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AUTOMATIC MACHINE FOR THE ASSEMBLY OF COMPOUND RIVETS, (U)  
SEP 78 N G YEGOROV, P A POLYAKOV  
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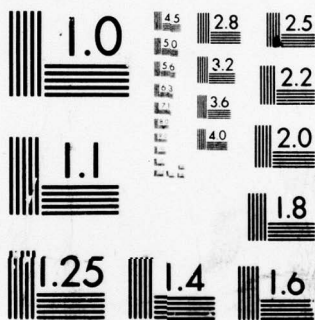
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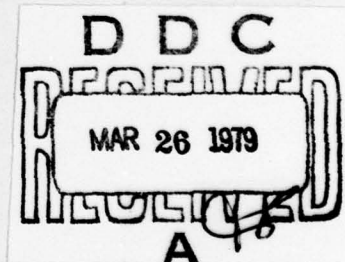
## FOREIGN TECHNOLOGY DIVISION



AUTOMATIC MACHINE FOR THE ASSEMBLY  
OF COMPOUND RIVETS

By

N.G. Yegorov, P.A. Polyakov, and V.P. Aleksandrinn



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By: N.G. Yegorov, P.A. Polyakov, and  
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# U. S. BOARD ON GEOGRAPHIC NAMES transliteration SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	<b><i>А а</i></b>	A, a	Р р	<b><i>Р р</i></b>	R, r
Б б	<b><i>Б б</i></b>	B, b	С с	<b><i>С с</i></b>	S, s
В в	<b><i>В в</i></b>	V, v	Т т	<b><i>Т т</i></b>	T, t
Г г	<b><i>Г г</i></b>	G, g	У у	<b><i>У у</i></b>	U, u
Д д	<b><i>Д д</i></b>	D, d	Ф ф	<b><i>Ф ф</i></b>	F, f
Е е	<b><i>Е е</i></b>	Ye, ye; E, e*	Х х	<b><i>Х х</i></b>	Kh, kh
Ж ж	<b><i>Ж ж</i></b>	Zh, zh	Ц ц	<b><i>Ц ц</i></b>	Ts, ts
З э	<b><i>З э</i></b>	Z, z	Ч ч	<b><i>Ч ч</i></b>	Ch, ch
И и	<b><i>И и</i></b>	I, i	Ш ш	<b><i>Ш ш</i></b>	Sh, sh
Й й	<b><i>Й й</i></b>	Y, y	Щ щ	<b><i>Щ щ</i></b>	Shch, shch
К к	<b><i>К к</i></b>	K, k	Ъ ъ	<b><i>Ъ ъ</i></b>	"
Л л	<b><i>Л л</i></b>	L, l	Ы ы	<b><i>Ы ы</i></b>	Y, y
М м	<b><i>М м</i></b>	M, m	Ь ь	<b><i>Ь ь</i></b>	'
Н н	<b><i>Н н</i></b>	N, n	Э э	<b><i>Э э</i></b>	E, e
О о	<b><i>О о</i></b>	O, o	Ю ю	<b><i>Ю ю</i></b>	Yu, yu
П п	<b><i>П п</i></b>	P, p	Я я	<b><i>Я я</i></b>	Ya, ya

\*ye initially, after vowels, and after Ъ, Ь; e elsewhere.  
When written as ё in Russian, transliterate as yë or ë.

## RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh <sup>-1</sup>
cos	cos	ch	cosh	arc ch	cosh <sup>-1</sup>
tg	tan	th	tanh	arc th	tanh <sup>-1</sup>
ctg	cot	cth	coth	arc cth	coth <sup>-1</sup>
sec	sec	sch	sech	arc sch	sech <sup>-1</sup>
cosec	csc	csch	csch	arc csch	csch <sup>-1</sup>

Russian English

rot curl  
lg log



## AUTOMATIC MACHINE FOR THE ASSEMBLY OF COMPOUND RIVETS

N. G. Yegorov, P. A. Polyakov, and  
V. P. Aleksandrin

This invention pertains to the mechanical assembly operations.

