

Schenectady
January 5, 1949

Mr. C. K. Skinner
Construction Materials Department
Bridgeport

We transmit herewith Value Analysis survey and suggestions applicable to the Mogul Base Lampholder and Switch, Catalog 95x890, which was studied in Bridgeport.

Earl Theall has all quotations.

The enthusiasm of your department for this type of work is inspiring to all of us.

PURCHASING DEPARTMENT

L. D. Miles
L. D. Miles
Value Analysis Division

LDM:AMH

- CC: C. H. Black
- E. J. Harrington
- D. Kimball
- E. G. Hopkins
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- A. G. Carey

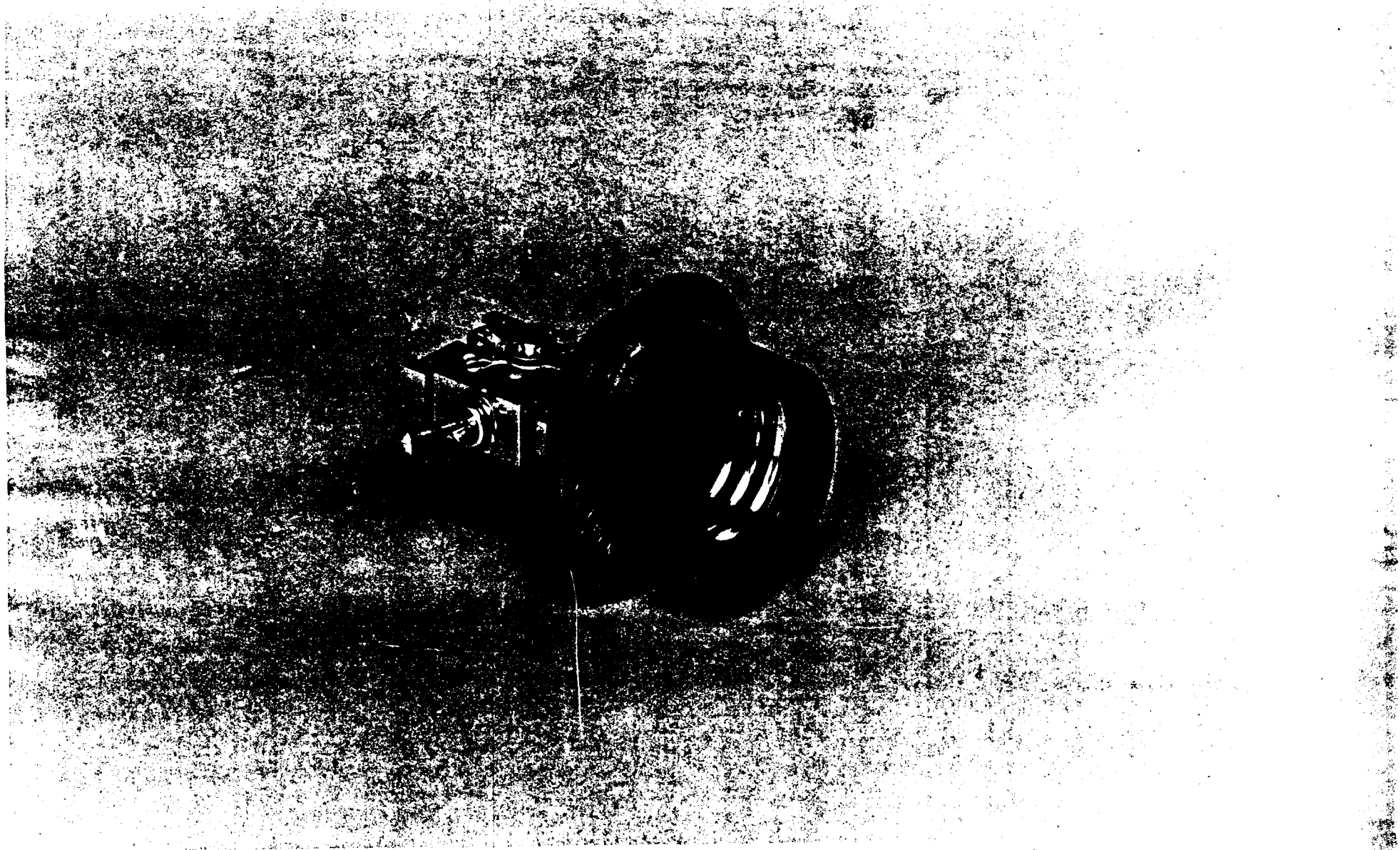
MOGUL BASE LAMPHOLDER
AND SWITCH

VALUE ANALYSIS REPORT

of

MOGUL BASE LAMPHOLDER AND SWITCH
(Catalog 95X890)

Compiled by: C. R. Stahl
F. D. Nicol
January 5, 1949



SUMMARY

The analysis of the parts and assembly costs of the two filament Mogul Base lampholder and switch (Cat. #95x890) is summarized as follows:

Present Costs--Dollars Each

	<u>Mat'l</u>	<u>Labor</u>	<u>I. M. E.</u>	<u>Shop Cost</u>
Parts	\$.369	\$.067	\$.221 (330%)	\$.657
Assembly (Inc. 20% W.R.A.)	---	.073	.125 (170%)	<u>.198</u>
				\$.855 ea.

