OPERATING, MAINTENANCE AND INSTALLATION INSTRUCTIONS

AVEY
UPRIGHT DRILLING AND TAPPING MACHINES

MODEL: AVEY MODEL #1/2 HEAVY MA-8

AVEY #1/2 HEAVY MA-8

TABLE OF CONTENTS

MANUAL

INSTRUCTIONS

FOR INSTALLING AND OPERATING NO. ½ HEAVY MA-8 AVEY DRILLING MACHINE

UNPACKING:

Carefully unpack machine from shipping crate. Remove all packing material and slushing compound. The gear box and motor are wrapped with a special tar coated paper; this is to protect the motor from dampness and foreign materials from entering the ventilating slots, and should not be removed until machine is placed in its permanent position.

INSTALLATION:

Place machine in position and level the table. Secure machine to floor if possible. The machine is completely wired, a conduit box is provided for attaching your line wires. Connect your power lines through a fused entrance switch to this box. Check rotation of drill spindle for right hand rotation.

LUBRICATION:

Use only a good grade of clean motor oil SAE-20. The gear box immediately over the motor is provided with a sight oiler. It will require about 1½ pints of oil to fill to the top level of guage. This oil, through an internal pumping system, automatically lubricates the gears and bearings inside the gear box with a spray of oil.

After the machine has been operating for several hours, the gear box will become slightly warm, but no harm will result as long as the sight guage shows almost a full amount of oil.

The lower rotor shaft bearing is provided with an oiler, which is located on the back of the machine directly under the sight oiler and requires a few drops of oil a day.

The spindle splines should be oiled twice a day, through an oiler on the top of the belt guard at the top. The oil cup on the spindle sleeve should be filled once a day. The spindle sleeve also requires a few drops of oil where it slides through the sliding head.

The spindle drive bearings are lubricated by approximately a teaspoon of oil each day at the oil cup on the left hand side of the column, immediately to the rear of the push buttons.

When extreme high speed is used (12,000) the front of the column becomes slightly warm. Adequate lubrication and ventilation facilities have been provided and no undue wear will be present as long as the machine is properly lubricated.

A vertical idler pulley is also to be oiled, an oil hole is provided in the end of the idler pulley stud and is oiled through a slot on top of the belt guard.

The idler pivot bearings are of the bronze oilless type and should never require oil during the life of the machine.

MOTOR AND CONTROL:-

On this machine the motor is wound for .....volts, ...phase, ...cycle, and should not be used with any other electrical power supply. The motor has ample power for the capacity of the machine. The allowable temperature rise is 50° Centigrade above room temperature. The motor will normally become quite warm when operated at its capacity, continuously. If motor trouble develops, contact the nearest office of the manufacturer of your motor, giving serial number, speed, voltage, etc., as shown by the manufacturer's name plate on the rear of motor housing.

The motor control is located at the rear of the top column, under the motor, and is operated from the front of the machine by push buttons. The control is entirely enclosed to prevent collection of metallic dust, which would cause trouble, after a period of time. In case of control trouble, contact the nearest office of the control manufacturer.

OVERLOAD RELAY:

Thermal overload relays are provided to protect the motor from continuous overload and is located at rear of the lower column. Should this relay be tripped, wait approximately sixty seconds and press the button provided which resets the mechanism.

CAPACITY:

This machine is designed and engineered for the following drilling capacities:

Mild Steel—¼"
Cast Iron—⅜"

If a larger size drill than the above is used with the correct feed, the motor will be overloaded.

SPEEDS:

In order to secure a good selection of speeds for drilling from No. 80 to 3/8" drill, eight speeds are provided. Two speeds by the motor, two by gears and a double range by two step pulleys.

The spindle speeds are 1200-1600-2400-3200 RPM, with the belt on the larger step of the spindle pulley and the motor on low speed, and 4500-6000-9000-12000 RPM with the belt on the small step of the spindle pulley and the motor running on high speed. These speeds are clearly indicated on the speed plate, and no difficulty should be experienced in locating the proper speed.

CAUTION:

Do not shift gears while motor is running, it is best to wait until the spindle has almost stopped, and then snap the lever over.

The gears are precision made, and provided with our lubrication system, will give quiet, continuous service for the life of the machine, they may however, be ruined by careless shifting.

A straight, endless canvas belt 1" x 33½" is used for the final drive due to the extreme high speed possible. It is best to use the lowest speed consistent with the operation to be performed. The belt will last over 10 times as long at 1200 than at 12000 RPM.

SPINDLE SLEEVE ADJUSTMENT:

The sliding head is provided with two socket head cap screws for tightening the split head, and a headless set screw for a separator. By adjusting these three screws, the proper adjustment is made between the sliding head and the spindle sleeve to compensate for wear.

SPINDLE RETURN SPRING:

The spindle return spring is adjusted by loosening the socket headless anchor screw on top of sliding head approximately ½" from spring case, turn spring case to desired tension, then tighten the anchor screw. This adjustment is to compensate for the addition of weight on the spindle nose for tools, tapping attachments, etc.

TOOLS FURNISHED:

Each spindle is equipped with a No. 32 Jacobs chuck and wrench.

One wrench for 3/16" headless socket head screw for adjusting spring case.

Two socket head wrenches are furnished for the spindle sleeve adjustment:

One—5/16" wrench for the cap screws in the head and belt guard.

