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KIPP KELLY GRAVITY SEPARATORS
KIPP KELLY GRAVITY TABLES

OPERATOR'S MANUAL
AND PARTS LIST

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SECTION 1

GENERAL INFORMATION

1.1 Introduction

The Kipp Kelly Specific Gravity Separator has incorporated into its design, features that have proven themselves in thousands of applications across the country and around the world. Many of these features are not available on other makes of specific gravity separators. For example:

1) Self-feeding controlled inlet hopper
2) Variable stroke main eccentrics
3) All metal chassis construction
4) Heavy industrial double roll ball-bearings
5) Multi-vane fan, ensuring constant air flow with precision air regulation and absolute control for fine seeds
6) Cone pulley variable speed drive, ensuring selected speed remains constant
7) Low horsepower requirements suitable for single phase applications

This manual contains information to enable you to install, operate, adjust and service your Specific Gravity Separator (Fig. 1.1). The following pages are intended to assist you in obtaining the best possible operation out of you equipment and enable you to identify any part quickly and accurately for replacement purposes.

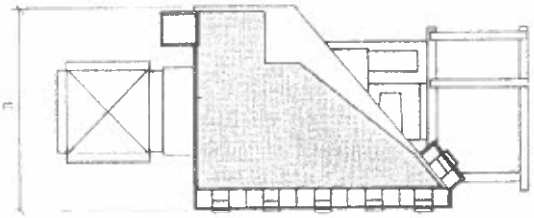
All persons involved with the machine's operation should read the contents of this manual carefully and thoroughly. Keep this book in a convenient place and free from anything that might damage its contents.

1.2 Description

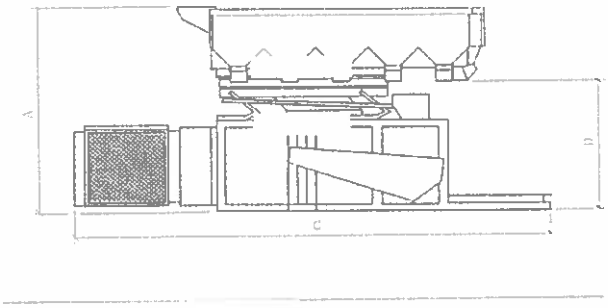
Principle of Operation

The Kipp Kelly Specific Gravity Separator is designed to separate materials by specific gravity only. Material to be processed is fed across the surface of a reciprocation deck, which is covered, with one of a variety of porous cloth or metal materials depending upon the material to be treated. Air is passed upward through the deck under pressure from a fan built into the tale frame, with an air gate on the suction side of the fan. Air enters the chamber below the deck and is then controlled precisely in distribution and degree of pressure. The air is thus used to "float" the material in such a way that it will be stratified, the heavier particles settling and lighter particles raising to the top of the bed. The motion of the separator deck, air volume and oscillation speed and longitudinal and lateral slopes of the deck all combine to cause the heavier particles to settle and travel further along the deck. The heavier particles travel to the direction of deck motion and are discharged close to the narrow end while the lighter particles are floated by air and travel across the line of motion of the deck and are discharged at the broad end.

PLAN VIEW



FRONT VIEW



MODEL NO.	100	200	300	400
Dimensions				
A	43 3/4"/112cm	53 7/8"/137cm	55 1/4"/140cm	54 1/2"/139cm
B	30"/76cm	49"/124cm	56"/142cm	56"/142cm
C	49"/124cm	111 1/4"/283cm	111 1/4"/283cm	119 1/2"/303cm
D	27"/68cm	33 7/8"/86cm	35"/89cm	34 1/2"/87cm
Net Weight	450lbs/205kg	1200lbs/545kg	1275lbs/580kg	1350lbs/615kg
Motor Requirement: Small seeds or Cereals Peas, Beans, Coffee	3	5	7 1/2	10
Deck Size	24" x 38 3/4"	40" x 56"	47" x 66"	44 3/4" x 90"
	61cm x 98cm	102cm x 142cm	119cm x 168cm	114cm x 229cm

SECTION 2

INSTALLATION

2.1 Introduction

The Specific Gravity Separator can easily be installed in most industrial sites with a minimum amount of adjustment and modification. It is the customer's responsibility to provide site preparation and conduct initial inspection of the proposed area to ensure safe and optimum performance.

The following section will include these areas, plus mechanical checkout and initial start-up information.

2.2 Site Preparation

In planning the location of your Gravity Separator, the following factors should be considered:

A) A substantially level foundation must be provided.
B) If the separator is being installed on a wood floor, some underfloor support might be required to conquer any false motion in the deck of Separator.
C) Incoming power lines are easily attachable without the danger of becoming entangled with the equipment or personnel.
D) The machine should be positioned so personnel can perform cleaning, repair and alignment procedures.

FOUNDATION REQUIREMENTS

	SY-100	SY-200	SY-300	SY-400
Static Load	450 lb/205 kg	1200 lb/545 kg	1275 lb/580 kg	1350 lb/615 kg
Dynamic Load	72.2 lb/33 kg	182 lb/83 kg	223 lb/ 101 kg	256 lb/116 kg
Horizontal Component	62.5 lb/28.4 kg	.158 lb/72 kg	193 lb/88 kg	222 lb/101 kg
Vertical Component	36.1 lb/16.4 kg	.91 lb/41 kg	112 lb/51 kg	125 lb/57 kg
Frequency (cycles/minute)	350-500	350-460	350-460	350-460

2.3 Operating Requirements

The Specific Gravity Separator requires one electric motor to drive its components. The following chart specifies which drive will suit the Gravity Separator, you have selected. (Also see table on pg. 3)

MODEL NO.	*H.P. REQUIRED
SY-100	3 H.P.
SY-200	5 H.P.
SY-300	7 1/2 H.P.
SY-400	10 H.P.

*H.P. may vary depending on the product being separated. Motor RPM Standard
1800 for 60 hz
1500 for 50 hz

2.4 Initial Inspection

Before uncrating your machine, examine for evidence of mishandling or damage. If equipment has been damaged in transit, notify ArrowCorp and the carrier immediately.

Be sure to check packing list against material received.

2.5 Installation Procedures

- Mount or lag the unit to the floor. Once the Gravity Separator is place in position and the pads are bolted to the floor, the machine must be at a level position.

- Place the motor (Specified in Section 2.3) on the motor rails. Fit the sheave on the motor shaft and line it up with the machine sheave. Place belts on sheaves and bolt motor to the rails. The belts should be tightened until a 19mm (3/4") deflection is achieved in the center of the belt. Attach guard (supplied) before initial start-up.

- Clean air must be supplied to the machine. The cell type air filter supplied with the mm machine must be carefully erected and far enough away from the machine so that any dust rising from the deck of the machine will not foul the filter inserts. If this is not done, the inserts will soon become clogged up and their efficiency impaired. If possible, the filter should be placed in a dust free room. This can be done by means of a metal or flex duct connected between the air filter module and Gravity Separator.

- The source of feed may be governed by the present position of bins. It is advisable to put a small receiving bin over the feed hopper to ensure an even continuous flow of stock.This receiving bin should be spouted into the Gravity Feed Hopper. The end of this pipe should end slightly below the feed hopper, at normal operating position. The feed hopper, which

is attached directly to the deck, can then be adjusted vertically without upsetting the spout or flow of stock.

- The Specific Gravity Separator discharge hopper assembly operates as part of the deck assembly. Meaning, the hopper oscillates with the gravity deck. Any second hopper or object attached to this will hamper the movement of the deck. Because of its additional weight, therefore restricting premium results when separating your product.

- It is possible in some atmospheric conditions to build up a static electric charge on the machine. It is recommended to ground (or earth) the main frame of the machine.

CAUTION:

- Be sure this machine is securely bolted down and level in both directions.
- Caution must be taken that there are no leaks on the suction side of the machine.
- Do not remove protective covering from deck until ready to operate the machine. (Cloth Deck Only)

- It is recommended that a minimum of 3 feet (1 meter) clearance zone be maintained around the machine for cleaning and maintenance of the machine.

SECTION 3

3.1 Introduction

This section explains the Specific Gravity Separator's mechanical controls and their various functions, as well as the daily operation of the machine and safety precautions that should be considered.

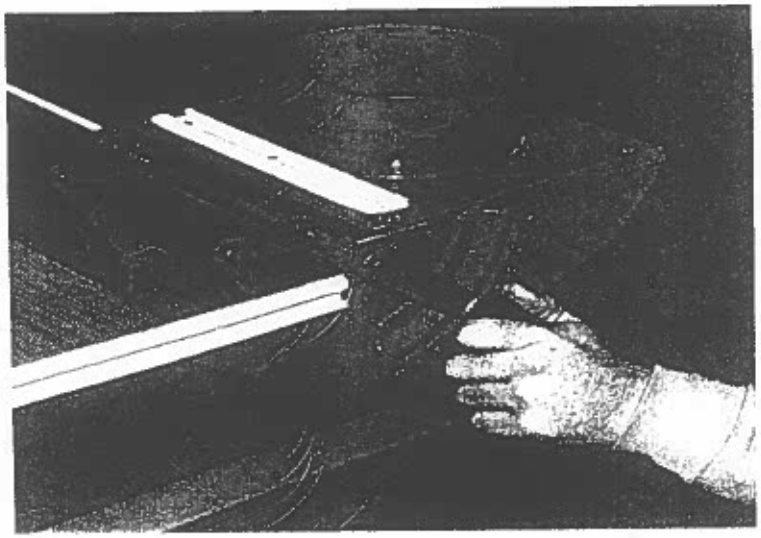
3.2 Operating Controls, Indicators & Adjustments

Even an inexperienced operator may operate the Specific Gravity Separator easily. All controls are conveniently located on the machine. On each control there are numerical gauges to indicate settings. Thus the setting can be recorded for various products, providing references for future work. The following explains the function of each adjustment and the location of the adjustments on the Gravity Separator.