Proposed Costs--Dollars Each

	<u>Mat'l</u>	<u>Labor</u>	<u>I. M. E.</u>	<u>Shop Cost</u>
Parts	\$.244	\$.013	\$.043 (330%)	\$.300
Assembly (Inc. 20% W.R.A.)	---	.042	.072 (170%)	<u>.114</u>
				\$.414 ea.

Annual Production Requirements

1,000,000 units

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M/

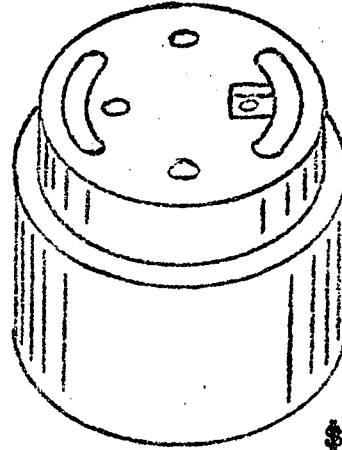
PARTS COST

			<u>Present Costs</u>			<u>Proposed Changes</u>		
			<u>Mat'l</u>	<u>Labor</u>	<u>Shop Cost</u>	<u>Mat'l</u>	<u>Labor</u>	<u>Shop Cost</u>
462960-2	Shell	1	33.75	7.19	64.65	36.25	---	36.25
2085451	Ring	1	3.54	.33	4.96			
2085493	Hex Nut	1	4.13	.40	5.85			
4191495	Nozzle	1	5.02	1.38	10.95			
4191497	Handle	1	12.39	18.36	91.34	5.62	---	5.62
4192485	Screw	2	.18	.14	.78			omit
4192668	Nut	1	.91	.74	4.09			omit
4196701	Screw	1	1.20	.14	1.80			
4196701-2	Screw	1	1.20	.14	1.80			
5411337	Spring	1	1.65	---	1.65			
5411339	Spring	1	7.35	---	7.35			
5414445	Base	1	217.00	---	217.00	94.60	---	94.60
5417231	Side Plate	1	10.51	---	10.51			
5417232	Side Plate	1	10.51	---	10.51			
5418534	Terminal	1	7.62	3.85	24.18	7.62	.95	11.71
5418535	Terminal	1	7.08	5.13	29.06	8.00	.24	9.03
5418536	Plate	1	1.47	1.17	6.50			omit
5418537	Plate	1	.44	.09	.83			
5418538	Plate	1	.53	.09	.92			
5418539	Rocker	1	.49	5.27	23.15	.46	.44	2.35
5418540	Washer	1	.06	.21	.96			
5418541	Washer	2	.10	.09	.49			
5418542	Washer	2	.28	.19	1.10			
5418543	Trip Arm	1	.47	4.24	18.11	.44	1.14	5.34
5418544	Blade	2	3.70	1.09	8.39			
5418545	Terminal	1	4.31	3.12	17.73	5.08	.24	6.12
5418546	Terminal	1	4.31	3.45	19.15	4.36	.24	5.39
5418547	Contact	1	2.53	.09	2.91			
5418548	Plate	1	1.47	2.12	10.59			omit
5418549	Ring	1	10.12	2.13	19.28	9.40	.80	12.84
5418550	Cover	1	1.68	.30	2.97			
5418555A	Blade Asm	1	Incl. in Final Asm.			Incl. in Final Asm.		
5418556A	Nozzle Asm	1	---	1.49	6.41	Incl. in Final Asm.		
5418557A	Plate Asm	1	Incl. in Final Asm.			Incl. in Final Asm.		
5418558A	Plate Asm	1	Incl. in Final Asm.			Incl. in Final Asm.		
5418916A	Term. Asm	1	---	.72	3.14			
5418917A	Term. Asm	1	---	.72	3.14			
5419510	Contact	1	6.68	.98	10.89			
#6-32x3/8	Screw	2	1.20	.14	1.80			omit
Proposed Mechanism								
	Plate	1	---	---	---	2.20	.70	5.20
	Eyelets	4				1.00	---	1.00
	Split Rivet (Cover)	1				1.00	---	1.00
Totals per M unit asm.			369.34	67.15	657.50			
Proposed Totals			244.22	13.08	300.55			

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PURCHASING DEPARTMENT
January 3, 1949

M/

5134445 Base



PRESENT COST

Purchased from Meriden
(Mat'l is now Mycalex)

\$217.00/M

PROPOSED COST

Purchase from Meriden
Tool Charge (1100/week)

