P.M. No. 1612
DATE 8-1-43
REPLACES: NONE
INDEX: 120-5-A

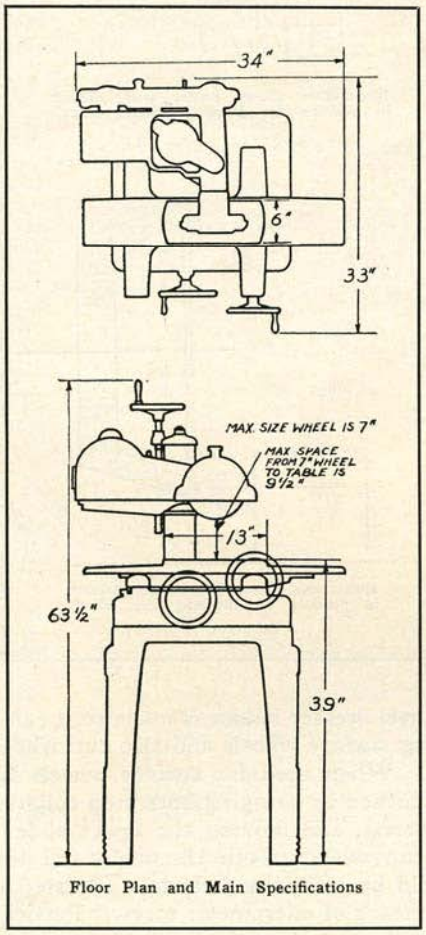
DELTA MILWAUKEE

THE DELTA MFG. CO., MILWAUKEE, WIS.

SERIES 24 TOOLMAKER GRINDER

OPERATING AND MAINTENANCE INSTRUCTIONS
For Toolmaker Surface Grinder

UNCRATING AND SETTING UP



Floor Plan and Main Specifications

Machine should be carefully uncrated and cleaned of all packing grease. In case there is no crane for handling available, the machine should be laid on the belt guard side with proper blocking under the side of the base casting to prevent breakage of the weaker castings.

Special care should be taken not to lift the machine by either the table or cross slide.

Before mounting the grinder on the legs, be sure that mounting surfaces are cleaned of grit or paint. Bolt legs to base of grinder. Be sure to draw the screws up tightly to insure rigidity of entire unit. After machine is in position, be sure that it rests firmly on all four points of legs and that it is leveled up in this position.

GENERAL INSTRUCTIONS

This machine has been carefully assembled at the factory and thoroughly checked for accuracy and ease of operation. The spindle has been "run-in" and the table top ground by a wheel that has been dressed on the machine. The column flange and base are arranged with corresponding marks to indicate when spindle is square with table ways.

It is therefore not necessary to readjust such points as table gibs, spindle bracket pivot and gibs, or the end play of spindle, unless they have been thrown out of adjustment in transit.

After the three hand wheels are assembled, motor and pulleys properly mounted and guarded, and spindle lubricated as specified on instruction plate, the machine should be ready for operation. Before starting the machine, oil all moving parts with machine oil; particular care should be taken that the oil cup on spindle housing is filled with high-grade spindle oil of viscosity 58 to 60, Saybolt at 100° F, such as Socony Vacuum Velocite "E" or equivalent. For lubricating details see chart.

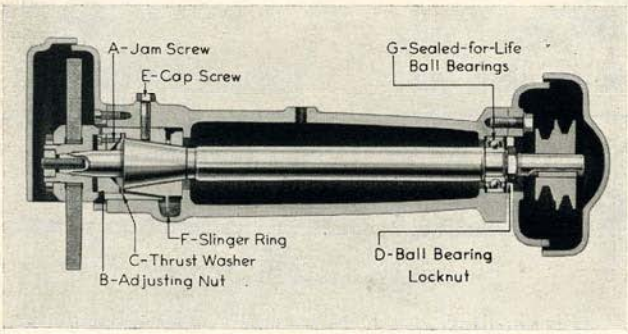
Before adjusting the lower slide, be sure that gib lock screw is released.

Check that wheel turns in direction shown by arrow on wheel guard.

