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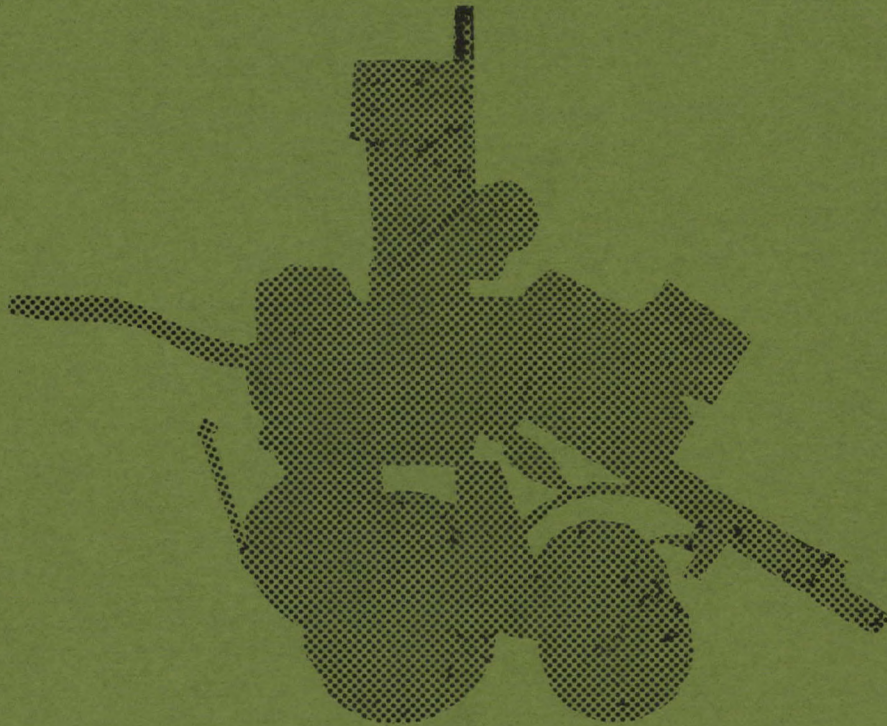
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# VACUUM BLOWER PLOT HARVESTER



## OPERATION MANUAL

G. B. HERGERT



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# Vacuum-Blower Plot Harvester

## Operation Manual

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### 1.0 Introduction

The vacuum-blower harvester described here was developed to quickly harvest two row cereal plots by cutting a minimum amount of material and transferring the cut material directly into a bag. The purpose of this report is to give a detailed description, a parts list and operating instructions.

### 2.0 Description

The basic component of the harvester is a materials handling blower capable of handling stringy materials. The blower has straight radial blades and is capable of producing 3400 l/min of air at 12 cm static pressure (1200 ft<sup>3</sup>/min at 5 in. S.P.). The blower wheel is mounted directly on the motor shaft, and the blower housing has attachments welded to it to form the basic frame of the machine. An attachment to the rear holds the motor, transmission and handlebars and acts as a pivot point for a hinged wheel drive. The attachments to the front hold the cutter bar and act as a pivot for the gathering mechanism. The blower assembly can move up and down on a pair of uprights attached to the wheel chassis.

The wheel chassis has two pairs of wheels, the rear driving wheels and smaller balance wheels in front. The two uprights support the blower and gathering assemblies. A winch is used at the top of the uprights to raise or lower the blower assembly. Stabilizer links are

placed between the wheel chassis and the divider points and are positioned to keep the tips of the points at the same height relative to the ground regardless of the level of the blower assembly. At the rear of the chassis, there is hinged drive incorporating a differential and roller chain drives. This feature permits the engine to be raised in relation to the wheels without any adjustments to keep the chains tight.

The dividers consist of two chain cases in which gathering chains are situated. The gathering chains have protrusions 7 cm (1-3/8 in.) long which extend into the throat area between the dividers. A cutter bar is mounted near the opening to the blower under the dividers. The chain gathering action is effective until cut material is well past the cutter bar. The dividers and cutter bar are driven by a drive arrangement over the top of the blower opening, the frame of which forms a vacuum chamber to draw cut material into the blower. The cutter bar and dividers have a separate clutch from the engine, and have a universal joint drive and a gearbox to reduce speed and to permit hinging.

### 3.0 Components

All commercial components used in the manufacture of the original prototype machine are listed below and are shown in Fig. 1 A, B and C. The components used in commercially produced machines may vary. A space is left for changes if this report is used as an instruction manual. Sources of supply for the components used for the original model are also given. Brand names are used for non-standard items as references only and do not imply preference over other brands.