\$ 94.60/M
2160.00

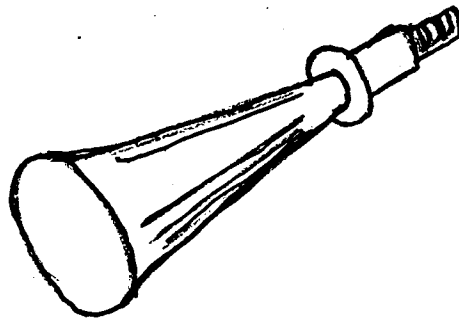
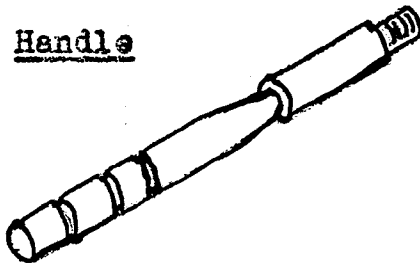
COMMENTS--

The new quote from Meriden was based on using #74 compound rather than Mycalex.

An outside vendor quotes a price of \$83.95/M to furnish this base made from porcelain. This price is based on standard porcelain tolerances. In order to determine variations vendor is furnishing a drawing marked to indicate his standard tolerances.

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4191497 Handle



PRESENT COST

<u>Material--</u>	3/8 Brass Rod	1000 pcs = 42#	\$12.39/M
<u>Labor--</u>	All operations		18.36
<u>I. M. E.--</u>	(330%)		60.59
		Shop Cost	<u>\$91.34/M</u>

PROPOSED COST

Suggest purchasing this part in present design as a zinc die casting. One supplier quotes as follows:

\$4.45/M	Zinc Alloy
1.17/M	Extra for nickel or brass plating
<u>\$5.62/M</u>	Total (Plated)
	Tool Charge \$600.00

COMMENTS--

Several methods of lowering the cost of this item have been investigated. The best proposition was as a zinc die casting. The threads will be cast on the handle but will have 2 flat sides to allow for the parting line. The G. E. Monogram, however, will not be intersected by the parting line as a three piece would be used.

A simplified screw machine part using a minimum of material and machining was investigated. Lowest quotation was--

	<u>Aluminum</u>	<u>Brass</u>
Lots 200,000	\$5.20/M	\$6.65/M
Lots 100,000	5.60	6.35

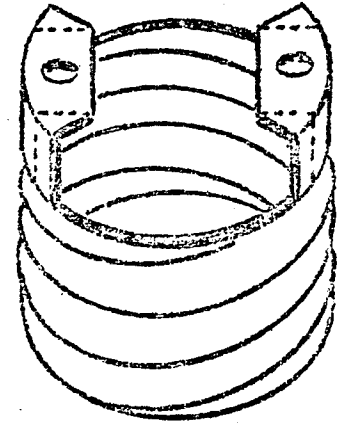
This design as shown above incorporates the necessary utility, but does not have the styling of present design.

Another supplier quotes \$46.75/M in lots of 100,000 to supply part to present drawing.

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462960 Receptacle

462960-2 Receptacle



PRESENT COST

<u>Material--</u>	.020 x 3 3/8 Copper 1000 pcs = 90#	\$33.75/M
<u>Labor--</u>	All operations	7.19
<u>I. M. E.--</u>	(330%)	<u>23.71</u>
	Shop Cost	\$64.65/M

PROPOSED COST

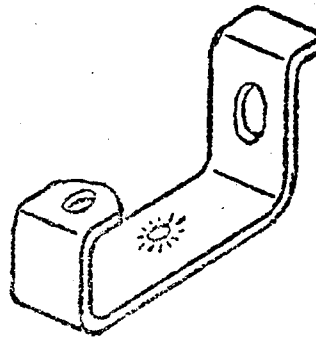
Suggest purchase from a vendor who quotes in the following schedule. The vendor would require the minor drawing change as shown in above sketch by the dotted lines.

Lots 500,000	\$36.00/M
Lots 250,000	36.25/M
Lots 100,000	37.00/M
Tool Charge	\$785.00

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M/

5418543 Trip Arm



PRESENT COSTS

<u>Material--</u>	.032 x 2 1/8 Steel 1000 pcs = 7#	\$.47/M
<u>Labor--</u>	Several press operations, tapping, and plating	
		4.24
<u>I. M. E.--(330%)</u>		14.00
	Shop Cost	<u>\$18.71/M</u>

PROPOSED COSTS

<u>Material--</u>	.032 x 5/16 Steel 1000 pcs = 6.5#	\$.44/M
<u>Labor--</u>	Make complete in 4 slide machine (125 strokes/min.)	.24
	Dial tap (1) hole (35/min.)	.70
	Zinc plate	.20
<u>I. M. E.--(330%)</u>		3.76
	Shop Cost	<u>\$ 5.34/M</u>

