

July 6, 1943.

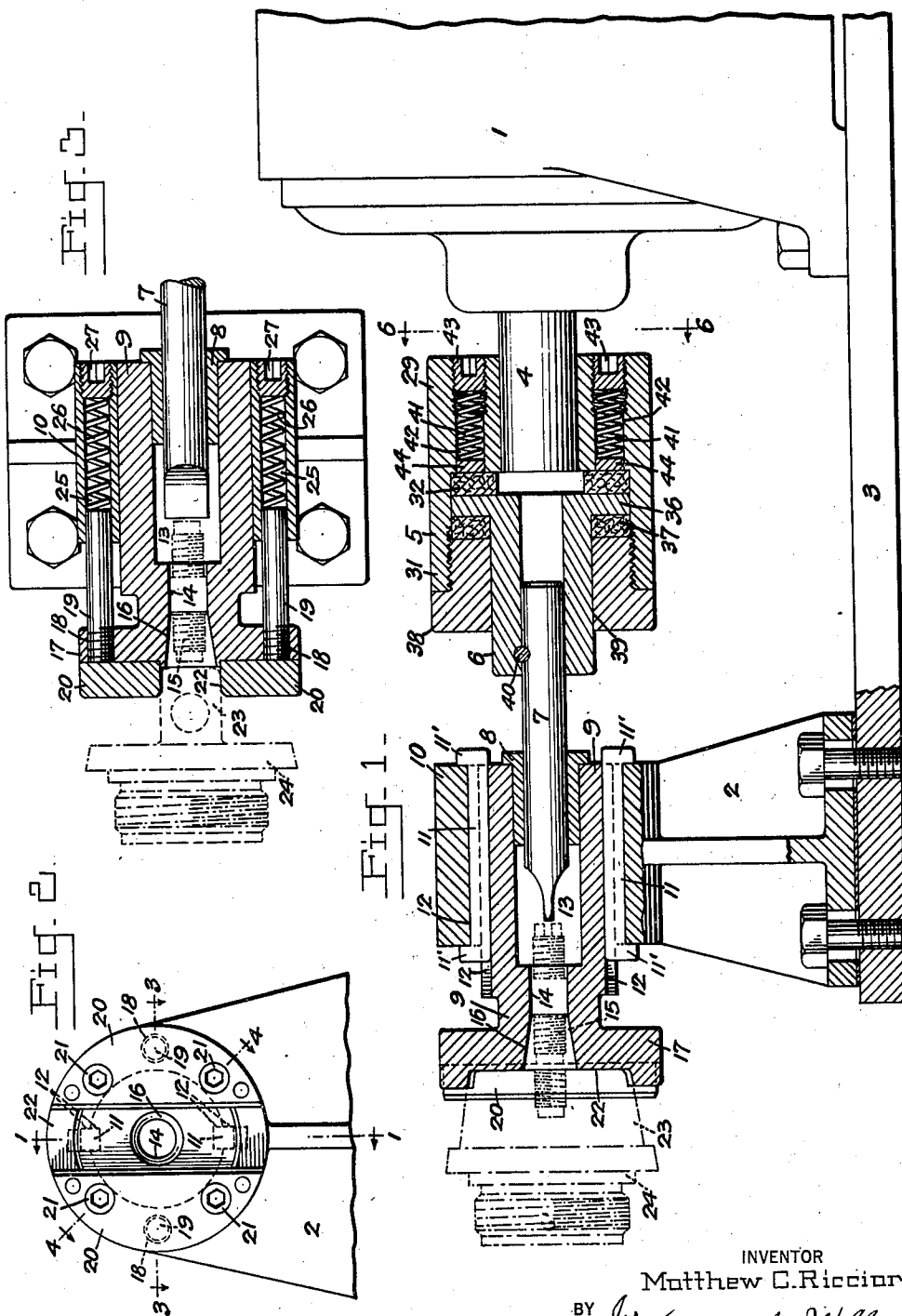
M. C. RICCIARDI

2,323,355

FUSE ASSEMBLING MACHINE

Filed July 23, 1941

2 Sheets-Sheet 1



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Fig. 6-

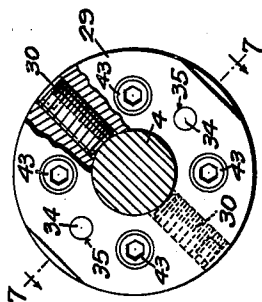


Fig. 6-

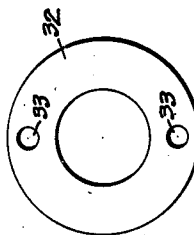


Fig. 7-

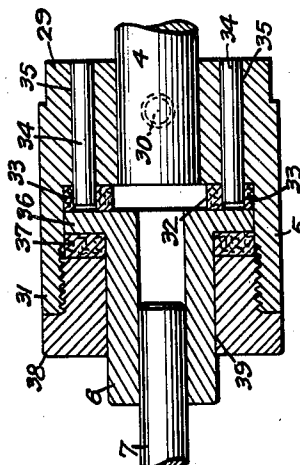


Fig. 4-

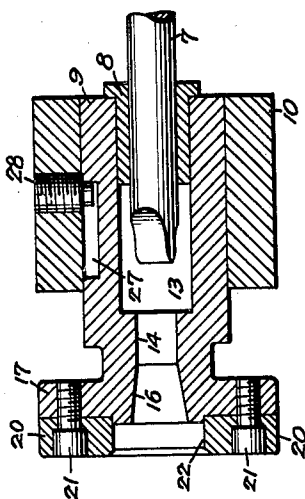
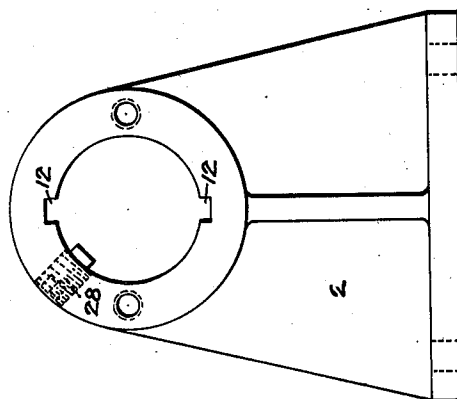


Fig. 5-



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UNITED STATES PATENT OFFICE

2,323,355

FUSE ASSEMBLING MACHINE

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Application July 23, 1941, Serial No. 403,772

1 Claim. (Cl. 64—30)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to an assembly device and more particularly to a device for assembling a pair of threaded articles.

An object of this invention is to provide a semi-automatic machine for assembling externally threaded objects to internally threaded members rapidly, safely and with a minimum of physical effort.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Fig. 1 is a central vertical section of the device on the line 1—1 of Fig. 2.

Fig. 2 is a side elevational view showing a portion of the work support, the work slide and tool guide,

Fig. 3 is a sectional view on the line 3—3 of Fig. 2 showing details of the slide feature,

Fig. 4 is a section on the line 4—4 of Fig. 2 illustrating additional slide details,

Fig. 5 is an end elevational view of the work support,

Fig. 6 is a sectional view on the line 6—6 of Fig. 1 with a portion broken away to show certain details,

Fig. 7 is a sectional view on the line 7—7 of Fig. 6 delineating details of construction of the friction or slip clutch, and

Fig. 8 is a plan view of one of the friction rings in the slip clutch.

Referring to the drawings by characters of reference, a geared motor 1 and a support 2 are firmly mounted on a base 3. The drive shaft 4 of the motor 1 carries an adjustable friction or slip clutch 5 which supports in its driven end 6 a tool 7. The tool 7 is journaled in a bearing 8 in a tubular work holder 9 which is adapted for reciprocation in the support 2.