COLUMN AND SPINDLE BRACKET

The column is fitted into and pivots about a bored hole in the base. The base and the column flange are marked to show position where spindle is square with table ways. To swivel column it is only necessary to release nut at top. Be sure that this nut is drawn down tightly when machine is in operation. The split column slide should be adjusted so it is free from any looseness. This can easily be done by properly adjusting and locking in position the lower lock bolt and the headless set screw. The Acme screw and handwheel are intended for fast or major adjustment, after which the slide is locked by tightening handle on upper stud. Fine adjustment is made by means of the hand knob above the spindle. This knob is arranged with an adjustable collar that is graduated so that each division is equal to .0005 wheel adjustment. The full range of this fine adjustment screw is about ⅜" and must be "backed up" when limit has been reached. The motor and spindle bracket is attached to the slide by two heavy pivot screws extending into machined centers in the slide to permit pivoting of the spindle bracket and to eliminate all end play. To remove bracket, merely release these screws. When machine is in operation these screws should be tightly pressed into position.

SPINDLE



The spindle is precision ground and balanced. It runs in a high grade tapered bearing, and is lubricated by means of an oil slinger ring. The oil level should be maintained at all times with type of oil specified on instruction plate. The rear bearing consists of a totally enclosed sealed-for-life precision ball bearing. In order to get a high-grade finish, the spindle must first be considered. The spindle must have the proper oil and must be seated correctly in its bearing. In case the spindle has too much END PLAY, this play can be readily taken up by releasing jam screw "A" and by advancing nut "B". This nut must be taken up with great care and must not be wedged too tight against the front face of spindle, otherwise spindle will be locked in its taper bearing. After adjustment is made, spindle should move freely. Be sure to lock jam screw "A" after taking up end play of spindle. If precision spindle bearing must be removed, follow instructions given on plate.

TABLE UNIT

The last operation on the machine when leaving factory is grinding top of table. This gives us the assurance that the table is square and that the spindle is properly adjusted. The lower slide is arranged with four wicks which can be re-oiled by removing table. Two side feed wick oil cups are connected to reservoir and wicks to lubricate the table ways are conveniently located on the outside of table, all wicks should be removed, cleaned and re-saturated frequently.

The table and cross slide is lubricated at the factory with a non-oxidizing oil such as Stay Put No. 310 of the E. F. Houghton Co. This is a very good oil but if not available, use SAE No. 10.

The table should also be removed occasionally and the sliding surfaces, also rack and gear, cleaned of gummy oil. To remove the table, it is merely necessary to remove the stop-screw holder and slide table off either side of the machine. Care should be taken that gib is not disturbed. All play can be eliminated by tightening up the gib screws. The table is suitable for mounting Brown & Sharpe No. 510 Magnetic Chuck or other make similar in size. One revolution of the cross adjustment handwheel moves the slide .100 inch, and each division on dial equals .001" movement.

WHEEL DRESSER HOLDER

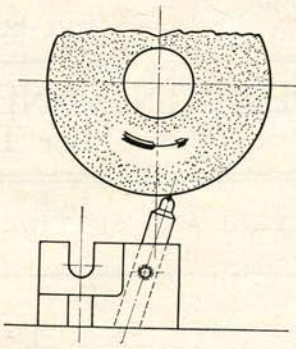


Illustration shows holder with dresser in position for dressing surface wheel.

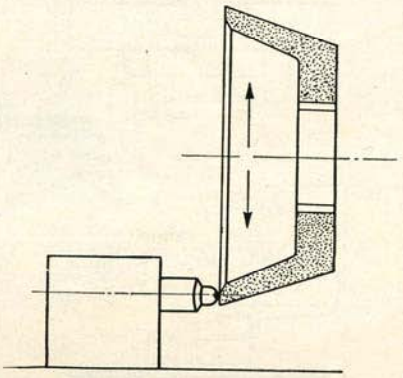


Illustration shows holder with dresser in position for dressing cup wheel.