One—5/16" wrench for the headless set screw in the head.

TABLE ADJUSTMENT:

The table is equipped with a table binder and gib for clamping the table solidly to lower column dove tail. Vertical movement is obtained through an elevating device below the table. When locating table in proper drilling position, relieve strain on elevating device by dropping the table one inch or so and clamp table to dove tail.

IDLER PULLEY OR BELT TENSION (SPRING) ADJUSTMENT:

An adjustment is provided to change tension of the idler pulley against the belt. Underneath the idler arm bearing directly behind the spindle, is located a flanged piece provided with spanner wrench holes. This flanged piece is attached to the fixed end of the idler tension spring. This flanged piece is also provided with four countersunk spots for locking purposes. A socket Hex head locking screw is provided and located on the right hand side of the housing about four inches back of the electrical push buttons. The procedure to change the adjustment is as follows:—

1. Apply spanner wrench to holes.
2. Loosen locking screw.
3. Turn spanner wrench to desired tension of idler.
4. Lock locking screw to nearest countersunk spot.

NO. 1/2 HEAVY MA-8 - TOP COLUMN

NO.	PART NAME	QUAN.
1	TOP COLUMN- - - - - - - - - -	1
2	BELT GUARD- - - - - - - - - -	1
3	IDLER ARM - - - - - - - - - -	1
4	IDLER PULLEY- - - - - - - - -	1
5	IDLER PULLEY STUD - - - - - -	1
6	IDLER PULLEY STUD BEARING - -	2
7	TRUARC RING (#5100-46)- - - -	1
8	TRUARC RING (#5000-125) - - -	2
9	IDLER ARM STUD- - - - - - - -	1
10	IDLER ARM STUD BUSHING- - - -	2
11	IDLER ARM SLEEVE- - - - - - -	1
12	IDLER ARM SPRING- - - - - - -	1
13	GEAR SHIFT HANDLE - - - - - -	1
14	BAKELITE KNOB - - - - - - - -	1
15	SHIFTER SHAFT COLLAR- - - - -	1
16	GEAR SHIFTER SHAFT- - - - - -	1
17	OIL SEAL- - - - - - - - - - -	1
18	GEAR SHIFT LEVER- - - - - - -	1
19	GEAR SHIFTER PIN- - - - - - -	1
20	GEAR SHIFTER DOG- - - - - - -	1
21	GEAR CASE - - - - - - - - - -	1
22	SLIDING GEAR SHAFT- - - - - -	1
23	LOCK NUT- - - - - - - - - - -	2
24	LOCK WASHER - - - - - - - - -	2
25	WOODRUFF KEY (3/16 x 3/4) - -	1
26	BEARING FLANGE NUT- - - - - -	1
27	UPPER GEAR SHAFT BEARING- - -	1
28	SLIDING GEAR SHAFT COLLAR - -	1
29	SLIDING GEAR- - - - - - - - -	1
30	SLIDING GEAR BALL SPRING- - -	1
31	STEEL BALL (3/16" DIA.) - - -	1
32	SLIDING GEAR KEY- - - - - - -	2
33	IMPELLER PLATE- - - - - - - -	1
34	PUMP IMPELLER - - - - - - - -	1
35	LOWER GEAR SHAFT BEARING- - -	1
36	GEAR CASE CAP GASKET- - - - -	1
37	GEAR CASE CAP - - - - - - - -	1
38	ROTOR BEARING BUSH NUT- - - -	1
39	UPPER ROTOR SHAFT BEARING - -	1
40	BEARING FLANGE- - - - - - - -	1
41	BEARING FLANGE GASKET - - - -	1
42	ROTOR BEARING BUSH- - - - - -	1
43	ROTOR SHAFT NUT - - - - - - -	1
44	DRIVE GEAR- - - - - - - - - -	1
45	ROTOR SHAFT KEY - - - - - - -	1
46	FLINGER - - - - - - - - - - -	1
47	ROTOR SHAFT SPACER- - - - - -	1
48	BEARING CAP- - - - - - - - - -	1
49	BEARING CAP GASKET - - - - - -	1
50	LOWER ROTOR SHAFT BEARING- - -	1
51	ROTOR SHAFT SPACER - - - - - -	1
52	ROTOR FAN- - - - - - - - - - -	1
53	MOTOR SHAFT KEY- - - - - - - -	1
54	TWO (2) SPEED MOTOR- - - - - -	1
55	ROTOR SHAFT- - - - - - - - - -	1
56	ROTOR SHAFT SPACER - - - - - -	1
57	ROTOR SHAFT BEARING- - - - - -	1
58	LOWER BEARING CAP GASKET - - -	1
59	ROTOR BOTTOM CAP - - - - - - -	1
60	SPINDLE DRIVE SLEEVE - - - - -	1
61	TOP CAP NUT- - - - - - - - - -	1
62	TOP CAP- - - - - - - - - - - -	1
63	DRIVE SLEEVE BEARING - - - - -	2
64	UPPER BUSH - - - - - - - - - -	1
65	OIL FLINGER- - - - - - - - - -	2
66	FLINGER RING - - - - - - - - -	1
67	BUSH SPACER- - - - - - - - - -	1
68	LOWER BUSH - - - - - - - - - -	1
69	DRIVE SLEEVE SPACER- - - - - -	1
70	LOWER DRIVE SLEEVE NUT - - - -	1
71	UPPER DRIVE SLEEVE NUT - - - -	1
72	LOWER HOOD - - - - - - - - - -	1
73	PUSH BUTTON PLATE- - - - - - -	1
74	SET SCREW-BELT GUARD MOUNTING- -	3
75	GITS OILER (#SGE-4051) - - - -	1
76	GITS 90° ELBOW (#8157) - - - -	1
77	GITS OILER (#1206) - - - - - -	1
78	TAPER PIN (#2 x 1¼") - - - - -	1
79	GITS OILER (#101)- - - - - - -	1
80	PUMP IMPELLER RETAINER PIN - -	1
81	DRIVEN PULLEY (SPECIFY SPEEDS) -	1
82	CANVASS BELT (SPECIFY SPEEDS)- -	1
83	DRIVE PULLEY (SPECIFY SPEEDS)- -	1
84	DRIVEN PULLEY KEY- - - - - - -	1
85	GEAR SHAFT SPACER- - - - - - -	1
86	TAPER PIN (#1 x 1")- - - - - -	1
87	PUSH BUTTON (HIGH-LOW) - - - -	2
88	PUSH BUTTON (STOP) - - - - - -	1