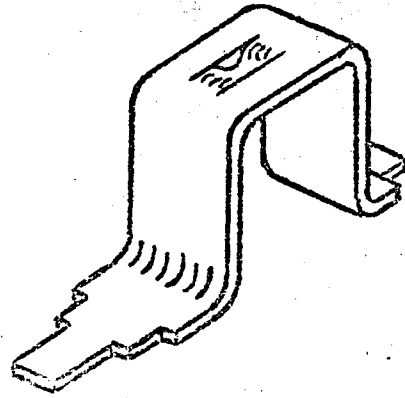
COMMENTS--

Suggest that this part be tooled and run on 4 slide machine. It would also be possible to run in a standard automatic punch press with the stock running the wide way.

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M/

5418539 Rooker



PRESENT COSTS

<u>Material--</u>	.032 x 7/16 Steel 1000 pcs = 7.5#	\$.49/M
<u>Labor--</u>	Several press operations and plating	5.27
<u>I. M. E.--(330%)</u>		<u>17.40</u>
	Shop Cost	\$23.16/M

PROPOSED COSTS

<u>Material--</u>	.032 x 7/16 Steel 1000 pcs = 6.75#	\$.46/M
<u>Labor--</u>	Make complete in 4 slide machine (125 strokes per min.)	.24
	Zinc plate (Barrel)	.20
<u>I. M. E.--(330%)</u>		<u>1.45</u>
	Shop Cost	\$ 2.35/M

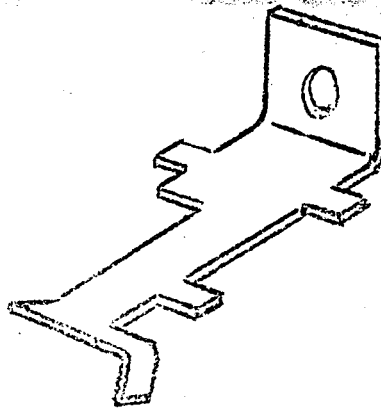
COMMENTS--

Suggest that Engineering and Manufacturing jointly review the close tolerances as the proper concessions would allow this part to be made on a 4 slide machine.

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M/

K-5418535 Terminal



PRESENT COSTS

<u>Material--</u>	.046 x 1 7/8 Brass 1000 pcs = 19.5#	\$ 7.08/M
<u>Labor--</u>	Several press operations and tapping	5.13
<u>I. M. E.--(330%)</u>		16.90
	Shop Cost	<u>\$29.11/M</u>

PROPOSED COSTS

<u>Material--</u>	.046 x 1 9/16 Brass 1000 pcs = 22#	\$ 8.00/M
<u>Labor--</u>	Make complete in 4 slide machine (125 strokes/min.)	.24
<u>I. M. E.--(330%)</u>		.79
	Shop Cost	<u>\$ 9.03/M</u>

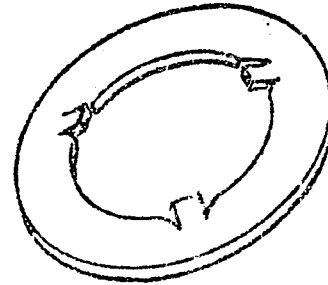
COMMENTS--

Suggest that this part be tooled and run in 4 slide machine. Also suggest that the swaging and tapping be eliminated as this part can be fastened to the base with an eyelet.

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M/

5418549 Support Ring



PRESENT COSTS

<u>Material--</u>	.046 x 3 9/32 Steel 1000 pcs = 151#	\$10.12/M
<u>Labor--</u>	Press work and plating	2.13
<u>I. M. E.--(330%)</u>		7.03
	Shop Cost	<u>\$19.28</u>

PROPOSED COSTS

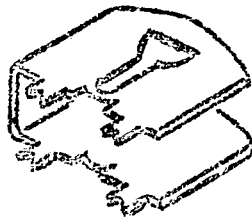
<u>Material--</u>	.046 x 3 1/4 Steel 1000 pcs = 140#	\$ 9.40/M
<u>Labor--</u>	Pierce, form, and blank (100 strokes/min)	.30
	Nickel plate (Barrel)	.50
<u>I. M. E.--(330%)</u>		2.64
	Shop Cost	<u>\$12.84/M</u>

COMMENTS--

It appears that the amount of material required by the die could be reduced both in width and pitch. When a replacement die has to be made, perhaps this could be reviewed.