Figure No.	Part No.	No. Req'd.	Item	Make and Specifications	Source Code
1-A	-1	1	Engine	Briggs and Stratton Model 130232, Type 0036-07, 5 H.P.	1
1-C	-2	1	Muffler	Briggs and Stratton	1
1-C	-3	1	Throttle Control	Briggs and Stratton	1
1-A	-4	1	Blower	Joy Manufacturing, Model 10-6, Design 12W, Arrangement 4 C.C.W. rotation No flanges	
1-C	-5	1	Clamp	Detroit Stamping Co. 207 U	3 or 8
1-A	-6	2	Cable pulleys	4"	3 or 4
1-A	-7		Cable	$\frac{1}{4}$ " wire braided	3 or 5
1-C or D	-8	1	Winch	Fulton 542 (shop modified)	6
1-C	-9	2	Bearings	Lube Align LA-1020-14	7
1-C	-10	1 pair	Rod end bearings	Spherco FR-6	3
1-C	-11	4	Knife sections	2"	9
1-A or C	-12	2	Wheel	Indus Corp. Rim 6 DC 350 WB $\frac{5}{8}$ " bore Tire 4.10/3.50 - 6 2 ply Studded with tube	10
1-A or C	-13	2	Wheel	Indus Corp Rim 8 DC 275 WR $\frac{3}{4}$ " bore (shop modified) Tire 4.80/4.00 - 8 2 ply Studded with tube	10
1-A or C	-14	2	Sprocket	36T #41 chain plate type	3 or 1
1-A or C	-15		Chain	#41 roller chain	3 or 1
1-A or C	-16	2	Sprocket	11T #41 chain hub type	3 or 1

Figure No.	Part No.	No. Req'd.	Item	Make and Specifications	Source Code
1-A	-17	1	Transmission	Foote Model P334-DV with needle bearings	12
1-C	-18	2	Bearings	SKF-PFT 47-0120 2 hole 3/4" flange	3
1-A	-19	1	Sprocket	40T #41 chain, plate type to suit #20	3 or 10
1-A	-20	1	Differential	Indus 57 DP A shaft 13 in., B shaft 9 in.	10
1-C	-21	2	Snap rings		3
1-A	-22	1	Control Cable	to suit	
1-C	-23	1	Idler	2 3/4" dia. x 3/4" wide, 3/8" bore	3
1-C	-25	1	Belt (reel drive)	4L	3
1-A	-26	1	Pulley (Transmission)	National #581 5" dia. x 5/8" bore	3 or 13
1-C	-27	1	Idler bearing (inside of aluminum idler)	SKF	3
1-A	-28	1	Gearbox	Foote Model 35 with needle bearings	12
1-A	-29	1	Sprocket	18T #41 chain, hub type	3 or 11
1-B	-30	2	Bearings	SKF PF 47-0120 3 hole flange 3/4" bore	3
1-B	-31	1	Sprocket	17T #41 chain with large hub (shop modified)	3 or 11
1-B	-32	1	Bearing	SKF PF 40-0100, 3 hole flange, 5/8" bore	3
2-B	-33	1	Universal joint yoke	Spicer 1000 series 1" bore (sleeved to 5/8")	3
2-B	-34	1	Universal joint yoke	Spicer 1000 series 3/4" sq. bore	3
2-B	-35	1	Universal joint yoke	Spicer 1000 series 3/4" sq. slip	3
2-B	-36	1	Universal joint yoke	Spicer 1000 series 3/4" dia. bore	3

Figure No.	Part No.	No. Req'd.	Item	Make and Specifications	Source Code
1-B	-37	2	Universal joint bearing kit	Spicer 1000 series	3
1-B	-38	2	Bearings	SKF, pressed steel pillow block 3/4" bore	3
1-B	-39	1	Pulley	National, 5" dia. x 3/4" bore	3 or 13
1-C	-40	4	Knife guards	2" spacing	9
1-C	-41	1	V-belt	4L	3
1-B	-42	2	Sprockets	36T #41 chain, 3/4" bore	3 or 10
1-B	-43	1	Idler sprocket	18T #41 chain (with oilite bearing inserted)	3 or 11
1-B	-44	1	Rod end bearing	1/2" bore, 1/2" female thread Sperco FRE-8	3
1-A	-45	4	Bushings	3/4" bore x 1" long flanged oilite	3
1-D	-46	2	Head sprockets	#50 - 24 tooth	3 or 11
1-D	-47	2	Idler sprockets	#50 - 24 tooth	3 or 11
1-D	-48		Chain with attachments	#50 with M-1 attachments every 10 pitches	3 or 11



Sources of Supply

Names and address of suppliers are given as information only and do not imply recommendation over other suppliers of similar components. Components listed on the preceding list are such that compact fitting is necessary, and the machine was originally designed using these components.