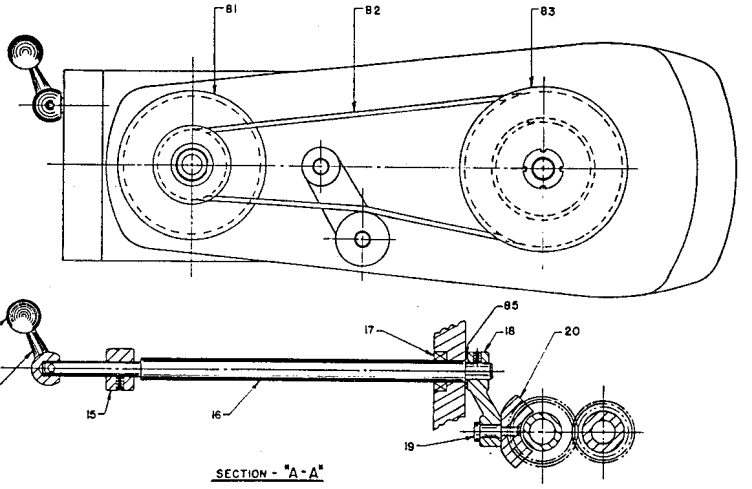
INSTRUCTIONS FOR ORDERING REPAIR PARTS

Order Parts by Number, Name, and Bulletin Number. Give Serial Number found on brass plate and Machine Number stamped on top of dovetail which carries the table.

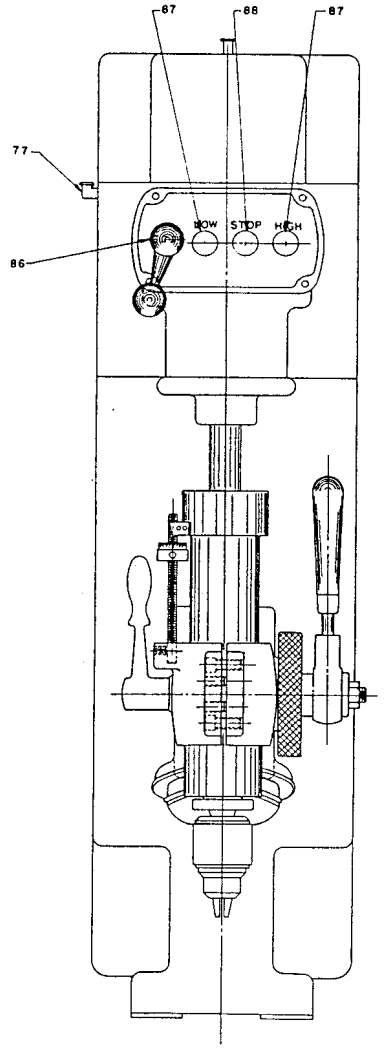
AVEY DIVISION - Motch & Merryweather Machinery Co.
Cincinnati, Ohio