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K/



Proposed Design



5418536



5418548

PRESENT COST

	<u>Mat'l</u>	<u>Cost/M</u>	<u>Labor/M</u>	<u>Shop Cost/M</u>
5418536	22#	1.47	1.17	6.50
5418548	22#	1.47	2.12	<u>10.59</u>
				17.09

PROPOSED COSTS

<u>Material--</u>				
.032 x 1 3/8 Steel 1000 pcs = 33#				2.20/M
<u>Labor--</u>				
Make complete in 4 slide machine (100/min.)				.39
Zinc plate				.40
<u>I.M.E.--(330%)</u>				<u>2.30</u>
			Shop Cost	\$5.20/M

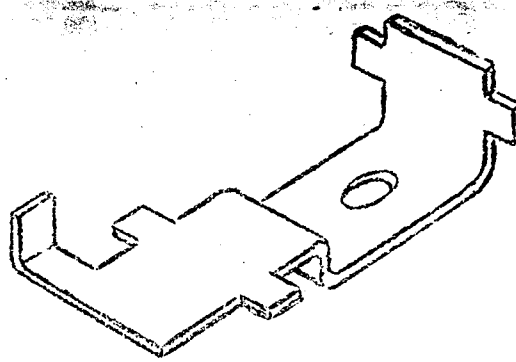
COMMENTS--

Suggest that both these parts be made as one piece joined together on one side as shown by above sketch. This type of construction will greatly facilitate assembly. See assembly sketches for details.

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M/

5438545 Terminal



PRESENT COSTS

<u>Material--</u>	.046 x 1 7/16 brass 1000 pcs = 11.9#	\$ 4.31/M
<u>Labor--</u>	Several press operations and tapping	3.12
<u>I. M. E.--(330%)</u>		10.30
	Shop Cost	<u>\$17.73/M</u>

PROPOSED COSTS

<u>Material--</u>	.046 x 7/8 brass 1000 pcs = 14#	\$ 5.08/M
<u>Labor--</u>	Make complete in 4 slide machine (125 strokes/min)	.24
<u>I. M. E.--(330%)</u>		.79
	Shop Cost	<u>\$ 6.12/M</u>

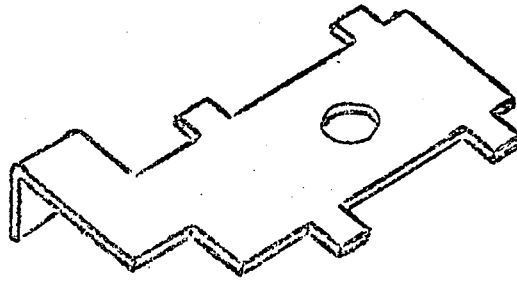
COMMENTS--

Suggest that this part be tooled and run in 4 slide machine. Also suggest that the swaging and tapping be eliminated as this part can be fastened to the base with an eyelet.

VALUE ANALYSIS DIVISION
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M/

K-5418546 Terminal



PRESENT COSTS

<u>Material--</u>	.046 x 15/16 Brass	1000 pcs = 11.9#	\$ 4.31/M
<u>Labor--</u>	Several press operations and tapping		3.45
<u>I. M. E.--(330%)</u>			<u>11.39</u>
	Shop Cost		\$19.15/M

PROPOSED COSTS

<u>Material--</u>	.046 x 7/8 Brass	1000 pcs = 12#	\$ 4.36/M
<u>Labor --</u>	Make complete in 4 slide machine (125 strokes/min.)		.24
<u>I. M. E.--(330%)</u>			<u>.79</u>
	Shop Cost		\$ 5.39/M

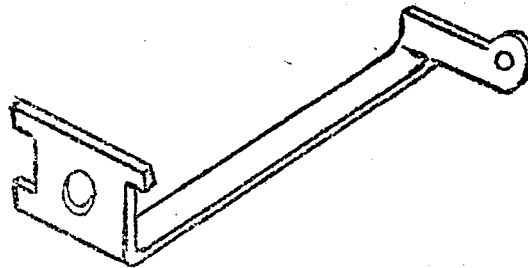
COMMENTS--

Suggest that this part be tooled and run on 4 slide machine. Also suggest that tapping at this stage be eliminated as tapping can be done when screw is assembled. (See 5418917A for assembly and tapping.)

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M/

K-5418534 Terminal



PRESENT COSTS

<u>Material--</u>	.046 x 2½ Brass 1000 pcs = 19.5#	\$ 7.62/M
<u>Labor--</u>	Several press operations and tapping	3.85
<u>I. M. E.--(330%)</u>		<u>12.71</u>
	Shop Cost	<u>\$24.18/M</u>

PROPOSED COSTS

<u>Material--</u>	.046 x 2½ Brass 1000 pcs = 19.5#	\$ 7.62/M
<u>Labor--</u>	Pierce, swage, and blank (150 strokes per min.)	.20
	Form complete (30 strokes per min.)	.75
<u>I. M. E.--(330%)</u>		<u>3.14</u>
	Shop Cost	<u>\$11.71/M</u>

COMMENTS--

Suggest that this part be made in two press operations and have the tapping for the binding eliminated at this stage as it can be tapped when screw is assembled. (See K-5418916A for assembly and tapping.)