Feed Rate

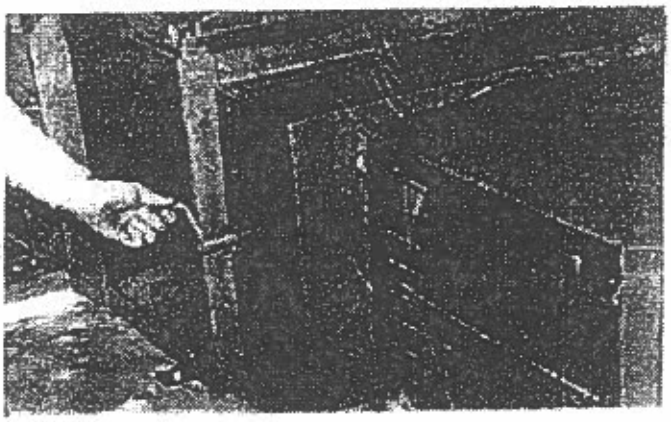
The rate of feed is controlled with one adjustment. Located on the product hopper (Fig. below), is a control knob. To adjust feed rate, loosen knob and slide to desired position. Tighten knob once satisfactory feed is accomplished.

We have found that better results are secured if the feed hopper is set so that the material being fed to the table does not bounce on the deck.



Air Volume

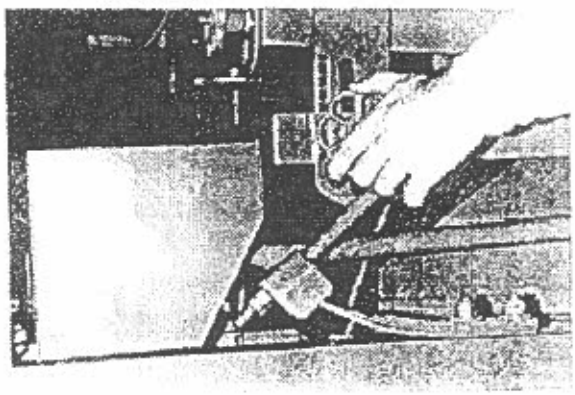
The intake of air can be adjusted accurately with the control handle (Fig below). When the handle rotated counter clockwise, an air gate opens increasing the volume of air allowed to pass through the deck.



End Raise

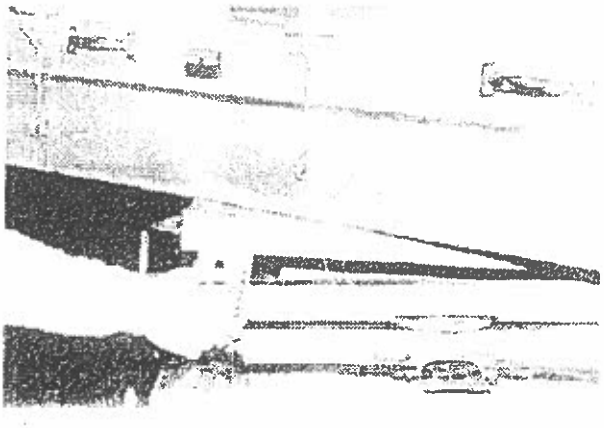
In order to decrease or increase the end slope, loosen the end raise clamp (Fig below) located at the drive end of the machine. By rotating the jack screw located also at the drive end, the desired slope can be obtained. Tighten the clamp by hand only, no tools!

Caution: Clamps alone will not hold adjustments, jacks must be solid to frames as well.



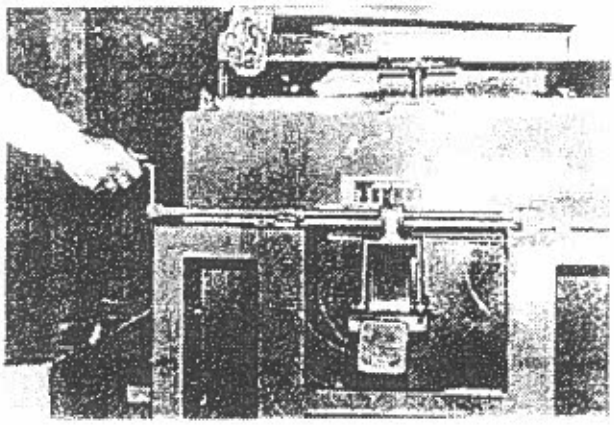
Side Raise

In order to increase or decrease the side pitch of the gravity deck, first loosen the side raise clamp (Fig below) located at drive end of machine. Second, rotate jack screw to obtain desired deck slope, tighten the side raise clamp by hand only, no tools!



Speed

The speed of the machine can be adjusted through the speed change handle (Fig below) located above the motor platform. The machine must be running to adjust the speed.



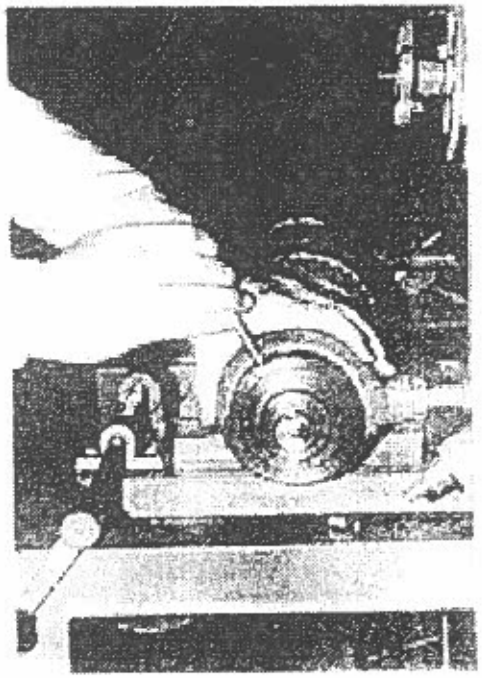
Eccentric Stroke

The Gravity Separator is fitted with variable throw eccentrics, which can be adjusted in 18 positions. To change the length of eccentric throw, proceed as follows:

1) *Disconnect and lock out power.*
2) *Remove eccentric cover*
3) *With set screw wrenches provided, loosen screws in outer rim. (Fig below)*
4) *Remove Knurled pin.* ***Do Not Misplace!***
5) *Rotate rim to desired settings.*
6) *Replace Knurled pin.*
7) *Tighten set screws.*
8) *Replace eccentric cover.*

CAUTION:

Be sure that both eccentrics are set at the same number. The eccentrics are set at 7 when shipped, and may have to be adjusted to suit the product.



Position of Cutting Fingers

The product being separated on the deck governs the location of the cutting fingers. To adjust, follow this procedure:

1) Loosen knurled screw in clamp.
2) Slide cutting finger along discharge hopper rail to desired position.
3) Lock to rail by tightening screw.
4) Adjust angle of cutting finger by knurled screw on top of cutting finger.

Angle of Toggles

The toggles are set at the factory at an angle, which we have found to be satisfactory for most operations. However, it is sometimes desirable to alter the angle and obtain a different lift to the table. Adjustment of the toggle angle is made by lengthening or shortening the eccentric rods. Long threads are provided on these reds for this purpose.

CAUTION:
If the toggle angles are changed, make particularly sure that each rod is tightened up equally, and that the distance from the centre line of the eccentric shaft to the connecting rod is the same on both sides.

3.3 Effects of Adjustment

Introduction

Observe the appearance of the deck load and make one adjustment at a time. Rerun the stock for each adjustment and observe the effect of each adjustment. We have found that it is quite advisable to have one man learn to run this machine. A crowd of people usually has the effect of confusing the operator by suggesting changes of settings before he has thoroughly grasped the effects of the various controls. The deck load should be fluid but not bubbling or boiling. Too much air causes (this boiling condition). The controls, except the feed, are all within easy reach. The simplest way to learn the effects of the various adjustments is to run a small quantity of stock over the table when the unit is at the following positions:

FEED GATE	4	**AIR GATE**	4
SIDE RAISE	1 1/2	**END RAISE**	4 1/2
TABLE SPEED	5	**ECCENTRIC STROKE**	7

The following details the effects of each variable control on the Gravity Separator:

1) An Increase in End Raise:
   - Retards the climb of material up the deck.
   - Causes more material to come off the Table at the low end.

2) An Increase in Side Raise:
   - Increases the rate of flow of material out of the feed area.
   - Causes more material to come off the Table at the low end.

3) An Increase in Speed:
   - Increases the rate of climb of material up the Deck.
   - Livens up the action of the material on the Deck.

4) An Increase in Eccentric Throw:
   - Increases the rate of climb of material up the Deck.

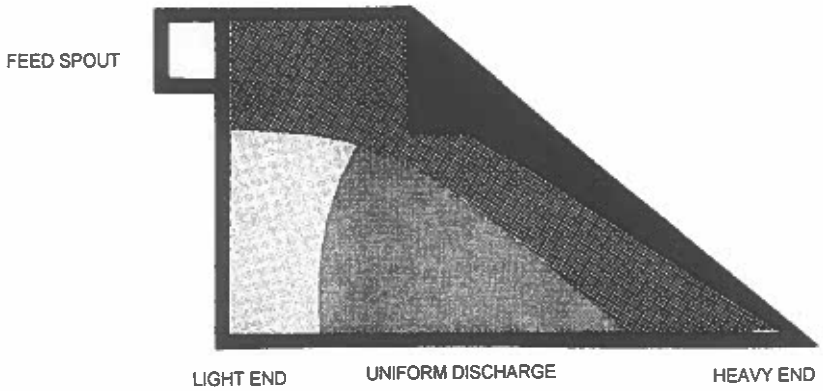
5) An Increase in Air:
   - Retards the climb of material up the Deck.