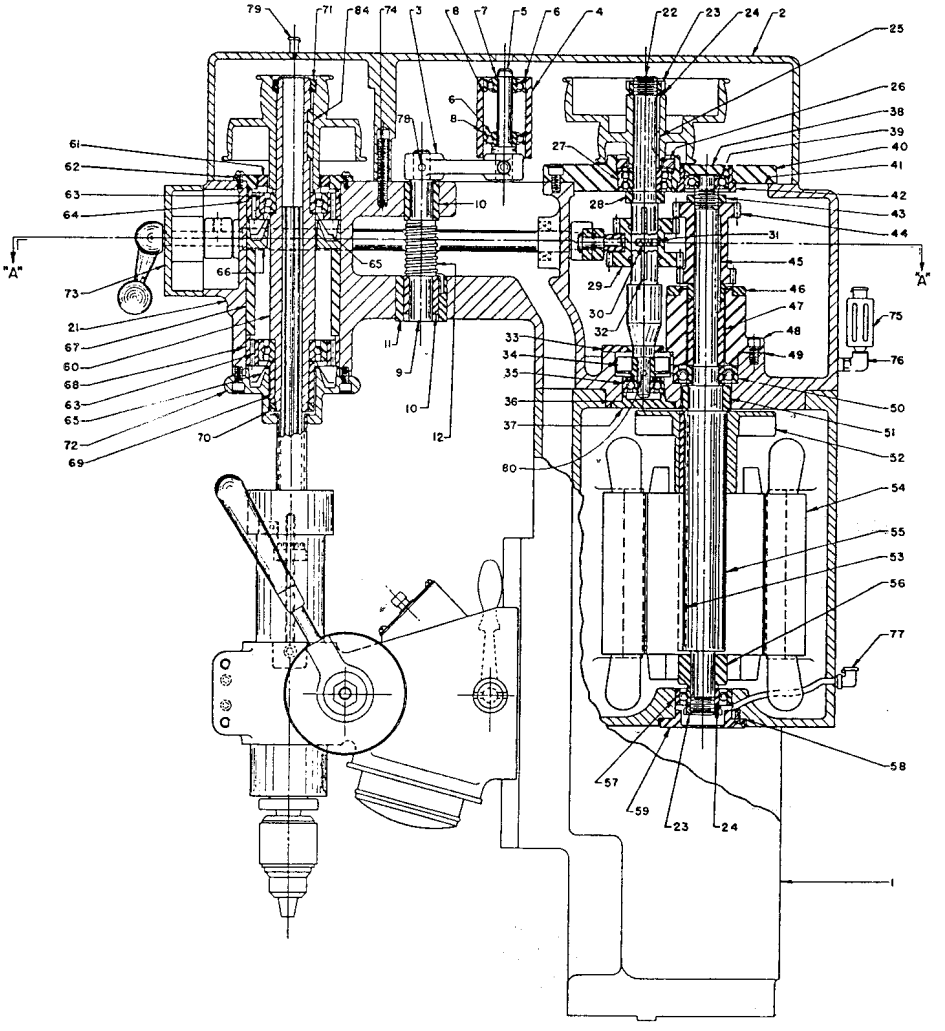
BULLETIN NO. RB-1458

NO. 1/2 HEAVY MA-8 - TOP COLUMN



SECTION - "A-A"





RB 1458 MEH 1-15-60

NO. 1/2 HEAVY MA-8 HEAD

NO.	PART NAME	QUAN.
93	HEAD- - - - - - - - - - - - -	1
94	HEAD BINDER STUD- - - - - - -	1
95	HEAD BINDER HANDLE- - - - - -	1
96	SWITCH MOUNTING PLATE GASKET-	1
97	SINGLE POLE PUSH TYPE SWITCH-	1
98	SWITCH COVER- - - - - - - - -	1
99	LAMP SOCKET - - - - - - - - -	1
100	LAMP SOCKET BRACKET - - - - -	1
101	DOME LIGHT COVER GASKET - - -	1
102	DOME LIGHT COVER, RETAINER, & DOOR - - - - - - - - - -	1
103	DOME LIGHT LENS GASKET- - - -	1
104	RACK PINION - - - - - - - - -	1
105	RACK PINION CAP - - - - - - -	1
106	RACK PINION BEARING - - - - -	2
107	SPRING CASE- - - - - - - - - -	1
108	SCROLL SPRING- - - - - - - - -	1
109	SPRING CASE LID- - - - - - - -	1
110	RACK PINION DOG- - - - - - - -	1
111	FEED LEVER HUB - - - - - - - -	1
112	FEED LEVER SPRING - - - - - -	1
113	FEED LEVER- - - - - - - - - -	1
114	FEED LEVER HUB NUT- - - - - -	1
115	HEX HALF NUT (3/8-16) - - - -	1
116	FEED LEVER NUT- - - - - - - -	1
117	FEED LEVER HANDLE - - - - - -	1
118	SPINDLE SLEEVE CAP- - - - - -	1
119	SPINDLE GUARD - - - - - - - -	1
120	SPINDLE SLEEVE- - - - - - - -	1
121	SPINDLE FOR #32 JACOBS CHUCK-	1
122	SPINDLE NUT - - - - - - - - -	1
123	SPINDLE SLEEVE BEARING- - - -	1
124	SPINDLE SLEEVE NUT- - - - - -	1
125	SPINDLE CHUCK NUT - - - - - -	1
126	#32 JACOBS CHUCK- - - - - - -	1
127	MICRO INDICATOR - - - - - - -	1
128	QUICK LOCK NUT- - - - - - - -	1
129	MICRO SCREW - - - - - - - - -	1
130	LOWER HOOD- - - - - - - - - -	1
131	SPINDLE SLEEVE CAP- - - - - -	1
132	BEARING SPACER- - - - - - - - - -	1
133	SPINDLE SLEEVE FOR NO. 1 MORSE TAPER SPINDLE- - - - - - - - -	1
134	TELESCOPE TUBE #1 - - - - - - - -	1
135	TELESCOPE TUBE #2 - - - - - - - -	1
136	TELESCOPE TUBE #3 - - - - - - - -	1
137	TELESCOPE TUBE #4 - - - - - - - -	1
138	TELESCOPE TUBE #5 - - - - - - - -	1
139	SPACER WASHER - - - - - - - - - -	1
140	SPINDLE SLEEVE BEARING- - - - - -	1
141	SPINDLE LOCK NUT & WASHER - - - -	1
142	SPINDLE - #1 MORSE TAPER- - - - -	1
143	TIT KEY - - - - - - - - - - - - -	1
144	TAPER PIN (#3 x 1-3/4" Lg.) - - -	2
145	TAPER PIN (#2 x 1" Lg.) - - - - -	1
146	GITS OILER (#1202)- - - - - - - -	1
147	GITS OILER (#101) - - - - - - - -	1