The wheel dresser holder is made so it can be used for dressing surface wheels and also cup wheels when necessary. When used for surface wheels the table should be locked by bringing both stop collars against the stop screw, and moving the lower slide. When dressing cup wheels, both the table and the lower slide should be locked and dresser adjusted into the wheel by means of micrometer screw. Particular care should be taken to place the holder in proper position when dressing wheel. The proper position for wheel dresser is in front of the center line of wheel (see illustrations.)

SURFACE WHEELS

SAFETY FIRST: Always place guard in position before starting up grinding wheel. Balanced wheels should always be specified. Always dress a wheel before grinding. We have standardized two types of abrasive wheels which are carried in stock, but in order to obtain the most efficiency from a wheel for production work, we suggest the customer contact the local representative of some reliable abrasive company in order to obtain the proper wheel for his purpose.

CUP WHEELS

Although this machine is primarily a surface grinder, some limited work can be done on it with cup wheels. Three and one-half inch diameter cup wheels can be used with guard in place. Any other wheel can be used, but front guard must be swung out of position or taken off completely.

CAUTION: Do not run wheels faster than recommended speed shown on the wheel. Operating speed not to exceed 3500 R.P.M. for a vitrified wheel.

2 spindle speeds are available,

For 60 cycle motor, 3200 and 4200

For 50 cycle motor, 2700 and 3500.

WHEEL ADAPTERS

The wheel adapters are fitted to a tapered end on the spindle. The wheels can be removed directly with the adapter in position, but many operators will find them useful in removing the adapter with the wheel in place, so that a centered or dressed wheel can be re-fitted to the spindle without resetting or dressing. This is especially useful where diamond wheels are used. When removing the adapter from the spindle, merely loosen the small spindle nut a few turns so it extends beyond the spindle end, and gently tap the nut with a babbitt hammer or other soft material until adapter is free from the taper. Do not try to pry the adapter loose, and take care that taper surfaces are not nicked or dented.

MOTORS

Operate grinder with a good dynamically balanced motor only.

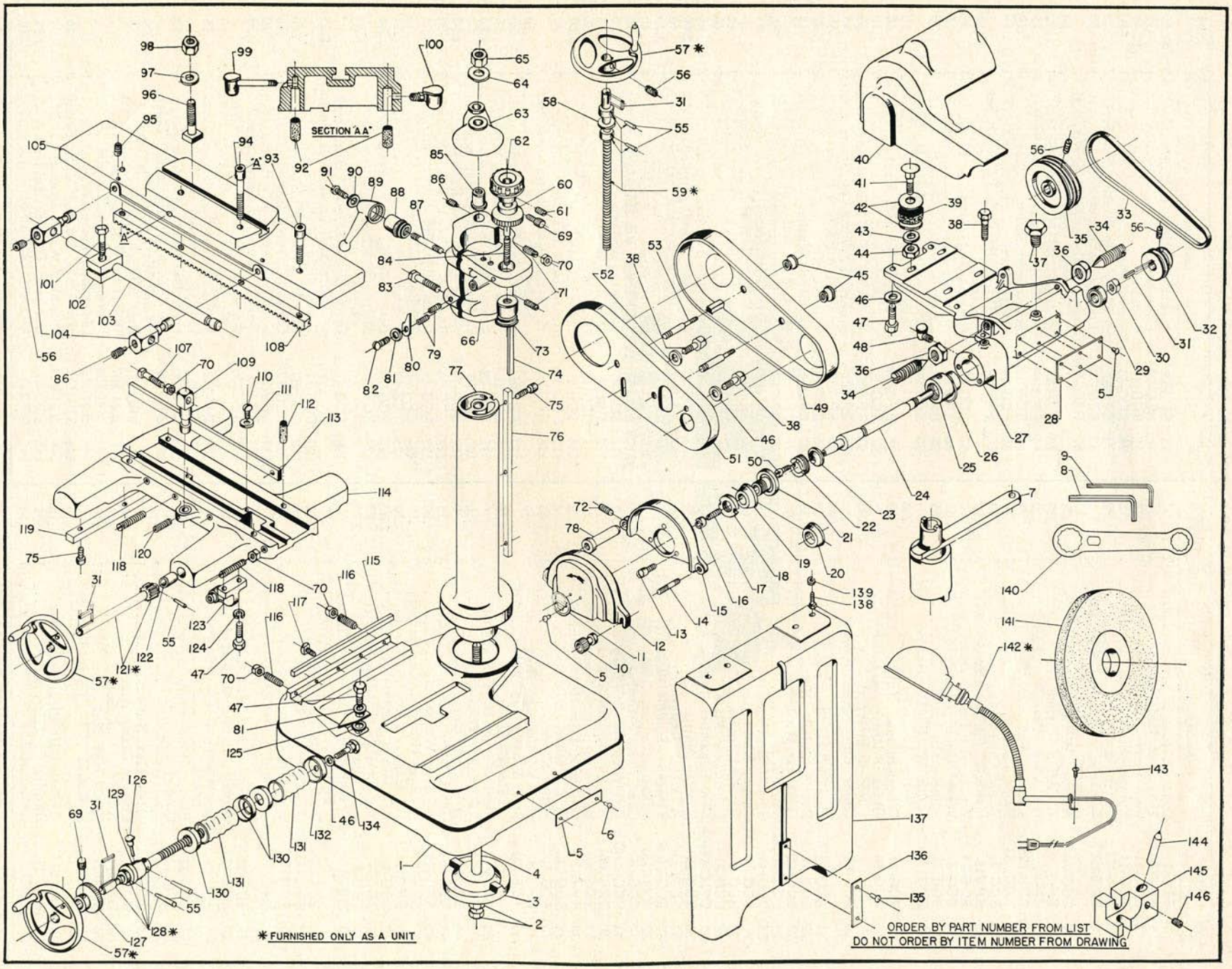
Motor bracket is drilled for ½ H.P. Delta 6" frame motors, and the cast guard will cover any of these motors. When using other makes of motors, it will be necessary to drill holes in the bracket to suit. Ample pads are provided for this purpose. In some cases where another make of motor is used, it may be necessary to omit the cast iron cover, but this can be done without affecting the efficiency of the machine in any way.