Source Code	Names and Addresses
1	Briggs & Stratton dealers
2	Joy Manufacturing Co. Ltd., 118 Midland Street, Winnipeg 21, Manitoba.
3	Industrial Suppliers and bearing distributors
4	
5	Hardware stores
6	Auto supply stores
7	R & M Bearings, 5385 Paré St., Montreal 9, Quebec.
8	De-Sta Co. Corporation, 350 Midland Ave., Detroit, Michigan 48203.
9	Year-a-round Cab Corp., P.O. Box 2075, Mankato, Minnesota 56001 (Jari Mower Parts)
10	Indus Corporation, 1815 Madison Ave., Indianapolis, Ind. 46225.
11	Chain suppliers
12	The J. B. Foote Foundry Co., P.O. Box 2214, Deerborn, Michigan 48123.
13	National Hardware Specialties Ltd., Dresden, Ontario.

#### 4.0 Plans

Plans are not available for the vacuum blower harvester. However, dimensions for repair purposes are shown on Fig. 2 A, B and C.

#### 5.0 Operating instructions

##### 5.1 Engine

Normal maintenance for air-cooled gasoline engines should be followed. Check the oil level often. The engine is equipped with a handle bar throttle control which will also turn the engine off when placed at full idle position.

##### 5.2 Clutches

Separate clutches are provided for the wheel drive and for the gathering reel. The wheel clutch is actuated by a handlebar lever and must be held to the on position. Adjustment can be made at the cable end near the engine. The gathering reel clutch is attached to the blower housing and consists of an over centre control bar which can be moved perpendicular to the direction of travel. Adjustments are made in the linkage. There is no clutch for the blower impeller.

##### 5.3 Transmission

The harvester is equipped with a two speed transmission. A shifting lever is located at the rear of the machine for forward and reverse and a second lever is located to the left side of the motor and transmission frame which selects either high or low range.

##### 5.4 Cutting Height Adjustment

The purpose of the variable cutting height on this harvester is to allow a minimum amount of material to be harvested. Cutting height is adjusted by a winch mounted at the tops of the uprights from the wheel chassis. A lock holds the harvester at any desired position, but must be

released to lower the machine. Cutting height is variable from 16 to 26 in. (40 to 66 cm). The divider points remain at 6 in. (15 cm) from the ground regardless of cutting height.

#### 5.5 Bag attachment

The collection bag must be of porous material, preferably jute or hemp. Cotton bags will work, but their capacity is more limited. The bag is held to the blower outlet by a locking clamp. The bag should be drawn tight over the blower spout and overlapped under the clamping surface. A second spring loaded clamp is used to hold the bag up over any adjacent crop. Be sure the bag is of sufficient capacity to hold the material being cut as plugging in the blower outlet will result in seed loss and breakage.

#### 5.6 Dividers for lodged material

Dividers are supplied which attach to the divider drive frame and extend to the ground. These are only necessary for lodged or tangled crops. They may be removed or held up with a rubber rope, cord when not required.

#### 5.7 Handlebar adjustment

The handlebars are adjustable for height by two locknuts, one on each side of the machine.

#### 5.8 Driving

Harvesting must be done in low gear. The capacity of the blower is limited to cut the minimum amount of material possible and yet retain all of the heads. Check blower speed on a guard row before proceeding into a plot. If breakage occurs, the engine speed is too high.

Be careful that blockage does not occur at the blower outlet or bag opening.

If blockage occurs at the blower inlet, the most common cause is excessive forward speed, probably using the wrong gear. Another cause can be cutting too much material - raise the cutting height if possible. If excessive material is continually a problem, the ground speed and gathering chain speed should be reduced by changing the sprockets between the gathering reel drive and the gearbox (28, Fig. 1A) and increase the size of the pulley on the input shaft of the transmission (17, Fig. 1A).

## 6.0 References

Hergert, G. B. 1970. A vacuum-blower plot harvester. Can. J. Plant Sci. 50: 359 - 361.