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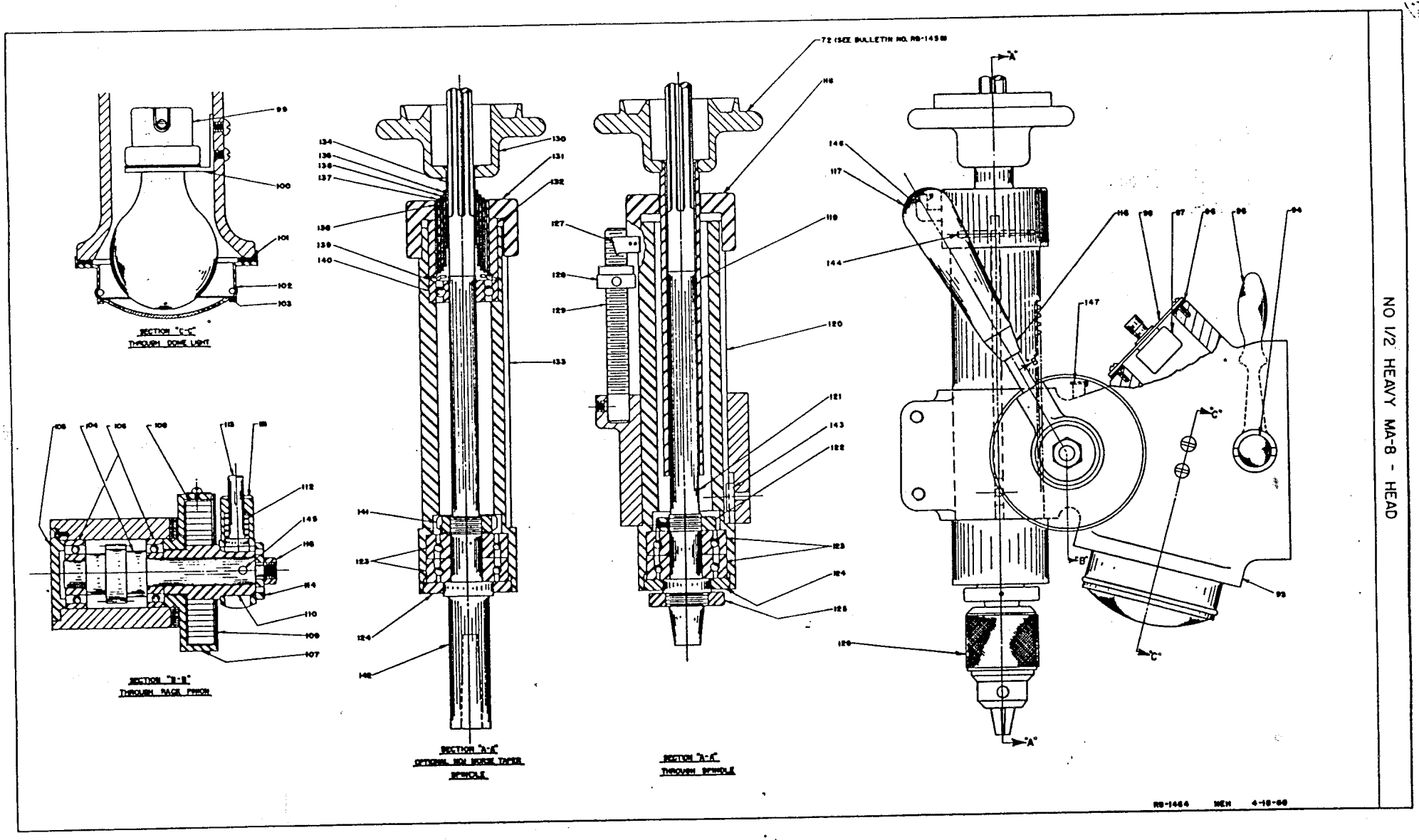

NO 1/2 HEAVY MA-8 - HEAD
72 (SEE BULLETIN NO. RB-1458)
SECTION "C-C" THROUGH DOME LIGHT
SECTION "B-B" THROUGH RACE PINION
SECTION "A-A" OPTIONAL 100 HORSE TAPER SPINDLE
SECTION "A-A" THROUGH SPINDLE
RB-1464 MEH 4-18-66

No-½ H Belt Drive Top Column Repair Parts List

PART NAME	NO	AMT. REQ
TOP COLUMN — 6¼" O.H.	BBH-51	1
" " — 12" O.H.	BBHH-51	1
UPPER CAP	BBH-51 E	1
LOWER HOOD	BBH-51 H	1
INSIDE CAP	BBH-51 P	2
SPINDLE PULLEY	BBH-53	1
" " SLEEVE	BBH-52	1
" " " KEY	BBH-52 B	2
" " " " BUSH	BBH-52 F	1
" " " NUT	BBH-52 E	1
" " " UPPER NUT	D-52 A	1
" " BEARING COLLAR	BBH-52 C	2
SPINDLE	BBH-54	1
" NUT	D-54 A	1
" CHUCK NUT	BBH-54 B	1
RACK PINION	BB-55	1
" " CAP	BB-55 C	1
" " DOG	BB-55 D	1
FEED LEVER	BB-55 E	1
" " HUB	BB-55 G	1
" " " NUT	BB-55 H	1
" " HANDLE	BB-55 J	1
" " SPRING	BB-55 S	1
SPRING CASE	BB-55 L	1
" " LID	BB-55 M	1
SCROLL SPRING	BB-55 P	1
SPINDLE SLEEVE	BBH-56	1
" " NUT	BBH-56 C	1
COUNTERSHAFT CONE PULLEY	BBH-50	1