TO GET A HIGH-GRADE FINISH

1. Operate grinder with a well balanced and properly dressed wheel only.
2. Use a good dynamically balanced motor.
3. Check spindle; it must run free and true and all end play must be eliminated.
4. Check, so that pivot screw and lock nut are drawn up tightly.
5. Be sure that upper column clamp is drawn up tightly when grinding.
6. Check up lower column slide clamp. This double lock arrangement is properly set at the time of shipment. Clamp should be adjusted so that it will have a tight sliding fit on column. The setting of this proper sliding fit should be accomplished by loosening up the upper clamp, also the column gib screws. Tighten the gib screws after proper adjustment has been made.
7. Always have nut on top of column drawn down tightly.
8. Check table, see that it is free from grit and other foreign substances.
9. Use proper wheel speed. See chart on belt guard.

LUBRICATION CHART

Parts To Be Lubricated	Recommended Oil	Method of Filling	Period of Change
Spindle Taper Bearing	High Grade Spindle Oil of Viscosity 58 to 60 Saybolt at 100° F.	Oil Cup	Daily
Spindle Ball Bearing	Pre-Sealed		
Table	SAE #10 — For Very Best Results Use E.F. Houghton Co. Stay Put #310	Oil Cup	Daily
Cross Slide		4 Oil Wicks Remove Table	Every 30 Days
Cross Slide Screw	Alemite Cup Grease	Push Back Dust Cover	Every 30 Days
Cross Slide Screw Bearing	SAE #10	Oil Cup	Daily
Pinion Shaft Bearing	Oilite Bushing, Pre-oiled		
Pinion and Gear Rack	Alemite Grease	Clean and Grease	Every 30 Days
Vertical Screw and Nut	SAE #10	Clean and Oil	Daily
Column	SAE #10	Clean and Oil	Daily


SECTION "AA"
* FURNISHED ONLY AS A UNIT
ORDER BY PART NUMBER FROM LIST
DO NOT ORDER BY ITEM NUMBER FROM DRAWING

REPLACEMENT PARTS

IMPORTANT: To avoid possible errors, be sure to include the serial number of the machine when ordering parts for repair or replacement.