Hergert, G. B. 1972. A two row cereal plot harvester. Third Int. Conf. I.A.M.F.E., Brno, Czechoslovakia. July 10 - 15.

## 7.0 Manufacturer

To the date of publication, several harvesters have been manufactured by Craftsman Machine Co., 201 Princess St., Winnipeg, Manitoba.

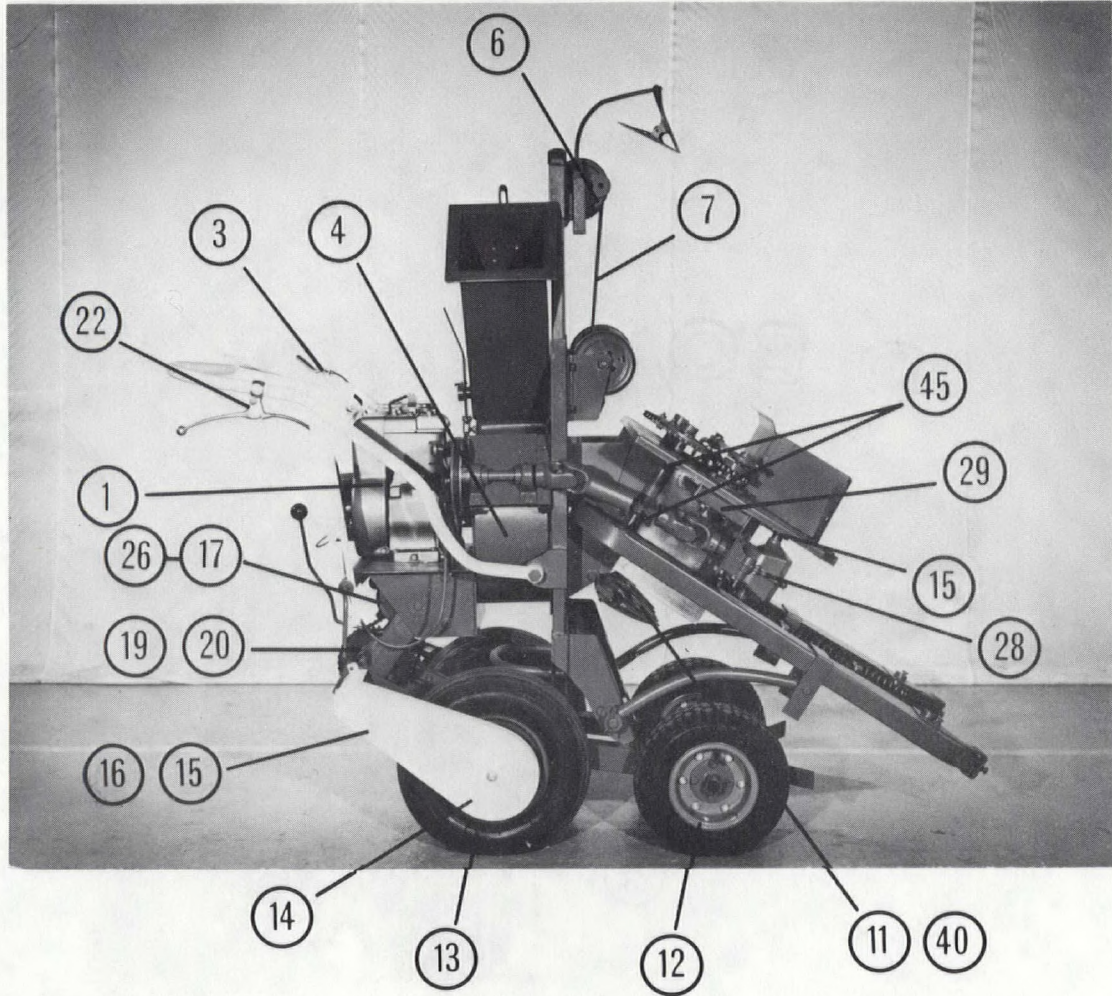


FIG. 1A

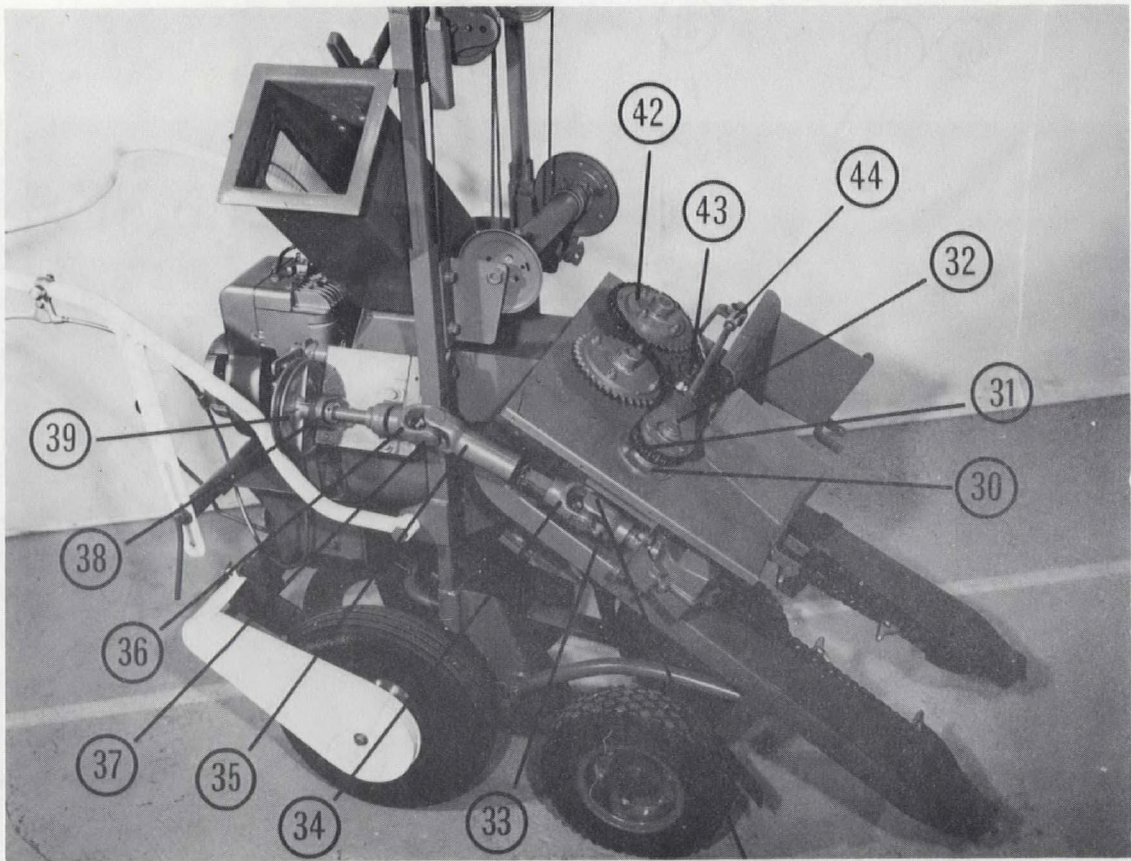


FIG. 1 B