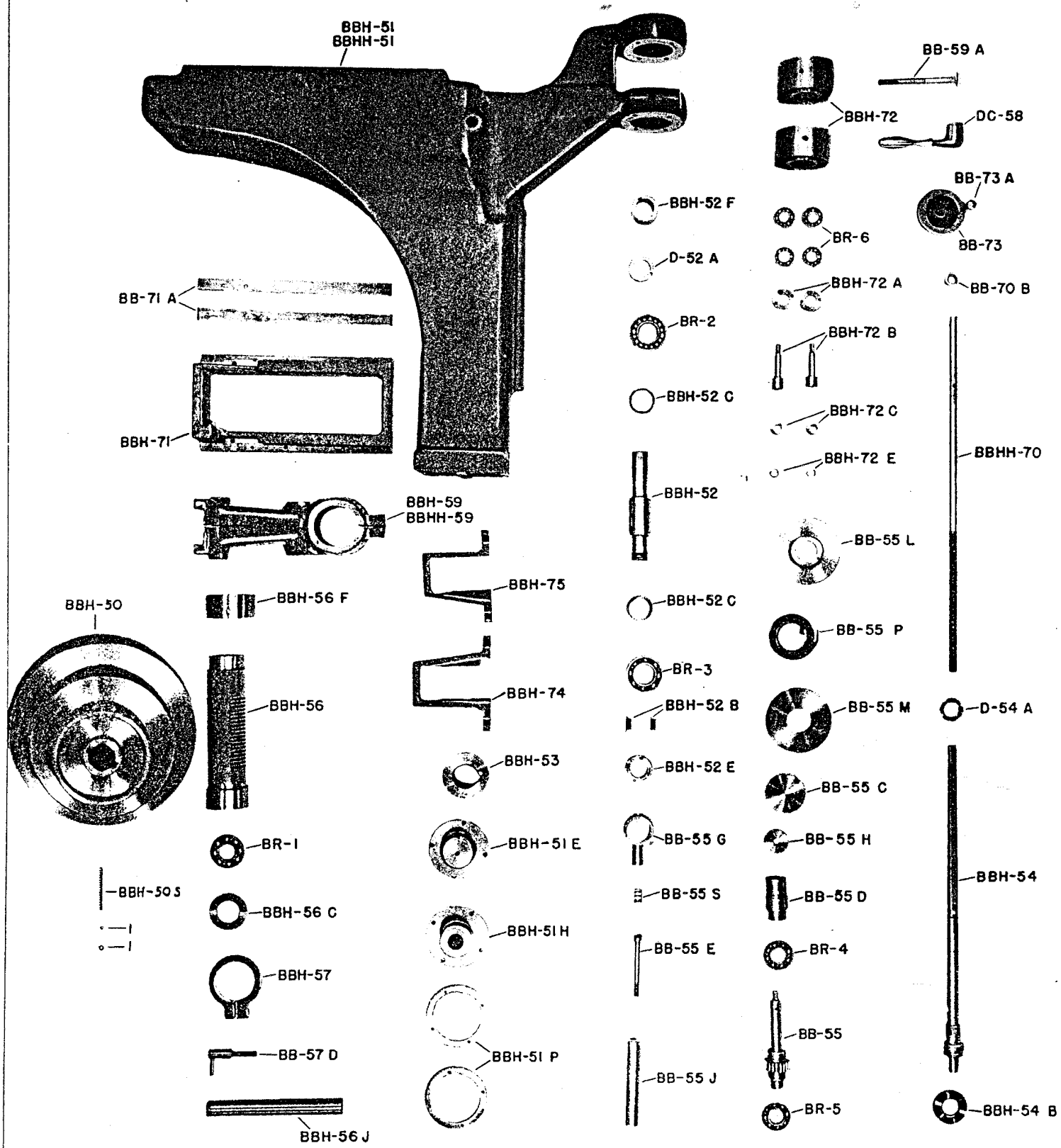
PART NAME	NO	AMT. REQ
SPINDLE SLEEVE CAP	BBH-56 F	1
" GUARD	BBH-56 J	1
STOP COLLAR	BBH-57	1
" " SCREW	BB-57 D	1
HEAD BINDER HANDLE	DC-58	1
" " STUD	BB-59 A	1
HEAD 6¼" O.H.	BBH-59	1
" 12" O.H.	BBHH-59	1
CARRIAGE SCREW	BBHH-70	1
" " COLLAR	BB-70 B	1
CARRIAGE	BBH-71	1
" GIB	BB-71 A	2
IDLER PULLEY	BBH-72	2
" SPLIT NUT	BBH-72 A	2
" STUD	BBH-72 B	2
" SPACER	BBH-72 C	2
SPACER BETWEEN PULLEY & BRACKET	BBH-72 E	1
HANDWHEEL	BB-73	1
" HANDLE	BB-73 A	1
IDLER BRACKET — FRONT	BBH-74	1
" " — REAR	BBH-75	1
SPINDLE SLEEVE BEARING	BR-1	1
" PULLEY SLEEVE BEARING-UPPER	BR-2	1
" " " " -LOWER	BR-3	1
RACK PINION BEARING - RIGHT	BR-4	1
" " " — LEFT	BR-5	1
IDLER BEARING	BR-6	1
C/SHAFT CONE PULLEY BALL	1	1
" " " SET SCREW	1	1
" " " SPRING	BBH-50S	1