<u>Maintaining Separation</u>

To make and maintain a separation, it is essential that:

1) Enough air to "float" the material being used.
2) There is sufficient end raise to cause the material to flow evenly off the deck, and also to prevent light material from climbing up the Deck.
3) There is sufficient side raise, so that the material flows freely out of the freed area.
4) The feed area is completely covered by material.
5) The speed is high enough to cause the material to climb up and discharge evenly off the Deck, for that particular setting of the eccentrics.
6) The material be flowed onto the Deck and not splashed on.
7) The flow of feed remains uniform in volume.

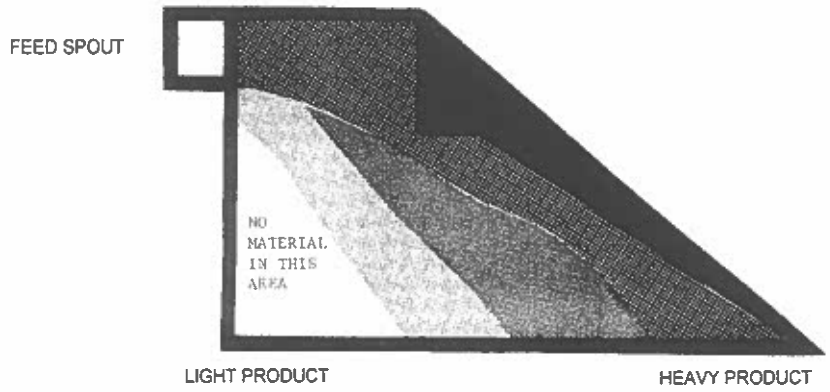
3.4 Daily Operation and Safety Precautions



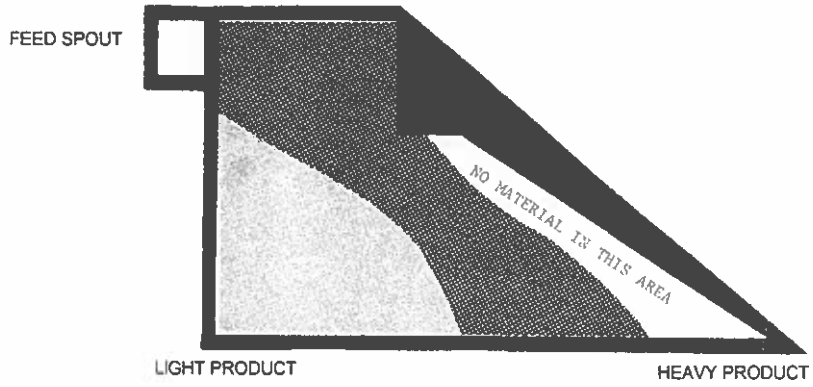
The figure above represents normal deck load distribution of a product. When normal deck load distribution is reached, the product will discharge uniformly. The cutting fingers, when placed in the proper position, will separate concentrate, middlings and tailings (depending on requirements of separation being made).

In order to maintain a constant satisfactory separation in day to day operation, it is essential to follow these 7 steps.

1) Enough air to float the material being used. A dead or boiling action will cause insufficient separation results.
2) There is sufficient end raise to cause the material to flow evenly off the deck, and also prevent light material from climbing up the deck.
3) There is sufficient side raise, so that the material flows out of the feed area.
4) The feed area to be completely covered by material.
5) The speed is high enough to cause the material to climb up and discharge evenly off the deck, for the particular setting of the eccentrics.
6) The material flowing from the feed hopper flows onto the deck and not splashed on.
7) The flow of feed remains uniform in volume.



PROBLEM	CAUSE	SOLUTION
Separation of product Poor, bare or thinly Covered section along Light end banking rail	Excessive speed	Decrease speed by rotating speed Adjustment control (see figure on page 9)
	Insufficient air	Increase air by adjusting air gate control (see Air Volume figure on page 8)
	Insufficient end slope	Gradually increase end raise adjustment (see End Raise figure on page 8)
	Insufficient side slope	Gradually increase side slope and adjustment (see Side Raise figure on page 9)



PROBLEM	CAUSE	SOLUTION
Separation of product Poor, bare or thinly Covered section along Heavy end banking rail	Insufficient speed	Increase speed by rotating speed adjustment control (see Speed figure on page 9)
	Excess air	Decrease air by adjusting air gate control (see Air Volume figure on page 8)
	Excess end slope	Gradually decrease end raise adjustment (see End Raise figure on page 8)
	Excess side slope	Gradually decrease side slope adjustment (see Side Raise figure on page 9)

SECTION 4

MAINTENANCE

4.1 Introduction

The Kipp Kelly Specific Gravity Separator is capable of efficient and reliable operation when it is properly maintained. The following section will explain such procedures that will enable you to get optimum performance from your machine. These areas will include:

1) Service and repair locations
2) Preventative maintenance

4.2 Service and Repair

For service or questions not covered in this manual, Kipp Kelly offers representatives to meet your special needs. Please contact us at the following:

Parts Central Canada: **ArrowCorp Inc.**
61 Airport Road
Winnipeg, Manitoba
Canada
R3H 0V5

Phone: **(204) 632-1000**
Fax: **(204) 632-0643**
E-mail: **arrow@arrowcorp.com**

4.3 Preventative Maintenance

Kipp Kelly Gravity Separators will meet your separation needs, when regular maintenance procedures are followed. Periodic inspection and cleaning of deck covers, filters, as well as proper lubrication are important steps to follow. Preventative and operational maintenance procedures are discussed in the following sections: refer to the Table on page 20 for location of maintenance points.

Air Filters

There are two types of air filters, which are available for use in the Specific Gravity Separator. The standard air filters, which are supplied, are completely disposable. Once dirty, the elements can easily be disposed of by removing them form the frame. When replacing the old filter, be sure the blue side of the new filter faces out. Kipp Kelly supplies a dispenser carton containing 50 - 2" thick filter elements.

An optional filter is also available with the Gravity Separator. A woven screen, oil impregnated filter can easily be cleaned and replaced back into the frame. This type of filter is suitable for

use with cloth covered decks #1, #2, and #3 and wire covered decks #7 and #7H. The following, explains the procedure of cleaning this filter:

1) Remove the filter insert from the filter frame.
2) Direct a stream of hot or cold water at the dirty side of the filter. The dirt and lint are quickly loosened and carried through the large triangular passage (spraying the filter on both sides is recommended - compressed air would be the ideal thing for this) no draining is required.
3) After sufficient cleaning, spray a white oil or viscosity SAE 30 and replace filter.

Deck Cover

In order for the machine to operate at peak efficiency, the gravity deck cover must be free of material, which may clog the pores. With proper maintenance, you can prevent particles from blinding your deck.

Whenever it is necessary to sweep off the deck, use a soft brush and have the machine running.

It is sometimes necessary to take the deck off the Separator and clean the air chest and underside of the deck thoroughly and also to blow out the deck covering. We have found that a certain amount of dust will get into the suction side of the fan in spite of all the air filters we can supply, and after awhile, this dust is deposited on the underneath side of the deck covering. To remove this, we suggest taking the deck off the air chest and placing it face up on two tressels and blowing out by means of compressed air. The air should be applied from the top of the deck so as to blow back any particles that are stuck underneath. The pressure should not be over 25 to 30 lbs. As the deck fabric may be damaged with higher pressures.

Lubrication

All bearings on the Gravity Separator are grease lubricated with high quality lithium based grease. To lubricate the bearings, it is necessary to take off the bearing cover plates, clean out as much of the old grease as possible and flush bearing with oil.

The following will explain proper methods of lubrication, and bearing locations:

1) Lower Cone Shaft & Eccentric Shaft

   On these two shafts the bearings are housed in standard pillow blocks and these are easily accessible. To get at these bearings loosen the two nuts at the top of the bearing housing, lift off top half of cover and the bearing is in the clear. Remove all grease, wash out bearing and replace with new high quality grease by pressing the grease in between the balls and about quarter filling the bottom half of the cover. Great care must be exercised in that you get the top half of the bearing housing properly back in position; otherwise, the bearing may be pinched and damaged.

2) Eccentric

   To lubricate the eccentric, remove the bearing cover, which is on the inner side of the eccentric, wash out the bearing and re-grease by about quarter filling the bearing housing,

using about the same amount of grease as for the main shaft. It is not necessary to completely disassemble this eccentric to lubricate it.

3) Idler

The idler pulley can be lubricated by use of a grease gun through standard grease fittings.

4) Toggle Seats

In our later model Separators, the upper toggle seats are lubricated from the side of the machine through grease fittings. The lower toggle seats are just packed with grease. In the older type machines, the upper toggle seats were provided with an oil hole in the upper toggle frame and the lower seats also provided with recesses for grease.

5) Balance Springs

The springs are grease lubricated and to re-grease, block up upper frame to take weight off the springs. Loosen spring bolts and spread each spring leaf with grease.

6) Spring Clips

The recess in these clips should be kept filled with grease.

7) Shoulder Bolts

Shoulder bolts are fitted with grease nipples and require regular greasing, in addition to regular inspection if of these components. This can be done by loosening the nuts in the spring adjusting bolts to release the tension and any wear or looseness will be noticed immediately.

8) Fan Shaft Bearing

These bearings are fitted with greased nipples and should be greased as recommended in the Table on page 20.

9) General Notes & Instructions

- In re-greasing or lubricating the Gravity Separator, great care must be taken to prevent foreign material from getting into bearings.
- Use only high quality ball - bearing grease. Cheap grease, which frequently contains acid, will ruin bearings in a very short time. One pound of ball-bearing grease will lubricate the Gravity Separator for one year.

10) Lubrication Schedule

The following maintenance chart will assist you in properly maintaining your Specific Gravity Separator.