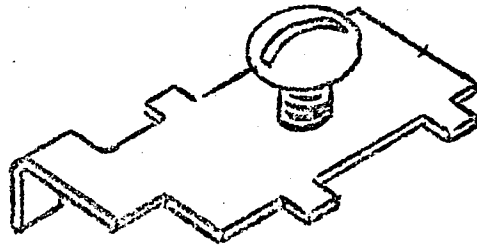
Also suggest that the swaged and tapped hole on small end be eliminated as this part can be fastened to the base with an eyelet.

Recommend that the nickel plating be eliminated.

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M/

K-5418917A Terminal Asm.



PRESENT COSTS

Planning now calls for the Terminal Screw to be assembled to the punching, staked, and then backed out.

Labor	\$.72/M
I. M. E.--(330%)	2.42
Shop Cost	<u>\$ 3.14/M</u>

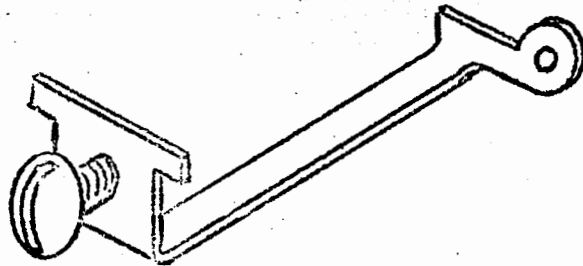
PROPOSED COSTS

Suggest that the above operations be combined with the tapping. All these operations could be run in a special Rotary Table Machine with multiple heads. (Bodine)

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M/

K-5418916A
Terminal Assembly



PRESENT COSTS

Planning now calls for the terminal screw to be assembled to the punching, staked and then backed out.

Labor	\$.72/M
I. M. E.--(330%)	<u>2.42</u>
Shop Cost	\$ 3.14/M

PROPOSED COSTS

Suggest that the above operations be combined with the tapping. All these operations could be run in a special rotary table machine with multiple heads (Bodine).

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M/

Explanation of Suggested Assembly Method

An analysis of the present cost breakdown of the Mogul Base Lampholder, shows that a very large portion of the total shop cost is contributed by the assembly labor. In an effort to make the assembly easier and therefore less costly, a modification of the present device is suggested.

One modification divides the switch into two units, the mechanism subassembly and the contact subassembly. The mechanism unit is made from the same parts as now makes up the unit except for two minor changes. The two mechanism plates are combined into a single "U" shaped punching. Projections are added to the rocker plate so that the two subassemblies can be connected together with these projections. The mechanism subassembly is then a straight-forward assembly operation.

The contact subassembly consists of the rest of the switch. This includes the mounting plates with all the contacts. The mounting plates are modified by slotting them so that the mechanism assembly can be inserted into the contact assembly. Four additional holes are added to the contact mounting plates so that the mechanism subassembly can be crimped to it. The contact subassembly is made by placing all the parts in a fixture, and then staking all the fastening projections at one time.

Another modification that is suggested is the use of eyelets to hold the contact subassembly, the two lamp contacts and the receptacle to the base. Four eyelets are placed on pins and then the two lamp contacts, the receptacle, and base are placed over the eyelets. The contact subassembly is then positioned over the eyelets and the pressure is applied by a hydraulic ram. This completes the assembly operation. Investigation has shown that such a method of assembly is easily and cheaply done on tools of the proper design. Eyeletting, in this case, seems more economical than either riveting or screw fastening.

The final operation is the inserting of the switch mechanism into the contact subassembly. The projections on the rocker plate are crimped inward into holes in the plastic side plates. This operation is done on a simple hydraulic press.

To enable easy assembly of the contact support spring into the base, the first few loops of the spring are enlarged so that it will stay in the base once it is inserted there.

The dust cover is held in position at the base by a small split rivet which is inserted into the eyelet hole. These rivets can be pushed in by hand.