INSTRUCTIONS FOR ORDERING REPAIR PARTS

REFER TO PARTS BY BOTH NAME AND NUMBER

ALWAYS GIVE THE SERIAL AND MACHINE NUMBER — THE SERIAL NUMBER WILL BE FOUND ON A BRASS PLATE — THE MACHINE NUMBER STAMPED ON TOP OF DOVETAIL WHICH CARRIES THE TABLE.

THE AVEY DRILLING MACHINE CO. **CINCINNATI-OHIO**


BBH-51
BBHH-51
BB-71 A
BBH-71
BBH-59
BBHH-59
BBH-56 F
BBH-50
BBH-56
BR-1
BBH-50 S
BBH-56 C
BBH-57
BB-57 D
BBH-56 J
BBH-75
BBH-74
BBH-53
BBH-51 E
BBH-51 H
BBH-51 P
BBH-52 F
D-52 A
BR-2
BBH-52 C
BBH-52
BBH-52 C
BR-3
BBH-52 B
BBH-52 E
BB-55 G
BB-55 S
BB-55 E
BB-55 J
BB-59 A
BBH-72
DC-58
BB-73 A
BB-73
BR-6
BBH-72 A
BB-70 B
BBH-72 B
BBH-72 C
BBH-72 E
BBHH-70
BB-55 L
BB-55 P
BB-55 M
D-54 A
BB-55 C
BB-55 H
BB-55 D
BBH-54
BR-4
BB-55
BR-5
BBH-54 B

No-½ Belt Drive Top Column Repair Parts List

PART NAME	NO	AMT. REQ
TOP COLUMN	BB-51	1
UPPER HOOD	BB-51 G	1
LOWER CAP	BB-51 H	1
UPPER HOOD CAP	BB-51 E	1
TOP LOWER "	BB-51 J	1
BOTTOM UPPER CAP	BB-51 K	1
COLUMN BUSH — UPPER	BB-51 L	1
" " — LOWER	BB-51 M	1
GUARD FLANGE	BB-51 F	1
BEARING COLLAR	BB-52 C	1
SPINDLE PULLEY	BB-53	1
" " SLEEVE	BB-52	1
" " " NUT (UPPER)	BB-52 A	1
OIL FLINGER	BB-52 D	2
KEY RETAINER	BB-52 F	1
SPINDLE PULLEY SLEEVE NUT—LOWER	BB-52 E	1
DRIVE BUSH KEY	BB-53 D	2
SPINDLE	BB-54	1
" NUT	BB-54 A	1
CHUCK "	BB-54 B	1
RACK PINION	BB-55	1
" " CAP	BB-55 C	1
" " DOG	BB-55 D	1
FEED LEVER	BB-55 E	1
" " HUB	BB-55 G	1
" " " SPRING	BB-55 S	1
" " " NUT	BB-55 H	1
" " HANDLE	BB-55 J	1
SPRING CASE	BB-55 L	1
" " LID	BB-55 M	1
SCROLL SPRING	BB-55 P	1
SPINDLE SLEEVE	BB-56	1
" " CAP	BB-56 F	1
COUNTERSHAFT CONE PULLEY	BB-50	1
" " " BALL	1	1

PART NAME	NO	AMT. REQ
SPINDLE SLEEVE BEARING GUARD	BB-56 H	1
TELESCOPING SLEEVE 1ST	BB-56 K	1
" " 2ND	BB-56 L	1
" " 3RD	BB-56 M	1
" " 4TH	BB-56 P	1
SPINDLE SLEEVE NUT	BB-56 C	1
STOP COLLAR	BB-57	1
" " SCREW	BB-57 D	1
HEAD BINDER HANDLE	DC-58	1
HEAD	BB-59	1
" BINDER STUD	BB-59 A	1
CARRIAGE	BB-71	1
" SCREW	BB-70	1
" " COLLAR	BB-70 B	1
" GIB	BB-71 A	2
IDLER PULLEY	BB-72	2
" " CAP	BB-72 G	2
" BRACKET — FRONT	BB-74	1
" " — REAR	BB-75	1
" " STUD	BB-72 B	2
" " " NUT	BB-72 D	2
" " " SPACER	BB-72 C	2
HANDWHEEL	BB-73	1
" HANDLE	BB-73 A	1
IDLER BRACKET WASHER	BB-75 A	4
SPINDLE SLEEVE BEARING — UPPER	BR-1	1
" " " — LOWER	BR-2	1
RACK PINION BEARING — LEFT	BR-3	1
" " " — RIGHT	BR-4	1
IDLER STUD BEARING	BR-5	4
SPINDLE PULLEY SLEEVE BR — UPPER	BR-6	1
" " " " — LOWER	BR-7	1
C/SHAFT CONE PULLEY SET SCREW	1	1
" " " SPRING	BB-50 S	1