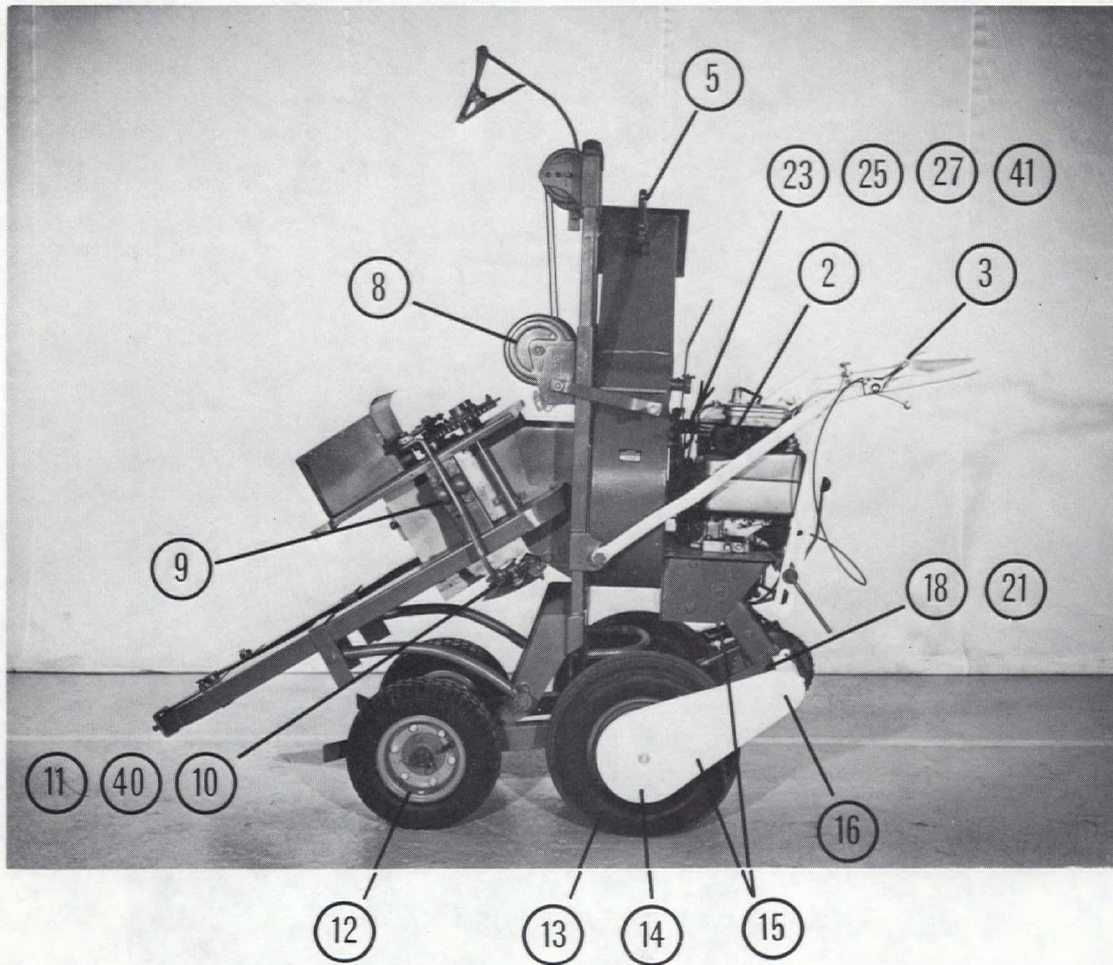


FIG. 1 C



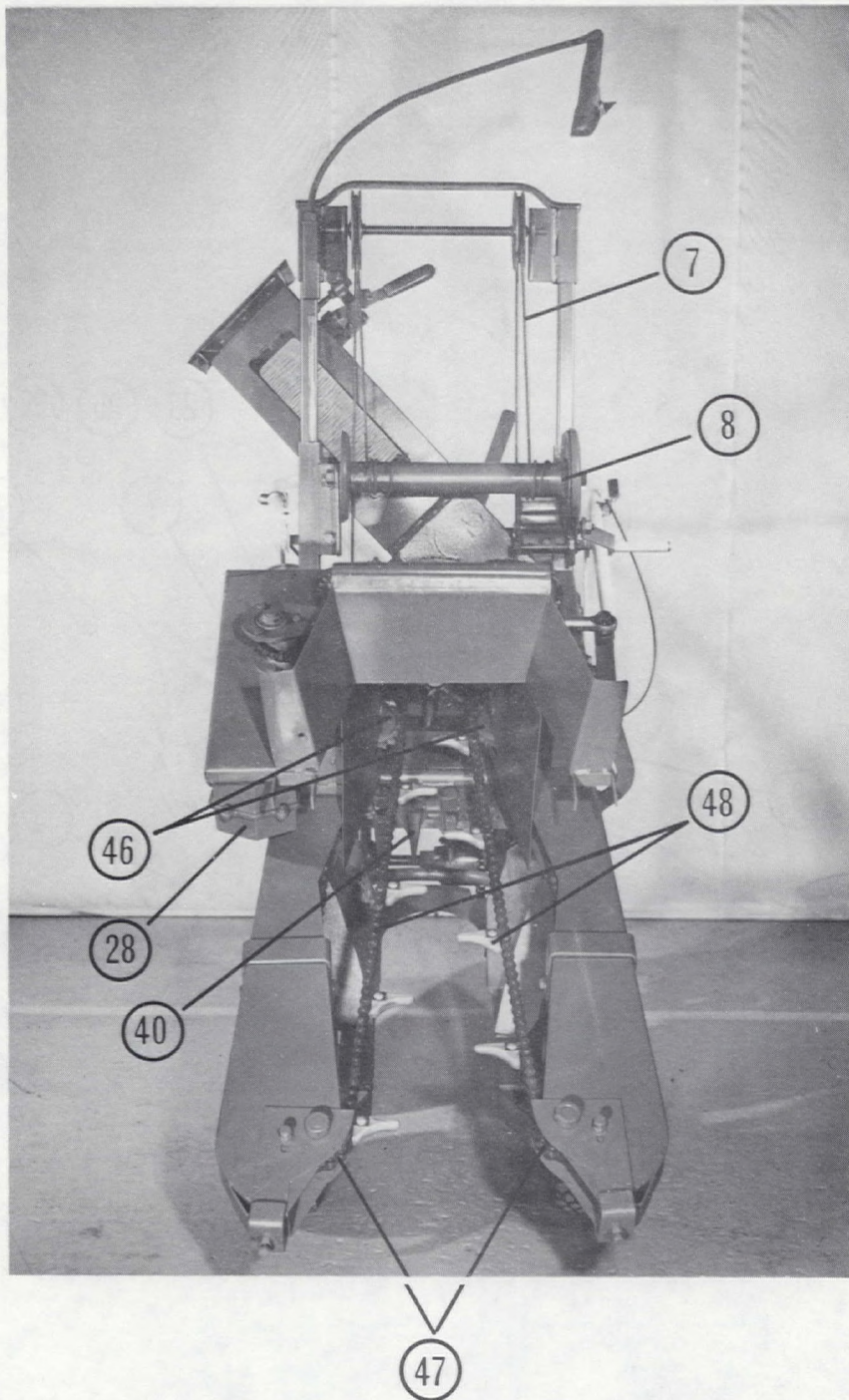
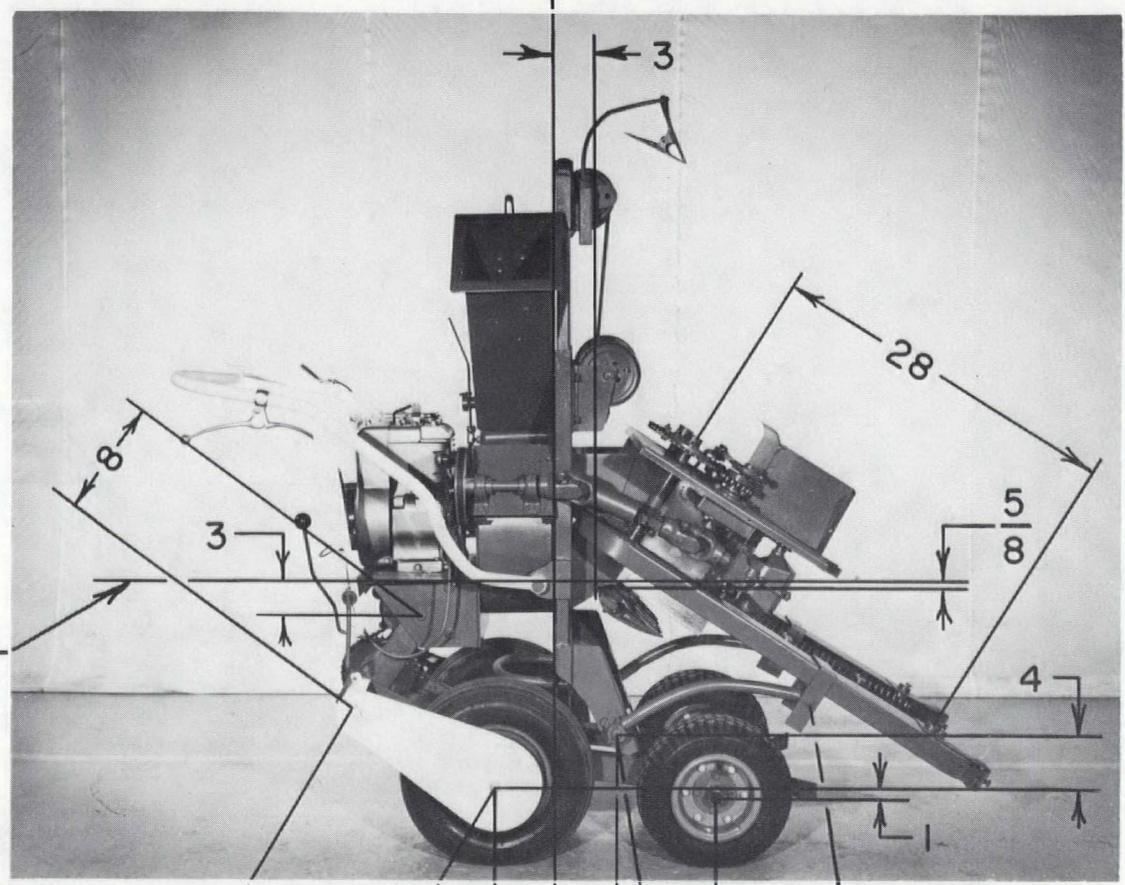