BEARING LOCATION	BEARING		RECOMMENDED LUBRICANT	CLEANING AND RELUBRICATION
	PG. NO	ITEM NO.		
Fan Shaft	6-A	14		1800 Hrs.
Eccentric Shaft Upper & Lower	6-A	8		3600 Hrs.
Eccentric	4-A	23		3600 Hrs.
Speed Change Pulley	9-A	2		3600 Hrs.
Toggle Seats Upper & Lower	4-A	2, 3, 29, 30		1000 Hrs.
Spring Adjustment Bolts	4-A	15		100 Hrs.

SECTION 5

Replacement Parts

5.1 Introduction

This section contains information on the procedure of ordering replaceable parts for your Kipp Kelly machine. This section also contains exploded drawings and corresponding parts lists to enable you to identify parts quickly and accurately.

5.2 Ordering Information

For immediate service when ordering parts write or telephone your closest Kipp Kelly office or representative (Sec. 4.2) to ensure prompt service, we ask you to follow these steps:

1) Determine the broken or faulty parts(s).
2) Locate the part(s) in the parts list given in section 5.3.
3) Find the part number(s) for the item(s) needed and determine the quantity you require.
4) When writing, please include the following information:

    - Machine model and serial number
    - Purchase order number
    - Date required
    - Method of shipment preferred
    - List of parts required, including part numbers & quantity required

5.3 Parts Locating Data

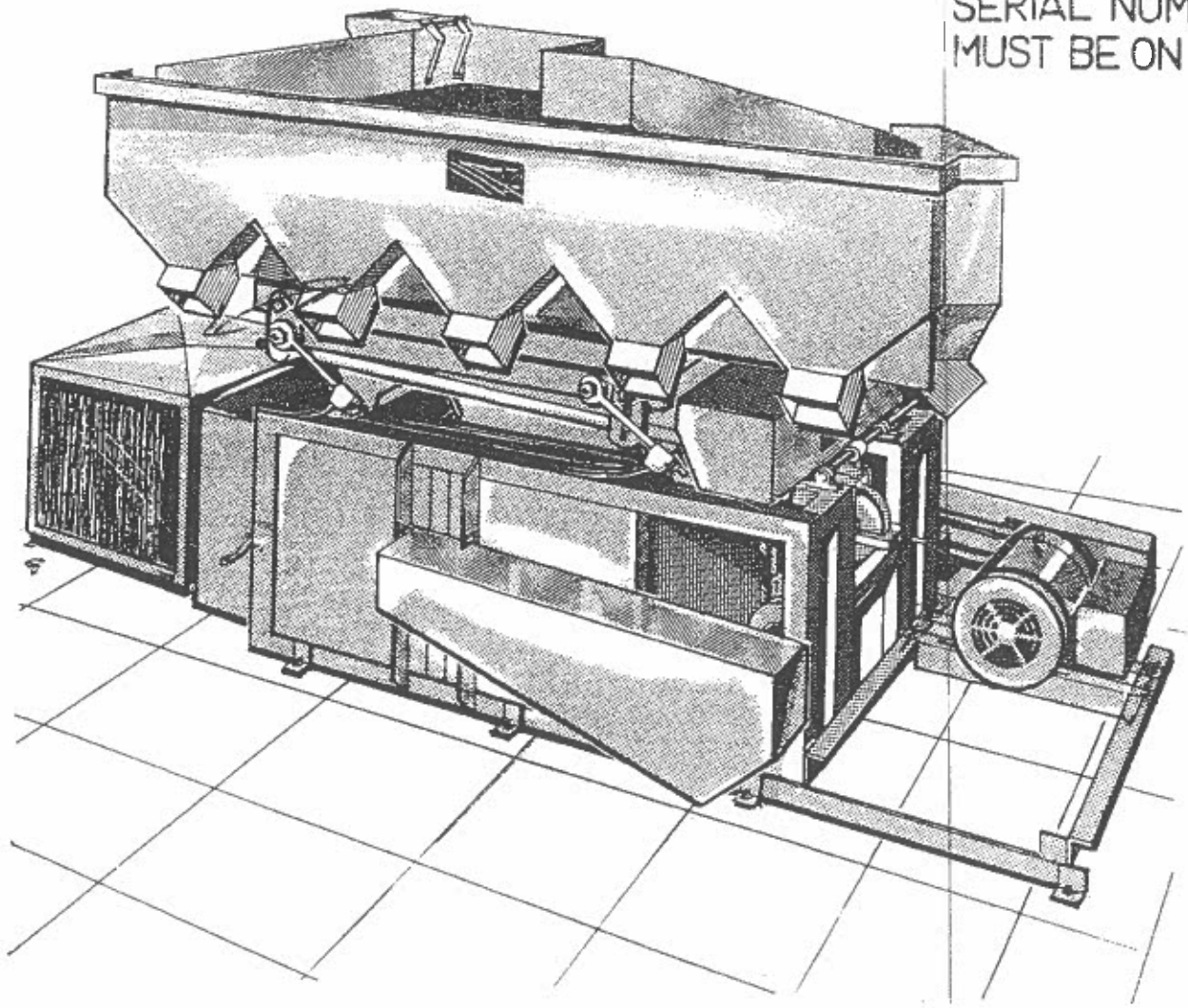
Parts lists for the Specific Gravity Separator are cross-referenced to exploded drawings. The numbered parts in the drawings will make it easy to identify any needed components. Parts lists are indexed by subject as follows:

DESCRIPTION	FIGURE
Discharge Hopper & Air Chest Assembly	1
Deck Assembly	2
End & Side Raise Frame Assembly	3
Goggle Frame Assembly	4
Eccentric Assembly	5
Running Gear	6
Control Adjuster Assembly	7
Speed Control Idler Assembly	8
Guard Set	9
Air Gate frame Assembly	10
Air Filter Housing Assembly	11