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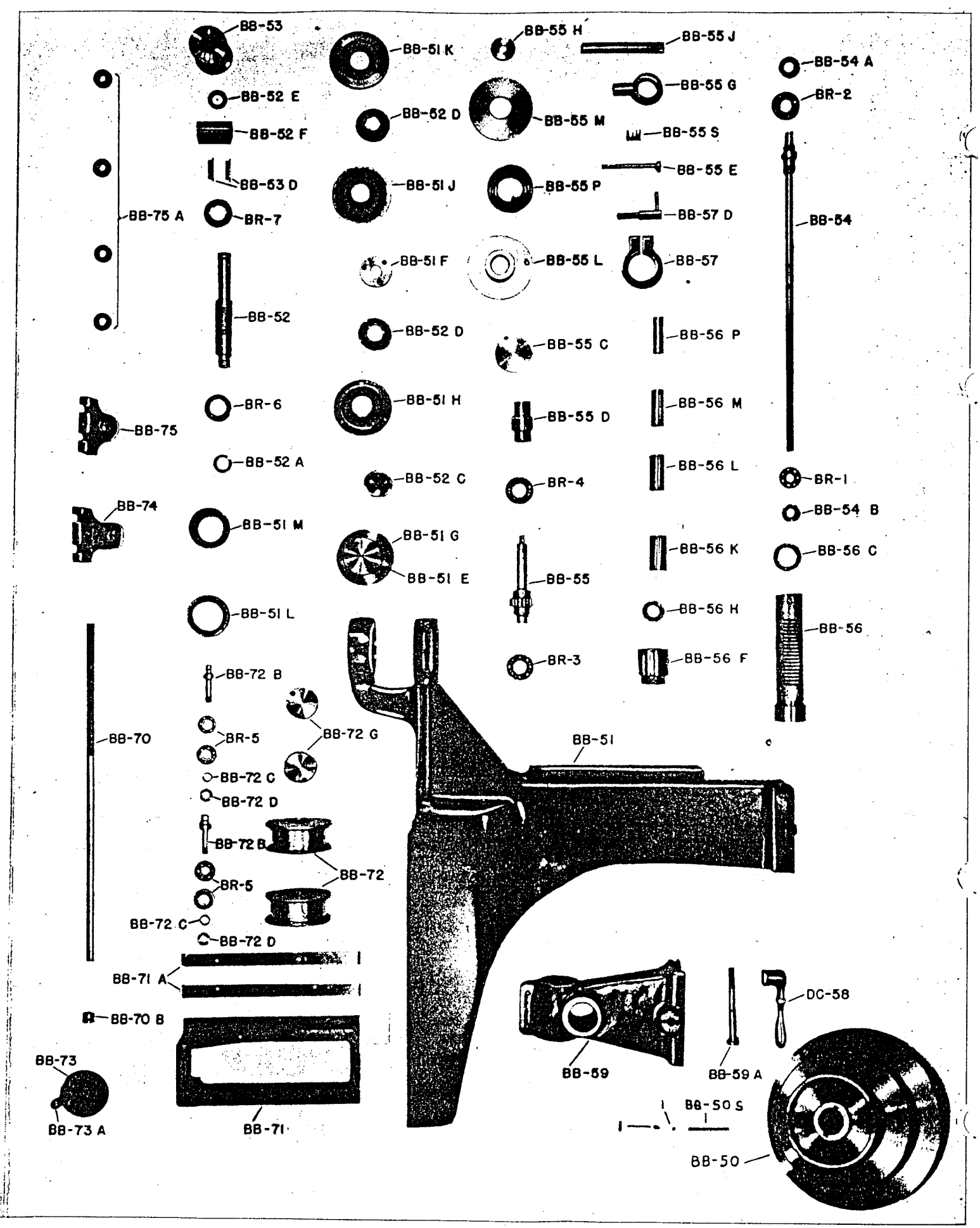
ALWAYS GIVE THE SERIAL AND MACHINE NUMBER — THE SERIAL NUMBER WILL BE FOUND ON A BRASS PLATE — THE MACHINE NUMBER STAMPED ON TOP OF DOVETAIL WHICH CARRIES THE TABLE.

THE AVEY DRILLING MACHINE CO. CINCINNATI-OHIO


BB-53
BB-52 E
BB-52 F
BB-53 D
BB-75 A
BR-7
BB-52
BR-6
BB-75
BB-52 A
BB-74
BB-51 M
BB-51 L
BB-70
BB-72 B
BR-5
BB-72 C
BB-72 D
BB-72 B
BR-5
BB-72 C
BB-72 D
BB-71 A
BB-70 B
BB-73
BB-73 A
BB-71
BB-51 K
BB-52 D
BB-51 J
BB-51 F
BB-52 D
BB-51 H
BB-52 C
BB-51 G
BB-51 E
BB-55 H
BB-55 M
BB-55 P
BB-55 L
BB-55 C
BB-55 D
BR-4
BB-55
BR-3
BB-55 J
BB-55 G
BB-55 S
BB-55 E
BB-57 D
BB-57
BB-56 P
BB-56 M
BB-56 L
BB-56 K
BB-56 H
BB-56 F
BB-54 A
BR-2
BB-54
BR-1
BB-54 B
BB-56 C
BB-56
BB-72 G
BB-51
DC-58
BB-59
BB-59 A
BB-50 S
BB-50