There is a known machine which is used for the assembly of the compound rivets consisting of a collar and a shank, which has the following mechanisms mounted on the stand and which are connected to one another kinematically: a mechanism which feeds the blanks from the hopper with guiding troughs shaped according to the configuration of the blanks, a rotor-type mechanism for seizing and orientating the blanks; it also contains a punch which has a reciprocating motion.

However, this machine is complex in construction.

The machine we propose does not have this drawback and is different from the other in that the blank seizure and orientation mechanism is made in the form of a disc fitted loosely around the axel with a hub with shaped seats for receiving blanks and which can be reversed by means of a ring, which is mounted on the hub of this disc, which has seats containing spring-loaded balls which come in contact with another ring mounted loosely on the mentioned axel and which is connected by means of a gear with the drive of the punch; in this case the guiding shaped troughs for the blank feed mechanism are mounted on the rotating sectors in the sections of the hopper.

Figure 1 shows the general view of this machine; Fig. 2

shows a cross section along A-A in Fig. 1; Fig. 3 shows a cross section along E-E (along the fastening axels of the mobile sectors) in Fig. 1; Fig. 4 shows an assembled rivet, general appearance; Fig. 5 shows a cross section along B-B (along the hopper) in Fig. 1; Fig. 6 shows a cross section along Γ-Γ along the sections of the hopper in Fig. 2; Fig. 7 shows a cross section along Δ-Δ in Fig. 1.

The machine consists of the following mechanisms mounted on the stand and which are kinematically connected with one another: blank feed mechanism, blank seizing and orientation mechanism, and the ejection mechanism of the assembled rivets.

The blank feed mechanism, for example of the shank 1 and collar 2, has a hopper in which rotating sectors 5 are mounted in sections 3 on axels 4. Guiding troughs shaped according to the configuration of the blanks are located on the face of the sectors. In this case, axel 6 connects the sectors with rod 7 of the swiveling pneumatic cylinder 8 of the blank seizing and orientating mechanism in the form of disc 10, which is free-fitted on axel 9, with a hub which has profiled seats 11 and 12 for the reception of the blanks. Disc 10 is contained in housing 13 with a small clearance and the hub of this disc has ring 14, with seats 15, which is secured on the key; the seats in the ring have spring-loaded balls 16 which fit into the recesses and come in contact with another ring 17, which is also free-fitted on axel 9. The ring has, pressed onto it, gear 18 which engages rack 19 connected with rod 20 of the drive for punch 21 connected to the other end of the rack by means of arm 22.

The mechanism which ejects the assembled rivets contains slide 23 mounted in the guides of housing 13. The central part of the slide has hole 24 and groove 25 whose dimensions permit the passage of the shank but not the collar 2 of the rivet. Roller 27 of the slide is pressed constantly against the rack by spring 26.

The machine operates in the following manner.

Shanks 1 and collars 2 of the rivets are loaded in bulk into sections 3 of the hopper; in this case the configuration of the blanks must correspond to the configuration of the guiding troughs of the moving sectors 5. Then the sectors are brought into motion

which swivel and pass through the container filled with blanks. For this reason, individual blanks fall into the trough of the sectors as they move and hang by their heads. When the sectors reach the extreme upper position the troughs get into the position which is coaxial to chute 28 and the blanks move down to seats 11 and 12 of disc 10. The blanks which are in a wrong position are retained by kicker 29.

As rack 19 moves down from rod 20 of the pneumatic cylinder, torque is transmitted from gear 18 and ring 17 to ring 14 and disc 10 attached to it through the spring-loaded balls 16. Simultaneously punch 21 moves down and roller 27 of slide 23 falls into groove 30 of rack 19. Groove 25 of the slide gets into position under disc 10. The rotation of the disc aligns seat 11 with a conical opening of axel 9. At this point shank 1 of the rivet falls from the seat 11 and gets into position in the conical opening of axel 9. The collar 2 of the rivet, which is in seat 12 of disc 10, turns and gets into position with its rim down and stops under shank 1 of the rivet, falling from disc 10 into the cavity of slide 23. The accuracy of the disc's rotation at the extreme positions is ensured by two controlled stops 31. With the stopping of disc 10 ring 17 continues to rotate, balls 16 overcome the tension of the springs and begin to slip through, punch 21 moves into opening 32 of disc 10 and, with further movement, presses shank 1 into collar 2 of the rivet. In this case the end of the shank gets into groove 25 of slide 23 and openings 33 of housing 13. After this, rod 20 with rack 19 move in a reverse direction. As long as punch 21 is in opening 32, disc 10 remains stationary and balls 16 continue to slip through. With a further movement of rack 19 upwards the disc is freed and returns to its original position. Roller 27 of slide 23 comes out of groove 30 of rack 19, the slide moves to the right ejecting the assembled rivet into opening 33 of housing 13. After this, the whole cycle is repeated.