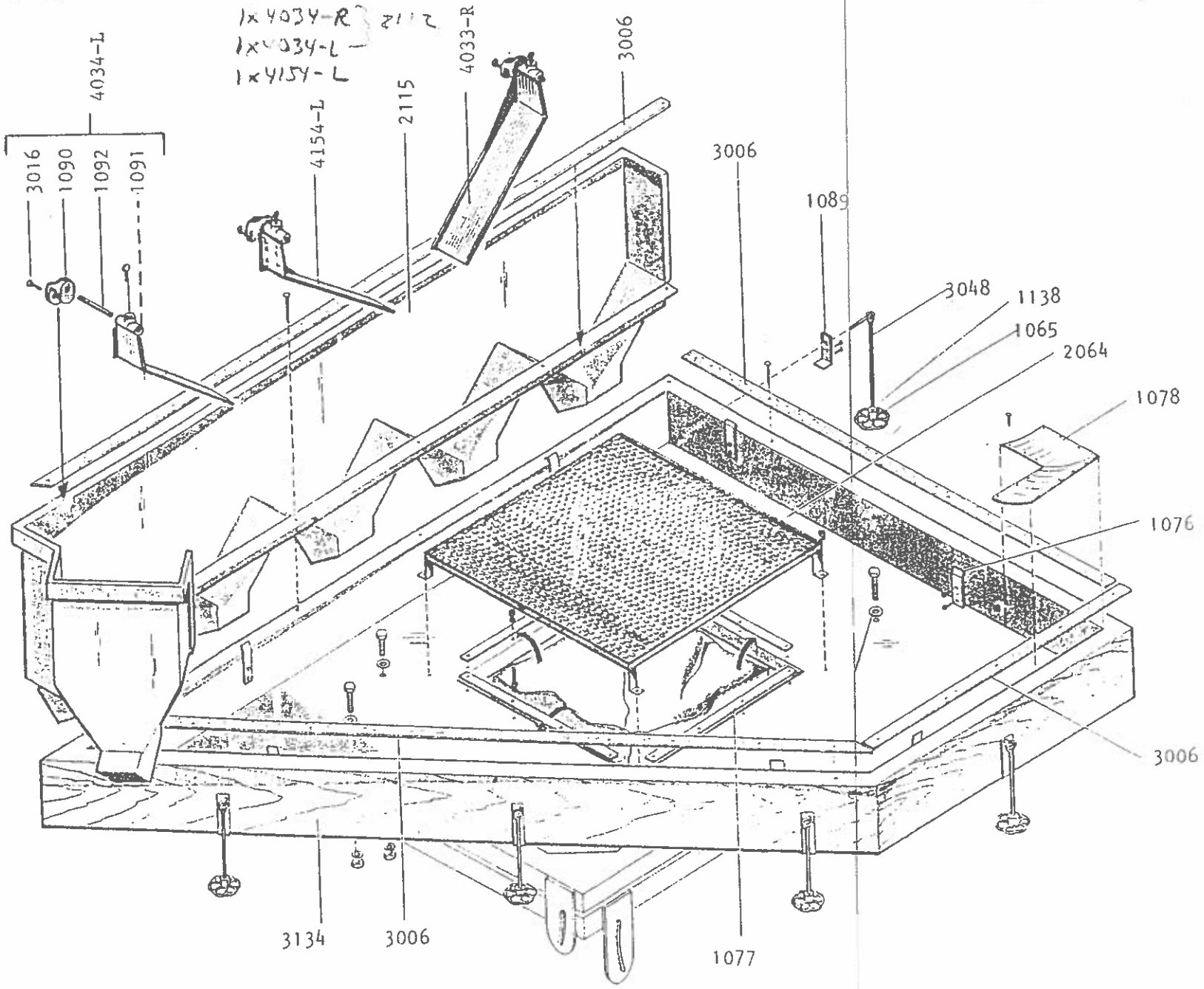
IMPORTANT

SERIAL NUMBER OF MACHINE
MUST BE ON YOUR ORDER

THANK-YOU



SPECIFIC GRAVITY SEPARATOR
MODEL SY - 400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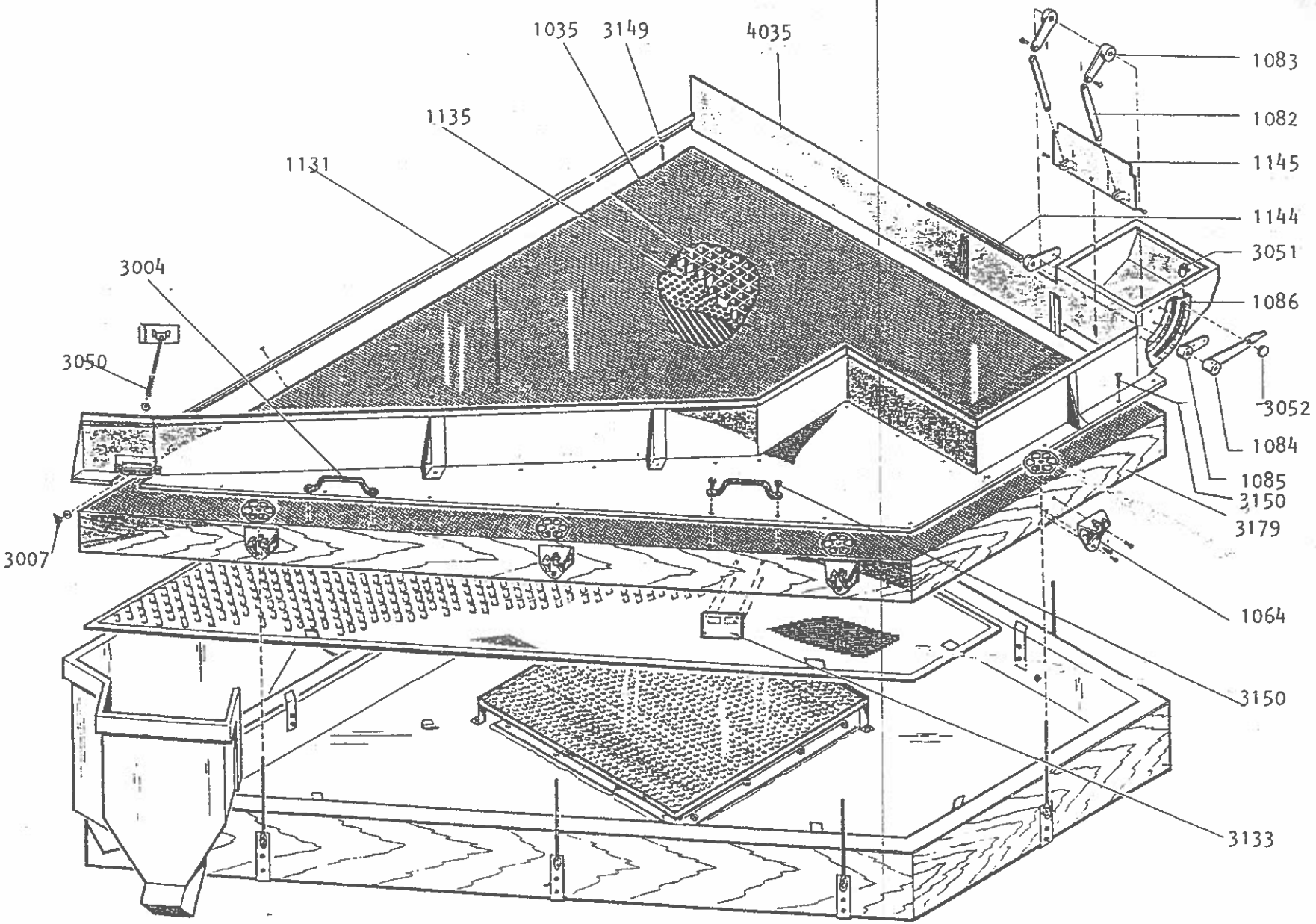
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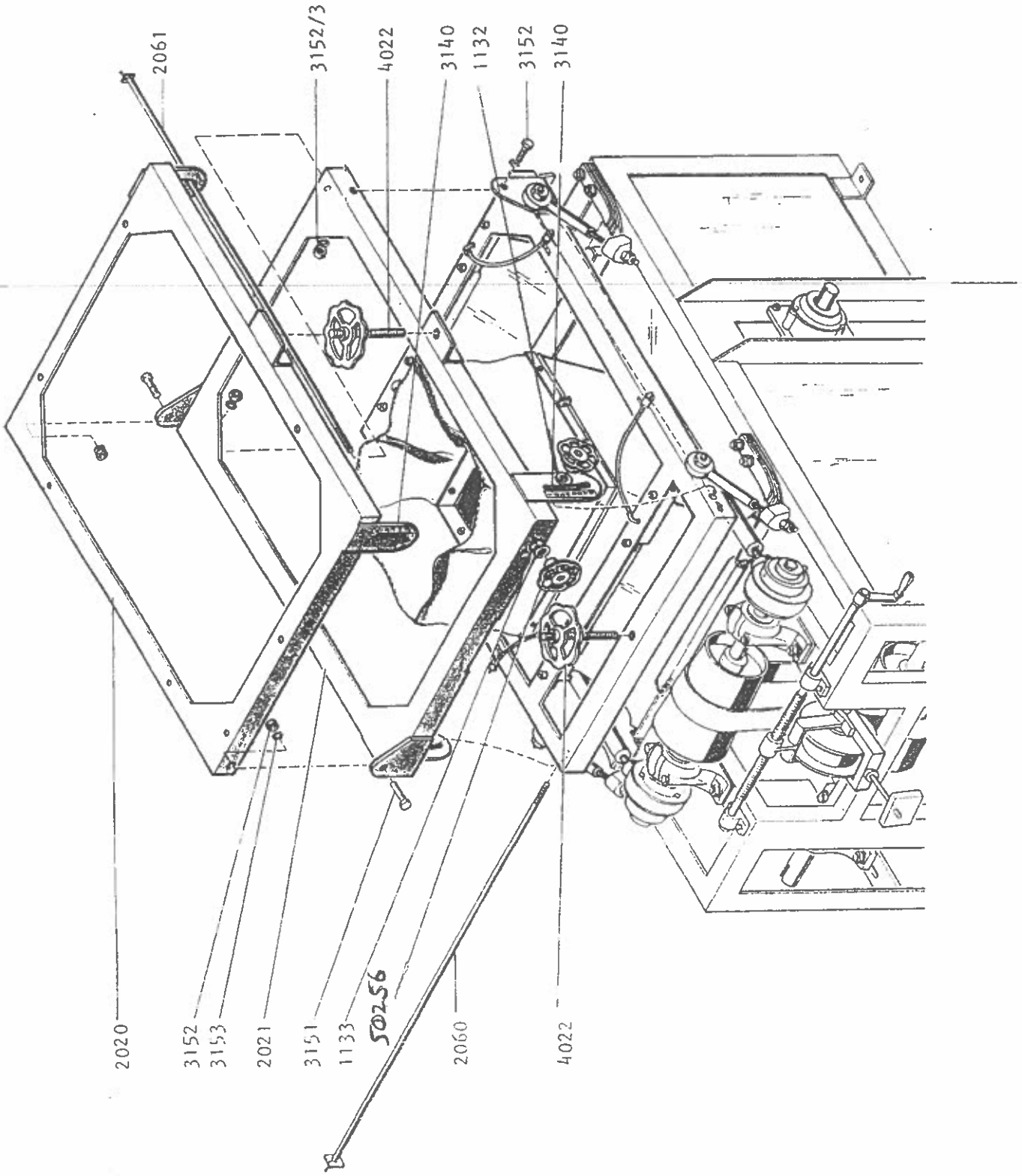