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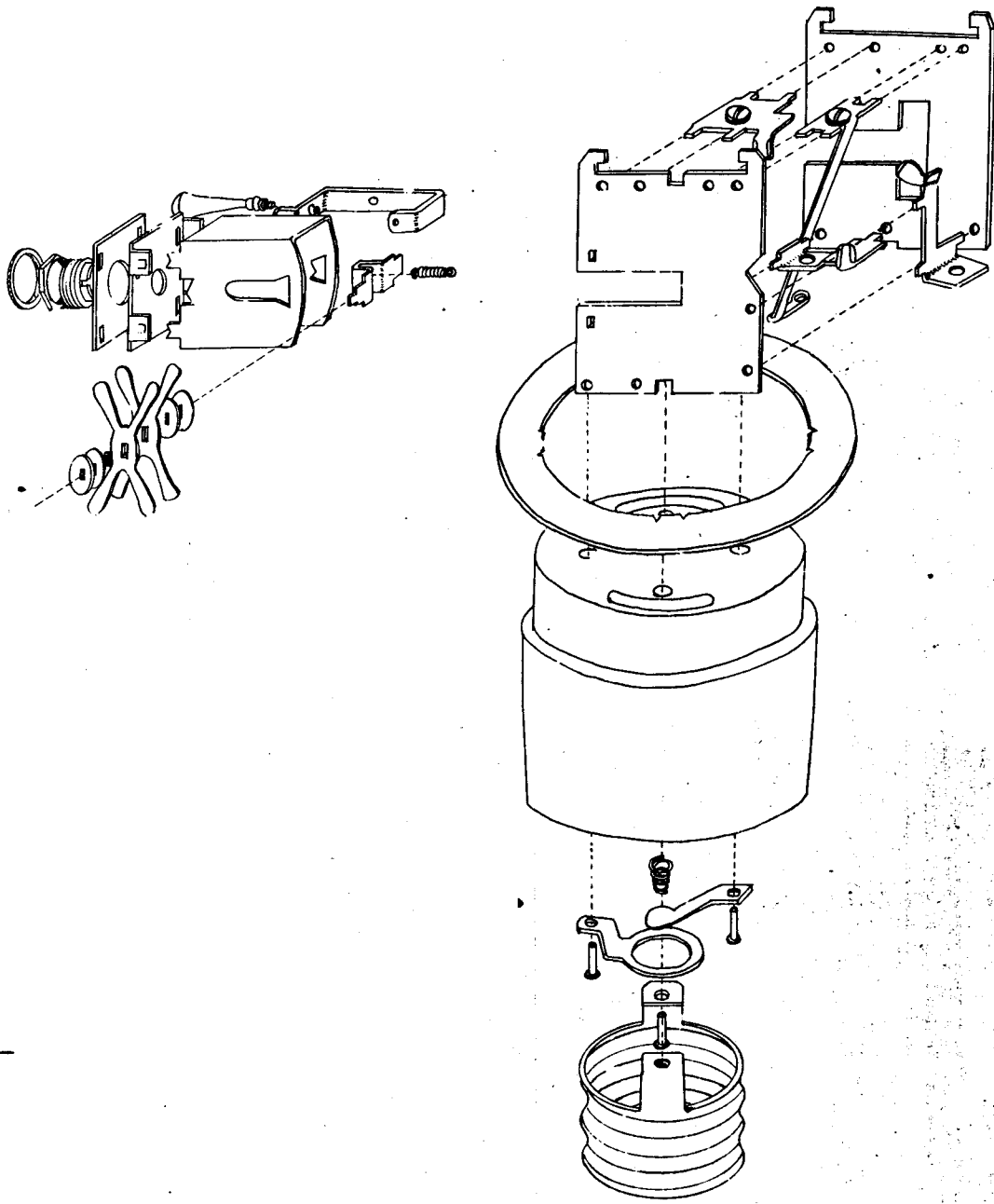
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2

THIRD ANGLE PROJECTION

6.

7



PRESENT TOTAL ASSEMBLY SHOP COST - \$198.61/M

PROPOSED ASSEMBLY

COST/M

- | | |
|---|------|
| 1. ASSEM. CONTACT BLADES TO
ROCKER | 2.50 |
| 2. ASSEM. NOZZLE TO NOZZLE PLATE | 1.50 |
| 3. ASSEM. SPRING TO ROCKER | 1.50 |
| 4. ASSEM. ROCKER TO "U" PUNCHING | 1.50 |
| 5. INSERT SPRING IN TRIP ARM | 1.50 |
| 6. ASSEM. NOZZLE & ROCKER PLATE
& STAKE | 2.00 |
| 7. ASSEM. SIDE PLATES & CONTACTS
(6 PARTS & STAKE) | 5.00 |
| 8. ASSEM. SUPPORT RING & SPRING TO
BASE | 2.50 |
| 9. ASSEM. BASE & SIDE PLATE ASSEM.
(EYELET 3 PARTS, BASE & SIDE PLATE) | 4.40 |
| 10. ASSEM. SWITCH MECHANISM TO SIDE
PLATE & CONTACT ASSEM. | 1.50 |
| 11. ASSEM. HEX NUT, KNURLED NUT &
HANDLE | 2.00 |
| 12. ADJUST & FINAL INSPECTION | 4.00 |
| 13. GREASE BLADE, ASSEM. DUST COVER | 3.00 |
| 14. PACK 50/CARTON | 2.20 |

TOTAL ASSEMBLY LABOR \$35.10/M

20% WRA + IME (170%) 78.62

PROPOSED TOTAL SHOP COST \$113.72/MMOGUL SOCKET ASSEMBLY

FIRST MADE FOR

DESIGN BY

TRAINED BY

FINISHED BY C.R. SULL

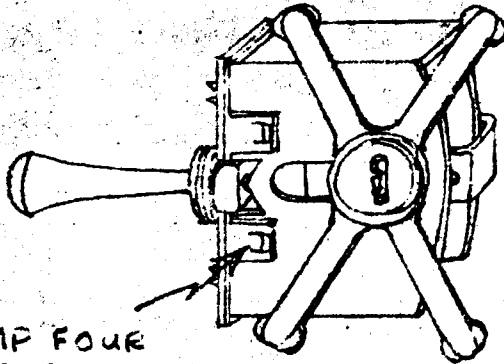
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GENERAL

