5/16"
502441	Ceramic Nozzle, 7/16"
503341	Ceramic Nozzle, 1/4" (Qty. of 10)
503351	Ceramic Nozzle, 5/16" (Qty. of 10)
503361	Ceramic Nozzle, 7/16" (Qty. of 10)
(7) 505641	Nozzle Adapter
(8) 523881	"O" Ring
(9) 520081	Hose Clamp Nut
(10) 551702	Set Screws, 1/4" - 20 X 3/8"



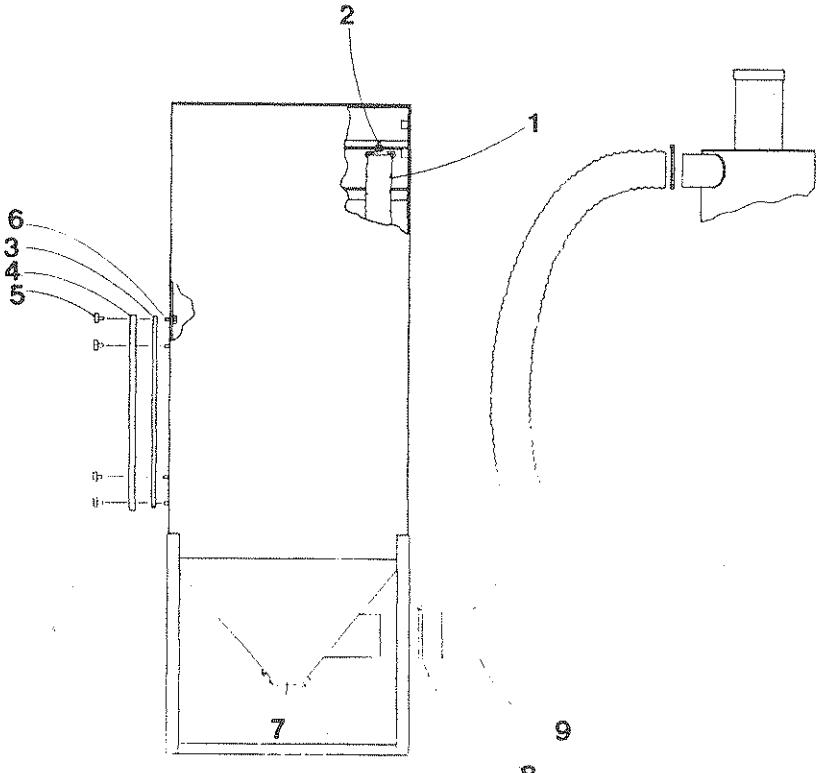
REGULATOR

PART NUMBER	DESCRIPTION
290156	Media Regulator Assembly
(1) 753351	Regulator Body
(2) 560031	Clean Out Plug Assembly
(2A) 510121	Clean Out Plug



DCM-80R DUST COLLECTOR

PART NUMBER	DESCRIPTION
(1) 515521	Dust Bag
(2) 509721	Rod Hanger
(3) 525711	Gasket
(4) 760851	Door
(5) 552542	Hex Nut
(6) 551852	Hex Head Bolt
(7) 524351	Clean Door Gasket
(8) 520531	Adjustable Clamp 4"
(9) 515861	Dust Hose 4" ID x 8'



8.0 SUGGESTED SPARE PARTS FOR 1500 BLASTING HOURS.

Quantity	Part No.	Description
1	501331 501341 401351	1/4" Di-carb nozzle (suction) or 5/16" Di-carb nozzle (suction) or 7/16" Di-carb nozzle (suction)
1	532701	Spotlights
20'	524441	Door gasket
25'	520802	5/8" blast hose
2 pr.	509891	Rubber gloves
1	524521	Window gasket
1	510401	Window safety glass
1	515841	Dust bag (if applicable)
1	515581	3" x 6" return hose
1	753551	Media gun body
2	505661 505671 505691	1/8" air jet or 5/32" air jet or 7/32" air jet

9.0 HELPFUL HINT FOR MORE EFFICIENT BLASTING

Whether or not your blasting operation will be an efficient one or not depends on four factors:

1. Proper Equipment Selection
2. Proper Media Selection
3. Proper Operation
4. Proper Maintenance

With help of your Empire Distributor and/or Empire Factory Representative, you should now own equipment which will properly meet your blasting requirements. Selection of proper media, proper operation and proper maintenance can be accomplished by careful implementation of the recommendations in this manual. If you need further information about any aspect of your machine feel free to contact your distributor or the factory.

Some other factors which may help improve efficiency are listed below:

1. Use the largest nozzle practical for your operation. Generally speaking, blasting tasks can be accomplished more quickly with a large nozzle than with a small one. Of course, nozzle diameter may be limited by the amount of compressed air available, but an increased volume of compressed air may be easily justified by reduced labor costs. (Of course it doesn't make sense to blast a very small part with a large nozzle — most of the blast pattern will be overspray.)

2. Use the highest pressure practical. Higher pressures generally mean faster cleaning. Maximum pressure for a given operation will be limited by type of media (some media like glass beads can break down rapidly above a certain pressure) and amount of material which must be removed from the workpiece.

3. Consider handling the work piece instead of the blast gun. If parts are small it may be more efficient to manipulate the part instead of the blast gun. An optional fixed nozzle holder can be supplied for any cabinet to allow the work piece to be handled instead of the blast gun.

4. Consider other Empire Standard Options. Optional work carts and turntables can reduce part handling time.

5. Don't Underestimate the Importance of Clean Dry Air

   More operational problems can be traced to the lack of clean dry air than any other single factor. Media quickly becomes contaminated if supply air is not of good quality causing flow problems and resulting in wasted media and operator down time.