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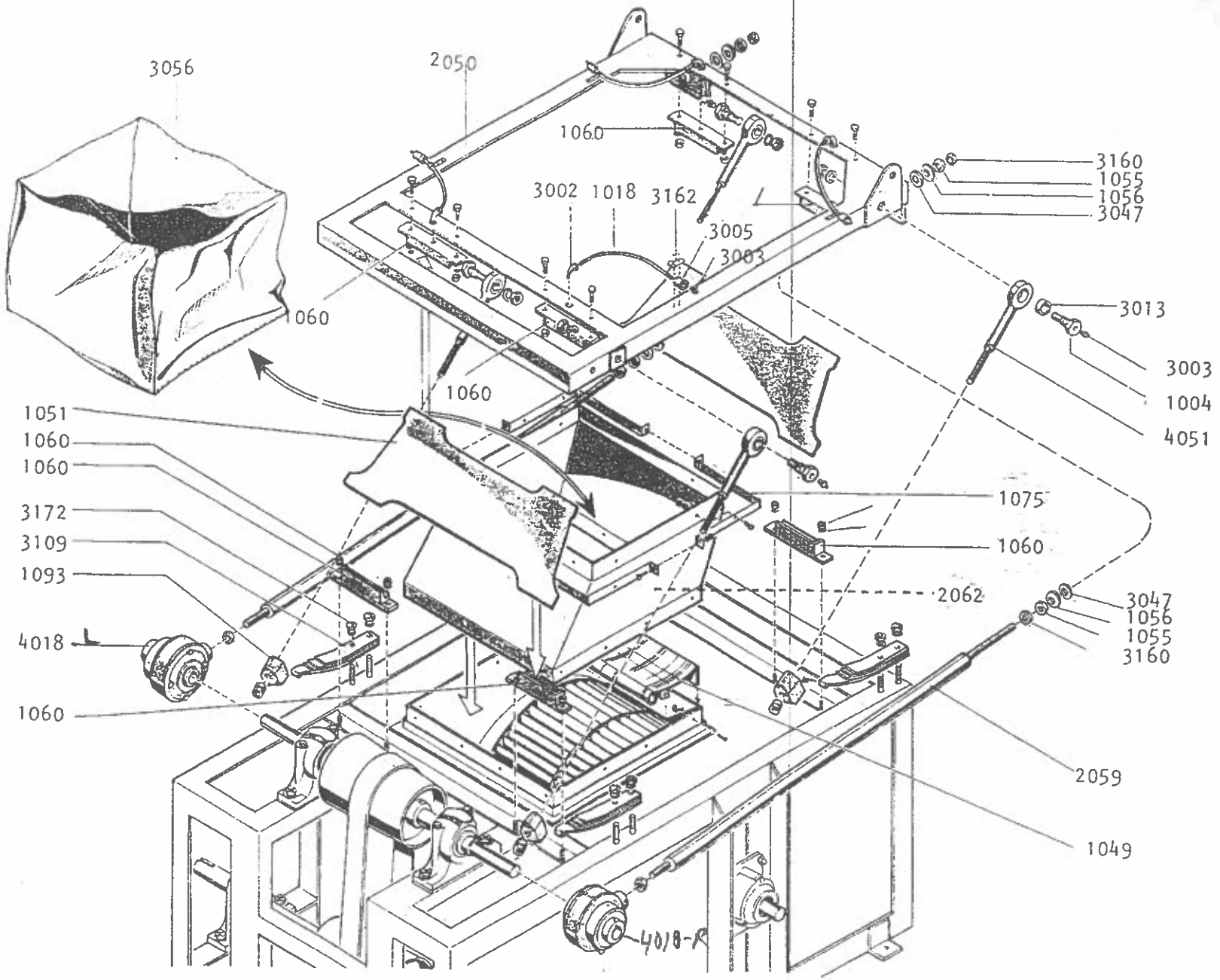
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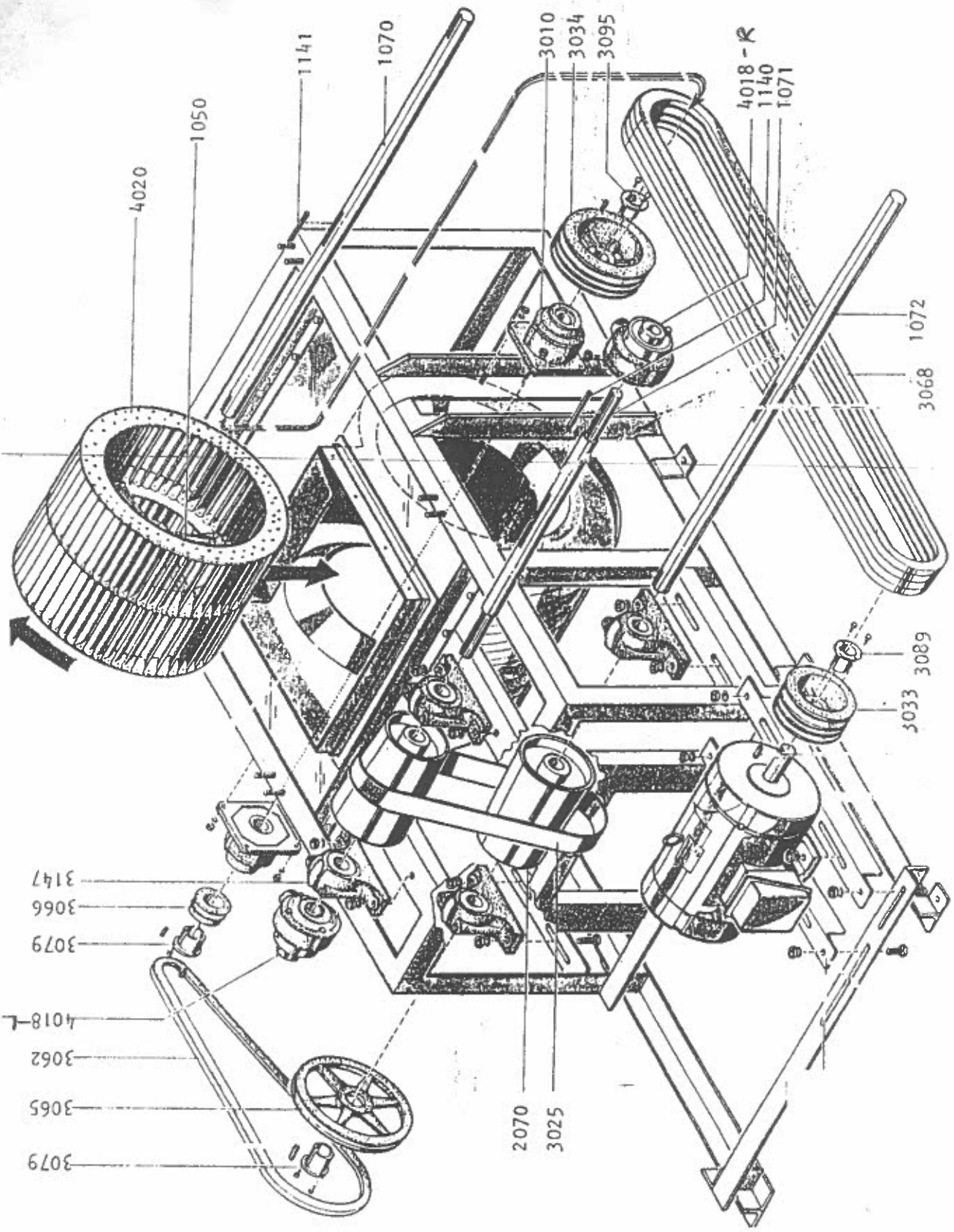
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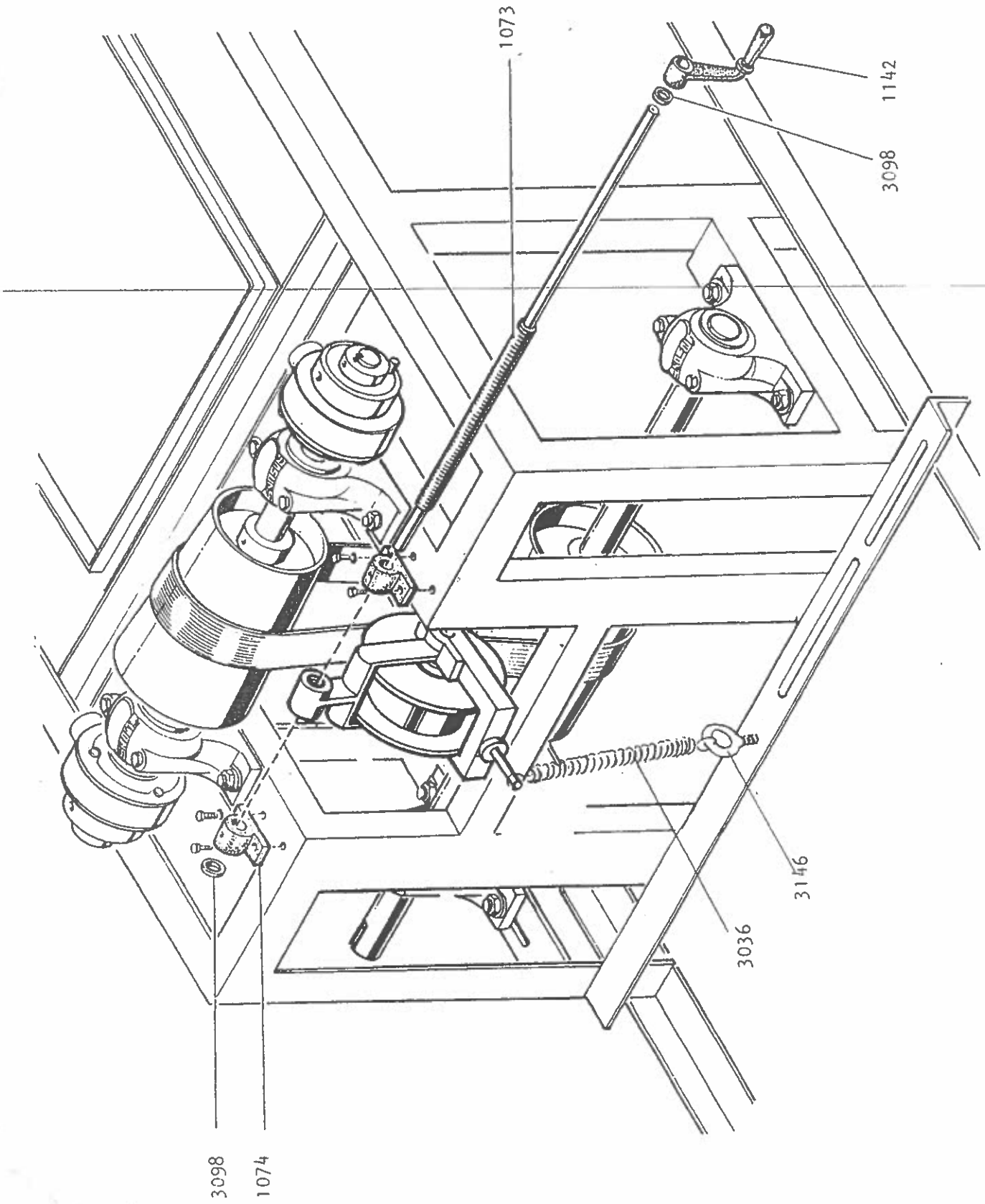
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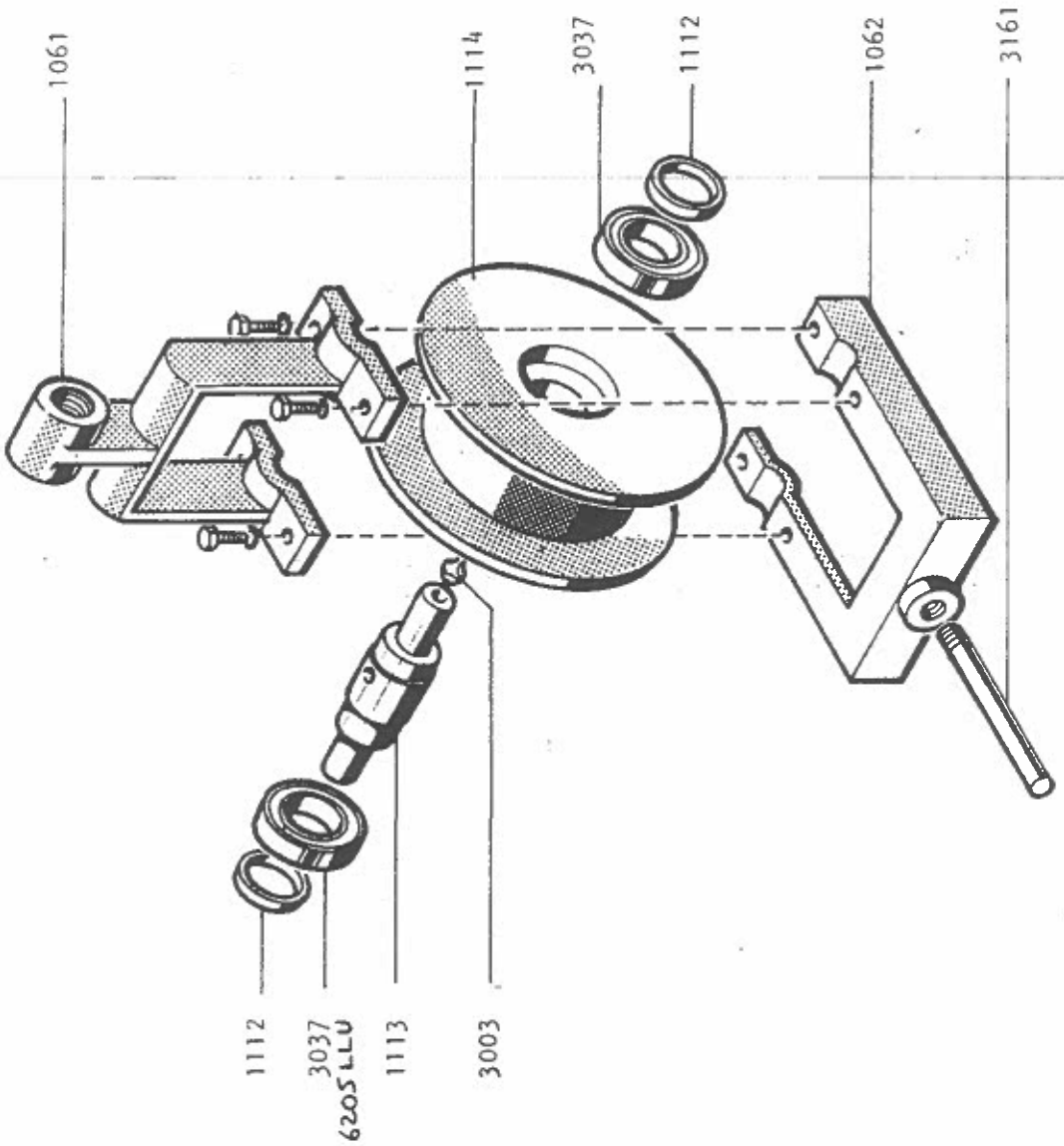