ELECTRIC
WORKS

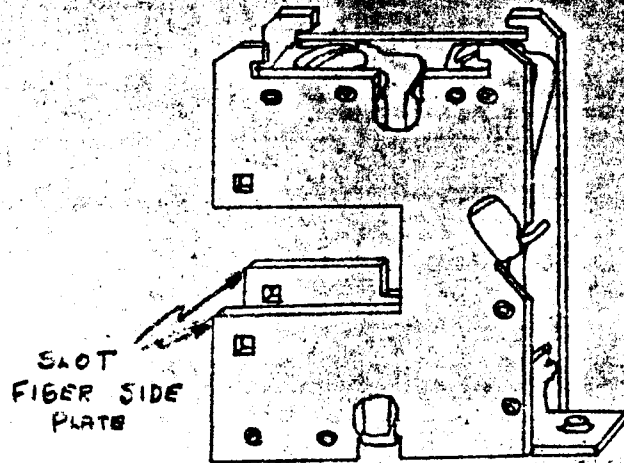
6.

SUGGESTED MODIFICATION OF SWITCH
TO FACILITATE EASIER ASSEMBLY

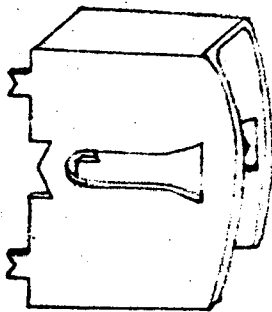


CRIMP FOUR
EARS TO ASSEMBLE
TO CONTACT ASSEMBLY

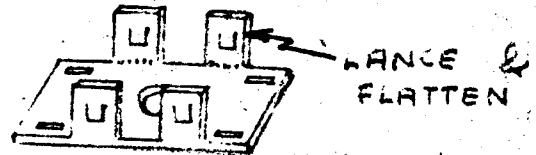
MECHANISM ASSEMBLY



CONTACT ASSEMBLY



MECHANISM PLATE



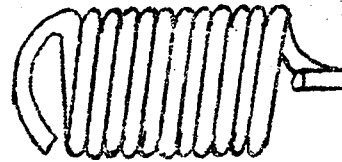
CONNECTION NOZZLE
PLATE

	MADE BY <i>W.K. Staff</i>	INSPECTED BY <i>23 Dec 1945</i>	
	DIVISION GENERAL ELECTRIC		

SUPPLEMENT TO MOGUL LAMP HOLDER AND SWITCH REPORT



K-5411337



K-5411339

K-5411337 Spring

Present costs (Vendor "A")

\$1.65/M

Quotations Received

	<u>Lots 100M</u>	<u>250M</u>	<u>500M</u>
Vendor "A" (to drwg.)	1.50	1.45	1.40
Vendor "B" (to drwg.)	1.23	1.17	1.16
Vendor "B" (Hard Drawn Wire)	1.06	.92	.91
Vendor "C" (to drwg.)	.73	.68	.60

K-5411339 Spring

Present costs (Vendor "A")

\$7.35/M

Quotations Received

	<u>Lots 100M</u>	<u>250M</u>	<u>500M</u>
Vendor "A" (to drwg.)	7.05	6.90	6.80
Vendor "B" (to drwg.)	6.12	6.08	6.02

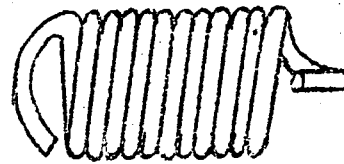
PURCHASING DEPARTMENT
VALUE ANALYSIS DIVISION
January 17, 1949

M/

SUPPLEMENT TO MOGUL LAMP HOLDER AND SWITCH REPORT



K-5411337



K-5411339

K-5411337 Spring

Present costs (Vendor "A")

\$1.65/M

Quotations Received

Vendor "A" (to drwg.)
Vendor "B" (to drwg.)
Vendor "B" (Hard Drawn Wire)
Vendor "C" (to drwg.)

Lots 100M

1.50
1.23
1.06
.73

250M

1.45
1.17
.92
.68

500M

1.40
1.16
.91
.60

K-5411339 Spring

Present costs (Vendor "A")

\$7.35/M

Quotations Received

Vendor "A" (to drwg.)
Vendor "B" (to drwg.)

Lots 100M

7.05
6.12

250M

6.90
6.08

500M

6.80
6.02

PURCHASING DEPARTMENT
VALUE ANALYSIS DIVISION
January 17, 1949

M/