#### **Object of the invention**

The automatic machine for the assembly of the compound rivets consisting of a collar and a shank, which contains the mechanism



for feeding the blanks from the hopper with the guiding troughs shaped to match the configuration of the blanks, rotor-type mechanism for the seizure and orientation of the blanks, and also a punch with a reciprocating motion, all of which are mounted on a stand and are kinematically connected to one another. This machine is distinguished by the fact that, in order to simplify the construction, the blank seizure and orientation mechanism is made in the form of a disc which is free-mounted on an axel and which has a hub with profiled seats for receiving blanks. This disc can be reversed by means of a ring mounted on the hub of this disc and which has seats with spring-loaded balls which come in contact with another ring which is free-fitted on the mentioned axel; this ring is connected with a drive, which moves the punch, by means of a gear; in this case, the guiding profiled troughs for the blank feed mechanism are mounted on the rotating sectors located in the sections of the hopper.

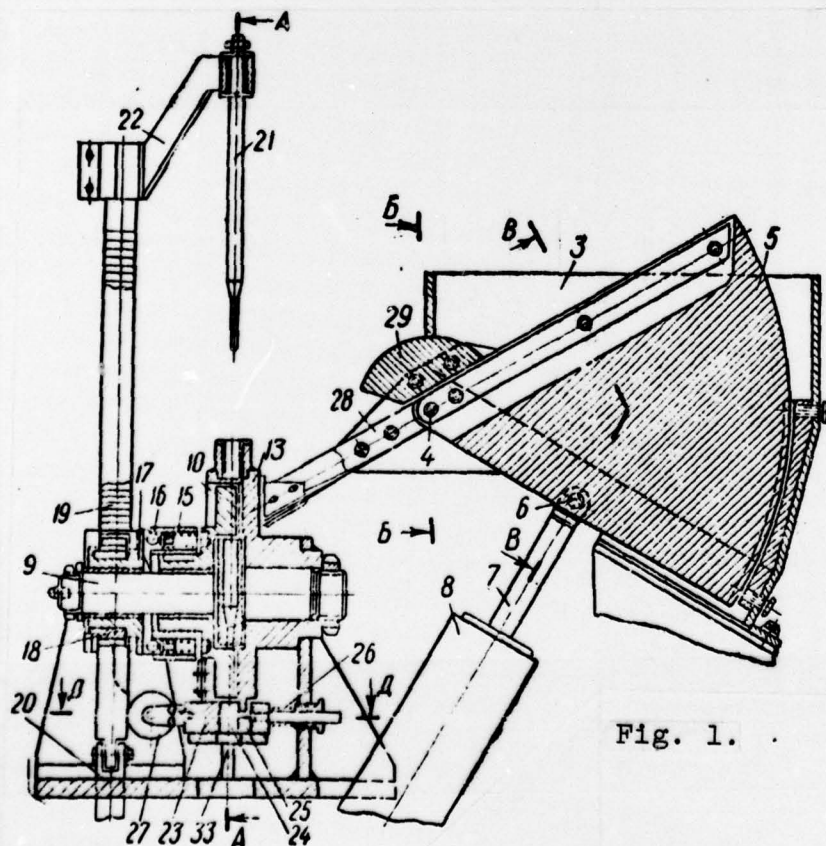


Fig. 1.