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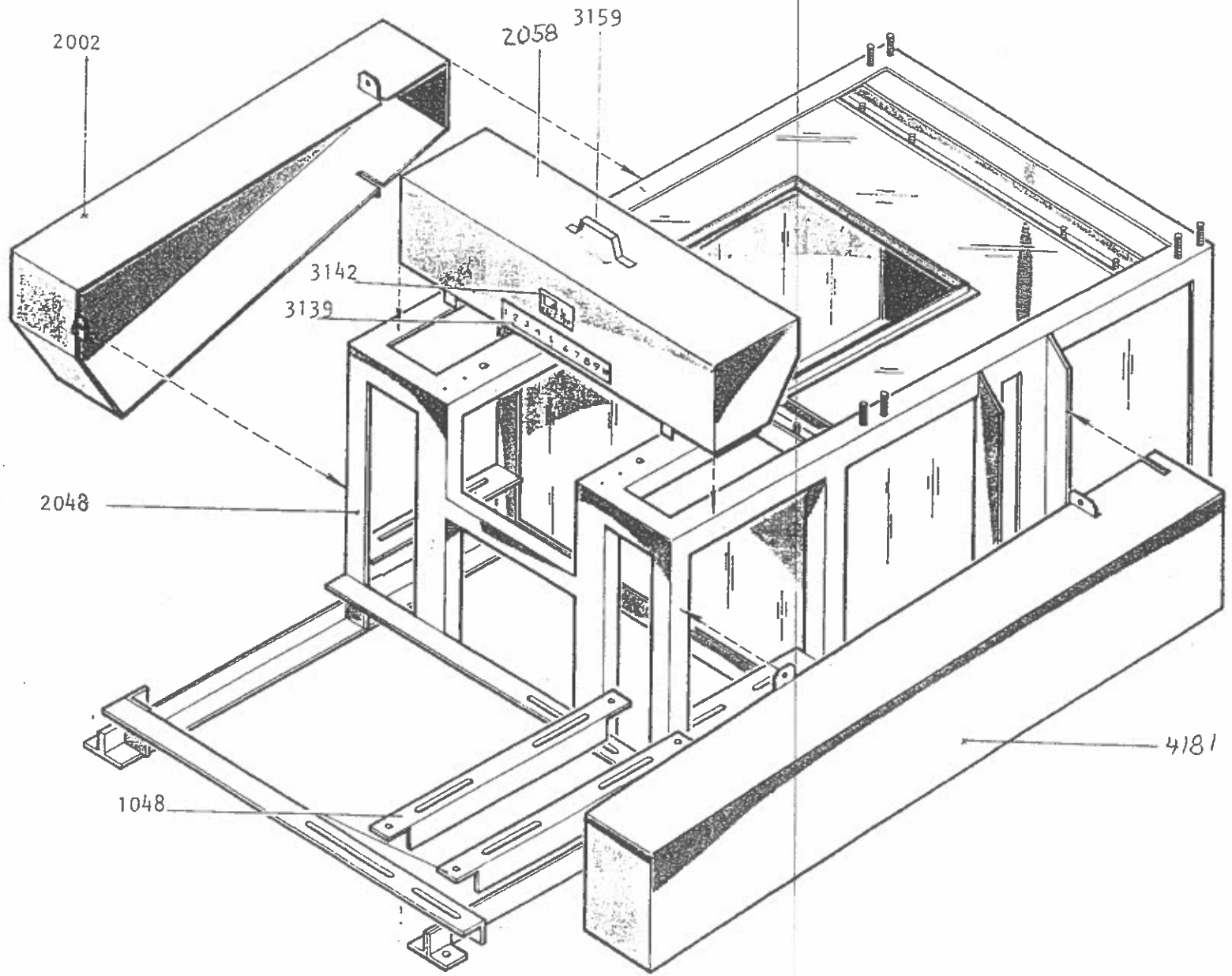
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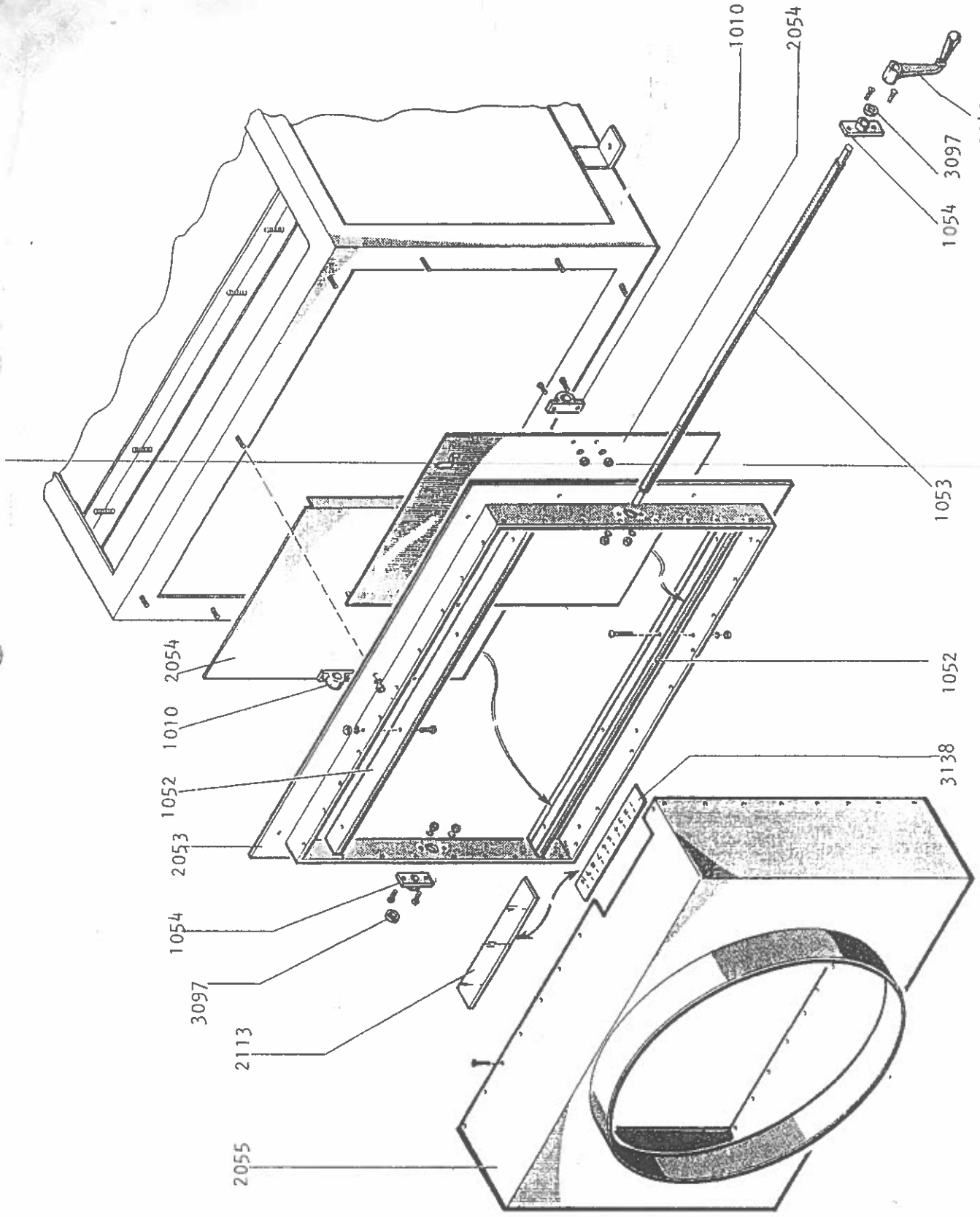
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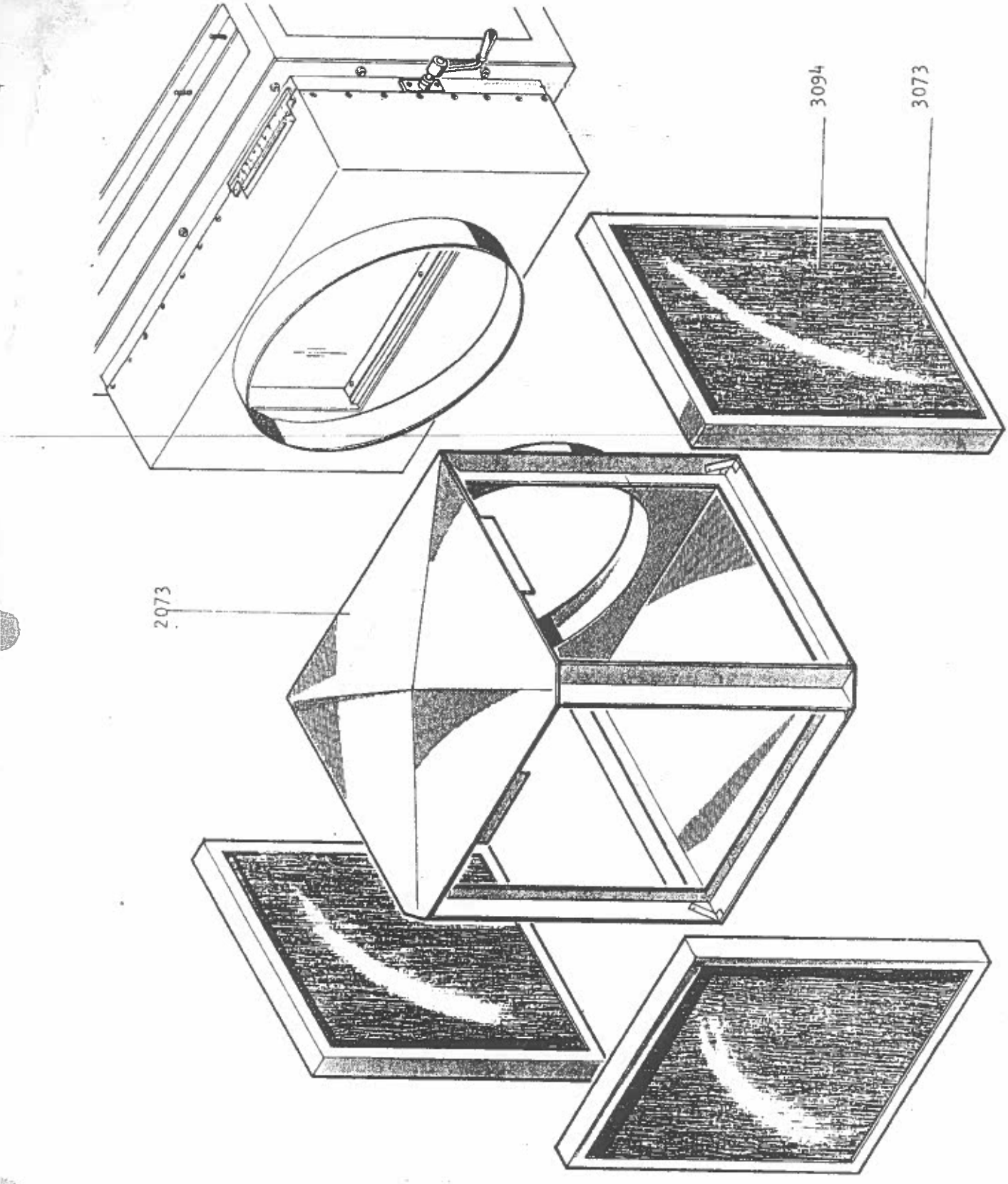
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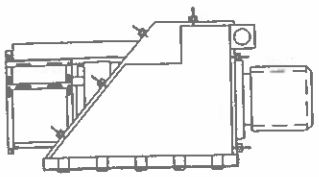