Item No.	Part No.	Description	No. Req.	Price Each
1	SCG-1	Base	1	$45 90
2	SP-1008	3/4-10 Hex. Jam Nut	2	.10
3	SCG-11	Stud Plate	1	.80
4	SCG-14	Column Stud	1	.75
5	SP-2482	Serial No. Plate	1	.10
6	SP-2252	#2x3/16" Parker Kalon Drive Screw	10	.10
7	SCG-70-S	Spanner Wrench	1	1.20
8	SP-2	5/32" Allen Wrench	1	.10
9	SP-1	1/8" Allen Wrench	1	.10
10	LBS-130	Knurled Nut	1	.10
11	LBS-233	Name Plate	1	.30
12	SCG-9	Wheel Guard (Cover)	1	.90
13	SP-715	1/4-20x1/2" Fil. Hd. Cap Screw	3	.10
14	SCG-24	Wheel Guard Stud	1	.10
15	SCG-8	Wheel Guard (Rear)	1	1.05
16	SCG-51	Spindle Nut	1	.35
17	SP-214	3/8-16x1 1/4" Fl. Pt. Headless Set Screw	1	.20
18	SCG-50	Wheel Adapter Nut	1	.90
19	SCG-49	Outer Adapter Wheel Flange 2 1/2" diameter	1	1.00
20	SCG-64	Outer Cup Wheel Flange 2 1/4" Diameter	1	.90
21	SCG-48	Inner Wheel Flange	1	4.00
22	SCG-47	Bearing Spindle Nut	1	2.35
23	SCG-45	Equalizer Washer	1	.80
24	SCG-41-A	Spindle	1	8.00
25	SCG-43	Spindle Bearing	1	5 75
26	SCG-44	Slinger Ring	1	.10
27	SCG-5	Spindle Housing & Motor Bracket	1	11.00
28	SCG-71	Instruction Plate	1	.60
29	CWC-88504	New Departure Bearing	1	2.50
30	SCG-62	Bearing Nut	1	.20
31	SP-2650	5/16" x 1 3/8" Straight Key	4	.10
32	SCG-79-S	Two-Step Spindle Pulley	1	3.50
33	#49-115	V-Belt	1	....
34	SCG-34	Cone Point Swivel Screw	2	.25
35	SCG-80-S	Two Step Motor Pulley	1	6.00
36	SP-1006	1/2"-13 Hex. Jam Nut	4	.10
37	SCG-36	Button for Micro Screw	1	.30
38	SP-602	5/16-18 x1 1/4 Hex. Hd. Cap Screw	3	.10
39	SCG-76	Felt Washer	4	.10
40	SCG-16	Motor Cover	1	7.65
41	SP-806	5/16 x 1 1/2" Carriage Bolt	4	.10
42	TCS-291	Steel Washer 1 1/8" O.D. x29/64" I.D.x1/16" Thick	8	.10
43	BM-46	Steel Washer 1 1/8" O.D.x25/64" I.D. x 1/8" Thick	4	.10
44	SP-1030	5/16-18 Hex. Nut	4	.10
45	LBS-177	Guard Nut	2	.15
46	SP-1604	5/16" Steel Washer	5	.10
47	SP-649	5/16-18x1" Hex. Hd. Cap Screw	6	.10
48	SP-2492	Oil Cup	1	.70
49	SCG-7	Belt Guard (Cover)	1	2.60
50	SP-759	#8-32x5/8" Socket Hd. Cap Screw	1	.20
51	SCG-6	Belt Guard (Rear Half)	1	2.35
52	DP-399	Washer 1 1/8" O.D.x13/32" I.D.x5/32" Thick	1	.10
53	TCS-305	Stud 7/16x3 3/4"	2	.30
55	SP-2420	#2 Taper Pin 1 1/4"	5	.10
55	SP-201	5/16-18x5/16" Allen Set Screw	5	.10
57	LTA-420-S	Handwheel complete	3	1.75
58	H-11	Fiber Washer	1	.10
59	SCG-35-S	Raising Screw with Collars	1	1.50
60	SCG-17	Spindle Micrometer Sleeve	1	2.10
61	SP-104	1/4-20x1/2" Cup Pt. Headless Set Screw	1	.10
62	SCG-38	Plastic Hand Knob	1	.55
63	SCG-12	Column Cap	1	1.55
64	DP-736	Steel Washer	1	.10
65	SCG-75	3/4"-10 Hex. Nut	1	.15
66	SCG-10	Column Clamp Bracket	1	7.20
69	DP-36	Knurled Head Screw	2	.10
70	SP-1029	1/4"-20 Hex. Nut	11	.10
71	SP-109	1/4-20x1 1/2" Fl. Pt. Headless Set Screw	2	.10
72	SP-102	1/4-20x3/8" Headless Set Screw	1	.10
73	SCG-37	Bushing for Micro Screw	1	.75
74	SCG-23	Column Gib	1	.10
75	SP-755	1/4-20x3/4" Allen Cap Screw	6	$ .15