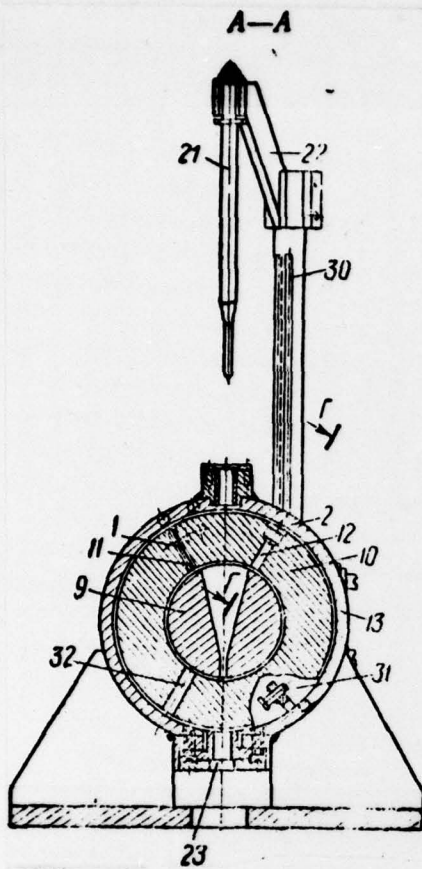


Fig. 2.

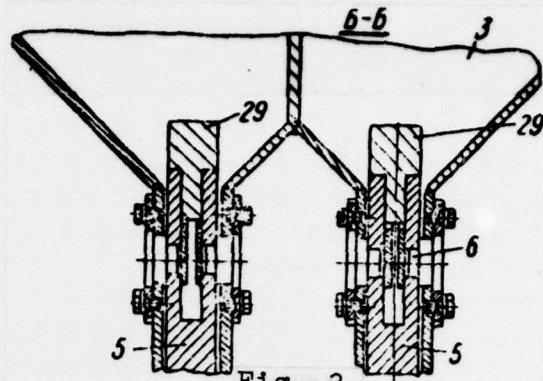


Fig. 3.

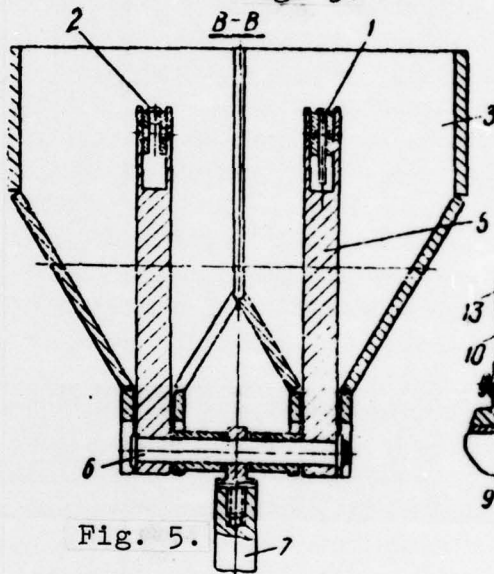


Fig. 5.



Fig. 4.

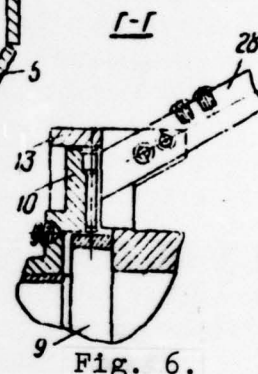


Fig. 6.

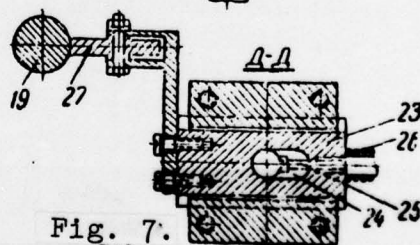


Fig. 7.

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C043 USAMIIA	1	E404 AEDC	1
C509 BALLISTIC RES LABS	1	E408 AFWL	1
C510 AIR MOBILITY R&D	1	E410 ADTC	1
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C513 PICATINNY ARSENAL	1	FTD	
C535 AVIATION SYS COMD	1	CCN	1
C591 FSTC	5	ASD/FTD/NIIS	3
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