LEFT HAND
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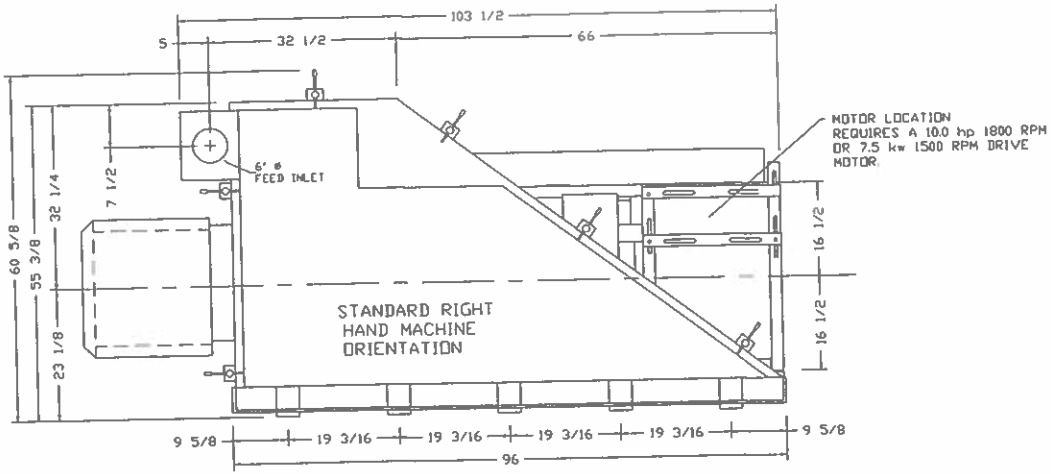
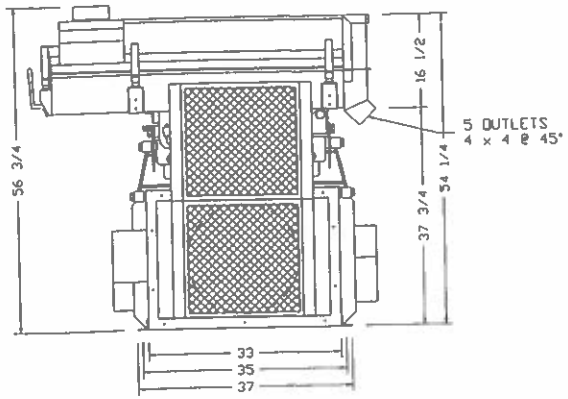
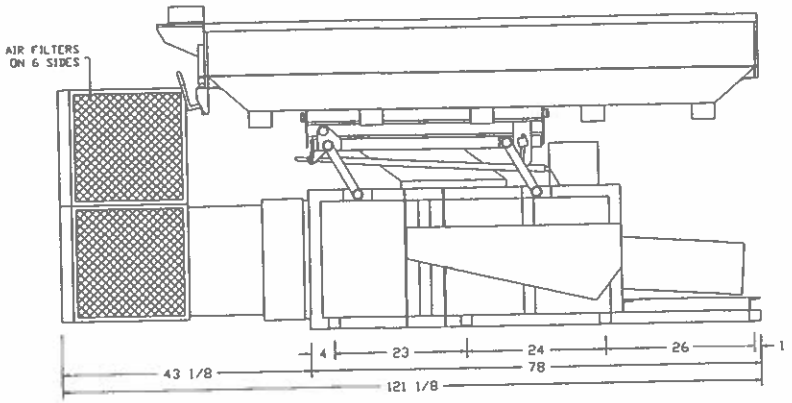
ORIENTATION







CUSTOMER: .
QUOTE REF. NO. .
SALES ORDER .
PAINT COLOR .
ORIENTATION .
TAG .

CUSTOMER APPROVAL
SIGNATURE / DATE

ITEM#	PART#	DESCRIPTION	QTY.	ITEM#	PART#	DESCRIPTION	QTY
09				18			
08				17			
07				16			
06				15			
05				14			
04				13			
03				12			
02				11			
01				10			

DATE	NO	DESCRIPTION - REVISION

STANDARD TOLERANCES UNLESS OTHERWISE SPECIFIED

DECIMAL: XXX. +/- .015 XX +/- .030
XX. +/- .030 XXX +/- .005
X. +/- .045 XXXX +/- .002
FRACTIONS: +/- 1/32
ANGULAR
FORMED +/- 1.0 DEG.
MACHINED +/- 0.25 DEG.

DATE:
DRAWN BY:
CHECKED BY:
ENG. REF. NO.

ArrowCorp Inc.

KIPP KELLY MODEL SY400
SPECIFIC GRAVITY SEPARATOR

ISSUE DATE:	DO NOT SCALE DIMENSIONS	
SCALE: NTS	DRAWING NO: SY400GA	REV: 0