76	SCG-22	Column Key	1	.55
77	SCG-4	Column	1	60.40
78	SCG-53	Swivel Pin	1	.40
79	SP-231	5/16-18x3/8" Cup Pt. Allen Set Screw	2	.10
80	SCG-72	Pointer for Micro Screw	1	.10
81	DDL-150	Steel Washer 21/32" O.D.x21/64 I.D. x 1/16" Thick	3	.10
82	SP-520	5/16-18x3/8" Rd. Hd. Mach. Screw	1	.10
83	SP-3109	1/2-13x2 1/2" Hex. Hd. Cap Screw.	1	.15
84	SCG-39	Micrometer Screw	1	.30
85	SCG-54	Raising Nut	1	1.15
86	SP-213	5/16-18x1/2" Hf. Dog Pt. Allen Set Screw	1	.10
87	SCG-27	Column Slide Stud	1	.15
88	SR-218	Serrated Nut	1	.15
89	SR-217	Clamp Handle	1	.20
90	SP-1603	1/4" Steel Washer 5/16" O.D., 3/64" Thick	1	.10
91	SP-509	1/4-20x1/2" Rd. Hd. Mach. Screw.	1	.10
92	SCG-77	Oil Wick	2	.10
93	SP-760	1/4-20x1 1/4" Soc. Hd. Cap Screw	2	.30
94	SP-221	1/4-20x2 1/4" Allen Cap Screw	2	.45
95	SP-206	5/16-18x5/16 Allen Cup Pt. Set Screw	2	.10
96	SCG-66	T Bolt	2	.30
97	SP-1605	3/8" Steel Washer	2	.10
98	SP-1207	3/8-24 Hex. Nut	2	.10
99	SP-2495	Gitts Oiler (front)	1	.60
100	SP-2494	Gitts Oiler (rear)	1	.45
101	SP-603	1/4-20x7/8" Hex. Hd. Cap Screw	2	.10
102	SCG-32	Stop Rod Block	2	.40
103	SCG-31	Stop Rod	1	.40
104	SCG-30	Stop Rod Holder	2	.55
105	SCG-3	Top Slide (Rough Ground)	1	15.60
107	SP-311	1/4-20x1 1/2" Sq. Hd. Set Screw	1	.10
108	SCG-25	Gear Rack	1	3.70
109	SCG-33	Center Stop	1	.40
110	SP-561	#10-32x3/8" Rd. Hd. Mach. Screw	2	.10
111	SCG-40	Retainer Washer	2	.10
112	VSL-6	Oil Wick	4	.10
113	SCG-21	Gib	1	.30
114	SCG-2	Cross Slide	1	16.00
115	SCG-29	Cross Slide Gib	1	.30
116	SP-117	1/4-20x1 1/4" Cup Pt. Headless Set Screw	4	.10
117	SP-305	1/4-20x1" Sq. Hd. Set Screw	1	.10
118	SP-116	1/4-20x1 3/4" Cup Pt. Set Screw	4	.10
119	SCG-28	Cross Slide Key	1	1.15
120	SP-106	5/16-18x1/2" Headless Set Screw	1	.10
121	SCG-19-S	Pinion Shaft, with Rack Gear	1	1.75
122	SCG-20	Bushing	2	.30
123	SCG-15	Cross Slide Nut	1	3.05
124	SP-1703	5/16" Lock Washer	2	.10
125	TCS-225	Pointer	1	.10
126	SCG-74	Gitts Oiler for Cross Feed Screw	1	.25
127	SCG-58	Micro Sleeve for Cross Feed Screw	1	2.05
128	SCG-18-S	Cross Feed Screw Assem. with Collars and Cross Slide Bush.	1	2.35
129	*SCG-13	Cross Slide Bushing	1	....
130	SCG-83	Cup Washer 1 1/4" Hole	3	.10
131	SCG-82-S	Canvas Covered Spring	2	.45
132	SCG-84	Cup Washer 11/32" Hole	1	.10
134	SP-635	5/16-18x2" Hex. Hd. Cap Screw	1	.10
135	SP-2250	#4 x 3/16" Parker Kalon Drive Screw	2	.10
136	DP-741	(Delta) Name Plate	1	.15
137	#1506	Leg (2 required)		....
138	SP-3100	3/4-10x1 3/4" Hex. Hd. Cap Screw	4	.10
139	SP-1707	1 3/32 O.D. x 3/4 I.D. x 5/16" Thick Lock Washer	4	.10
140	SBS-47	Box Wrench	1	.25
141	#24-807	Wheel for Soft Material		....
	#24-808	Wheel for Hard Material		....
142	#24-815	Light Attachment	1	....
143	SP-559	#10-32x1/2" Rd. Hd. Mach. Screw	2	.10
144	#24-805	Diamond Wheel Dresser	1	....
145	SCG-67	Diamond Dresser Holder	1	2.70
146	SP-208	1/4-20x1/4" Allen Set Screw	1	.10