FIG. 1 D

REFERENCE LINE #1 REAR SIDE OF UPRIGHT SUPPORT. SUPPORT MUST BE PERPENDICULAR



REFERENCE LINE #2—  
MOTOR BASE

FIG. 2A

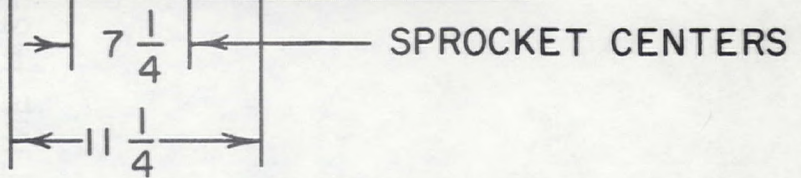
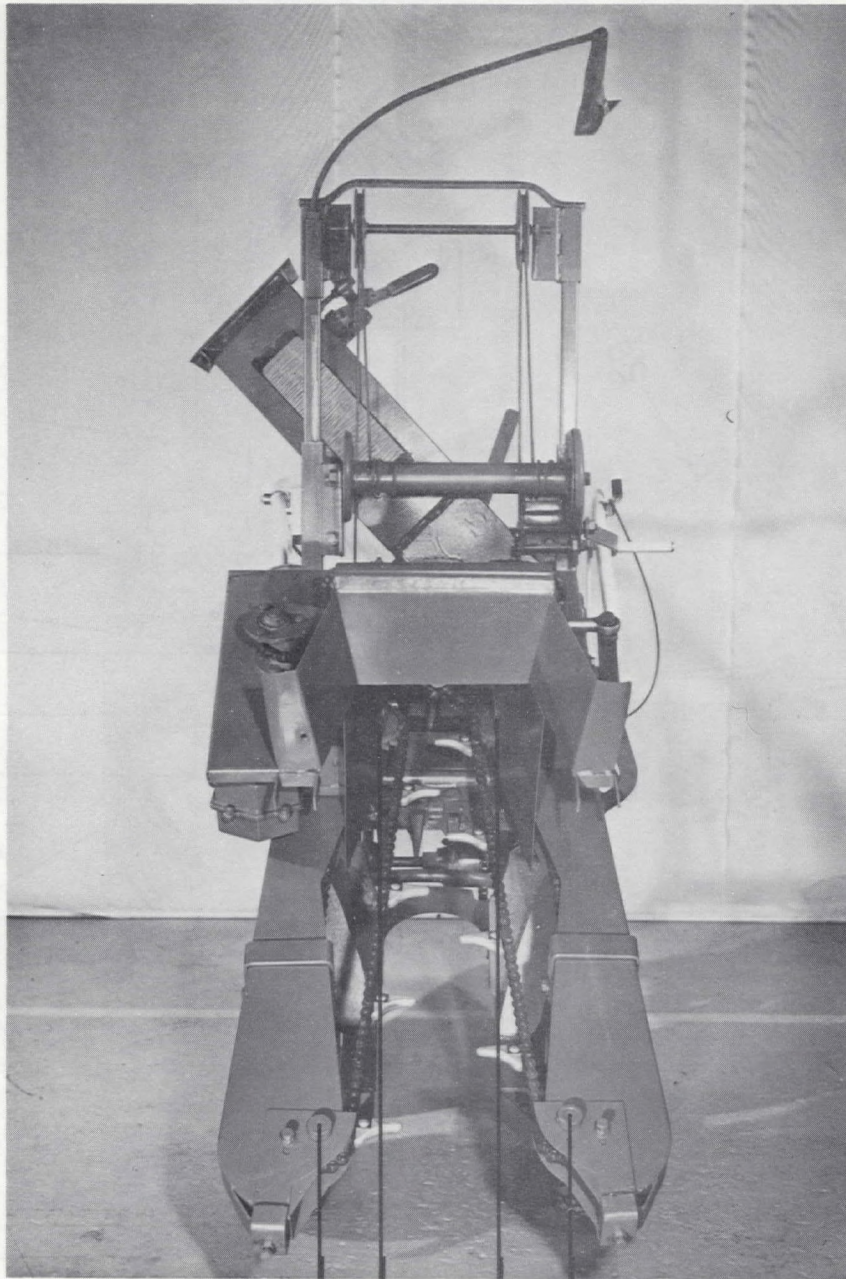


FIG. 2B

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