ORDER BY PART NUMBER FROM LIST. DO NOT ORDER BY ITEM NUMBER FROM DRAWING.

NOTE:—Prices in this list apply only to parts ordered for repair and replacement. They cannot be used for computing allowance values if a machine is ordered "less" certain parts.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SECTION
Index: 120 – 24D
Product Data—Toolmaker Grinder
Engineering Change Bulletins
Form No.: AD276 Date: 8-23-44
Replaces Form No.: None

IMPROVEMENTS ON NO. 24-105 TOOLMAKER SURFACE GRINDER

Supplement To P M No. 1628 of 5-1-44 and P M No. 1636 of 4-20-43

ANNOUNCEMENT

Several changes have been made in the details of the No. 24-105 Toolmaker Surface Grinder to improve its operation and increase its accuracy. These will be described fully in new operating and maintenance instructions as soon as they can be published and will be shown in the revised drawings at that time.

For the present it will suffice to describe the changes briefly and to point out their purpose. Item numbers in this description are the reference numbers shown on the drawing in the present Operating and Maintenance Instructions, PM No. 1628, and parts numbers are as listed under "Replacement Parts" therein.

1. LONGER GEAR RACK ON TOP SLIDE

The gear rack (Item 108, SCG-25) has been increased in length from 23½ to 33 inches, making it the full length of the top slide. This results in smoother operation, greater accuracy at the extreme positions and less friction on the gib. The spacing of screw holes and method of mounting remains the same. The change has no effect on the length of travel, which remains 13½ inches.

2. LONGER KEY ON CROSS SLIDE

The cross slide key (Item 119, SCG-28) has also been lengthened, from 14 to 19¼ inches, and is now equal to the width of the cross slide. The reasons and results are the same as in (1) above—smoother and more accurate travel. Mounting of the key on the cross slide remains the same and cross travel remains 7 inches.

3. TAKE-UP NUTS ON CROSS-FEED SCREW

(Effective 6-5-44, beginning with Serial No. 29-2196)

Two take-up nuts SCG-89 are now being used on the cross-feed screw, in place of the collar on the inside end of the cross slide bushing (Item 129, SCG-13). These provide an adjustment to take up end play which may develop as the bushing wears.

In making the adjustment, the cap screw (Item 47, SP-649) is removed from the machine base to release the bushing SCG-13, and the cross-feed screw is turned to the right until it is out far enough to expose the take-up nuts. The nuts are backed off, the first one is turned against the bushing until the end play is taken up, but not tight enough to bind, and the second nut is turned against the first to lock it in position. Drift pins can be used in the radial holes in these nuts to turn them.

In the old arrangement, collars were fastened to the screw by means of taper pins (Item 55, SP-2420), one on each side of the bushing; this did not provide for adjustment. The new assembly retains the outer collar, but the inner one is replaced by the take-up nuts. Fiber thrust washers H-11 have been inserted at each end of the bushing.

These take-up nuts cannot be used on the older machines with serial numbers below 29-2196 except by installing a new cross-feed screw assembly SCG-18-H. This is the cross-feed screw with collar, SCG-13 bushing, and two lock nuts, SCG-89. To remove the cross-feed screw follow the instructions contained in PM No. 1636.

4. ECCENTRIC SWIVEL SCREW ON SPINDLE HOUSING.

(Effective 7-24-44, beginning with Serial No. 30-394)

An eccentric cone-point swivel screw SCG-90 replaces the present center-point screw (Item 34, SCG-34) in the back side of the spindle housing and motor bracket (Item 27, SCG-5). The concentric cone-point screw in the front of the bracket, also shown as item 34, remains as before.

The purpose in making the back swivel screw eccentric is to provide for fine adjustments in the alignment of the grinding wheel. Having its point off center $\frac{1}{32}$ inch, the eccentric screw tilts the entire spindle housing through a small angle as the screw is turned.

When assembled at the factory the eccentric screw and column are set so that the grinding wheel flange is in a vertical plane parallel to the table slot, and the index at the base of the column is then marked. By turning the eccentric swivel screw to other positions the operator can tilt the wheel slightly toward or away from the table, as may be required in some operations. In doing this, a small horizontal change may also occur, requiring a slight shift of the column if the wheel is to be kept parallel to the table slot.

In making this fine adjustment the front swivel screw should be backed off or tightened accordingly. The exact alignment of the wheel face should be checked by means of a square or an indicator mounted on the top slide.

Jam nuts (Item 36, SP-1006) are used on both swivel screws, as before, to lock them after they have been set. The new eccentric swivel screw is fully interchangeable with the old one.

5. REVISED RAISING NUT WITH LOCK NUT

(Effective 8-18-44, beginning with Serial No. 30-4438)

The raising nut (Item 85, SCG-54) in the column clamp bracket (Item 66, SCG-10) has been changed to provide for a lock nut TCS-217. In the old arrangement it was possible for the raising nut to become loose in the bracket, resulting in a small amount of lost motion or drop of spindle which might in some cases damage an expensive diamond wheel. In the new design the raising nut is fixed on the bracket by means of its shoulder on the bottom and a lock nut on its upper end. The set screw (Item 86, SP-213), to prevent the nut from turning, remains unchanged.

The column clamp bracket (Item 66, SCG-10) is now being milled on both sides so that the shoulder of the raising nut and the lock nut will seat properly. On machines in the field it may in some cases be necessary to file or face the surfaces so that the new raising nut assembly will fit properly.

6. INCREASED COLUMN HEIGHT

(Effective 2-5-44, beginning with Serial No. 26-7252)

The column (Item 77, SCG-4) has been increased two inches. This gives additional travel for the machine head and makes the maximum clearance under a 7 inch wheel 11½ inches instead of the 9½ inches former available.

NEW PARTS INTERCHANGEABLE WITH OLD

In the above changes the new parts are fully interchangeable with the ones which they replace, except as noted. When any of these items are ordered as replacement parts for old machines, the new parts will be furnished, making these refinements available to the user.

Printed in U. S. A.

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