In alignment with the axis of rotation of the drive shaft 4 of the motor 1 is a hollow cylindrical cradle 10 on the upper end of the support 2. The cradle 10 carries the sliding work holder 9. Holder 9 is adapted to reciprocate in cradle 10 but is prevented from rotating by a pair of keys 11 in suitable aligned channels 12 in the holder and cradle, see Figs. 1, 2 and 5. Each key 11 has enlarged ends 11' which engage the corresponding ends of cradle 10. The enlarged ends 11' prevent the keys 11 from sliding out of the chan-

nels 12 when the holder 9 reciprocates in its cradle.

Holder 9 has a passage or cavity 13 which has fitted therein the bearing sleeve 8 for the tool 7. The outer end 14 of the cavity 13 is of reduced diameter and is shaped to receive an article or work piece 15, see Figs. 1 and 4. The mouth of passage 14 is flared as at 16 to facilitate insertion of the work piece 15. The front end of the work holder 9 has a circular flange portion 17 that contains two threaded apertures 18 which retain threaded pins 19 as shown in Fig. 3. A pair of spaced segmental plates 20 are fastened to the circular flange 17 by set screws 21, see Figs. 2 and 4. This produces a slot 22 which is adapted to engage the nose 23 of a second work piece 24 to secure it from rotation, see Figs. 1 and 3.

The cradle 10 has a pair of spaced horizontal bores 25 which parallel the axis of passage 13. The pins 19 on the work carrier 9 ride in these bores. Compression springs 26 rest in the bores 25 with their ends bearing against the pins 19 and threaded adjusting screws 27 as shown in Fig. 3. The springs 26 urge the sliding work carrier 9 to the left for a purpose which is to be mentioned.

Figs. 4 and 5 show a preferred method of limiting the reciprocating movement of the work slide 9. A notch 27 is provided in the periphery of slide 9. A stop pin 28 in the cradle 10 projects into the notch 27 and limits the movement of the slide 9 to the length of the notch.

The driving end or head 29 of slip clutch 5 is fastened to drive shaft 4 by screws 30 or any suitable fasteners. The head 29 is a hollow cylindrical block with an internally threaded skirt 31. Seated within the skirt 31 is a fibre or leather friction ring 32 having a pair of holes 33 which receive the ends of pins 34 press fitted into bores 35 in the head 29, see Figs. 7 and 8. The pins 34 negative rotation of the ring 32 relative to head 29. The driven end 6 of the clutch 5 is a sleeve having a flange portion 36 which forms one of the clutch plates or faces. A friction ring 37 fits on sleeve 6 against the flange 36 and within the skirt 31. A hollow nut 38 is threaded into skirt 31 and bears against one face of the friction ring 37. The driven member 6 of the clutch 5 is adapted to rotate within the skirt 31 and the bore 39 of the hollow nut 38. The tool is secured in sleeve 6 by a pin 40.

The clutch 5 may be regulated to deliver predetermined torques before slip occurs between the driving and driven elements by regulating the compression of loading springs 41 in passages 42 in the driving head 29. The outer portions

of passages 42 are conditioned to engage threaded adjusting screws 43. The inner ends of these passages receive pressure pads 44 which engage a portion of one face of the friction ring 32. The loading springs 41 are positioned between the pads 44 and the adjusting screws 43. Advancement of screws 43 toward the pads 44 increases the pressure applied to the flange 36 of the driven member 6 through friction ring 32 and thereby increases the torque required to make the clutch slip.

The operation of the device is as follows: A threaded work piece 15 is inserted in the sliding work holder 9. The nose 23 of an internally threaded work piece 24 is inserted in the slot 22 in the flange portion of the work slide. In the drawings a fuse part 15 is shown in position to be assembled to a fuse body 24 although any similarly threaded objects may be assembled in the device. The tool 7 illustrated is a screw driver bit and is rotated at a suitable speed by the drive shaft 4. Bit 7 has no rectilinear movement. When the operator presses to the right on the work piece 24, the work holder 9 slides in that direction in its cylindrical cradle 10. Plungers 19 on the holder 9 advance into the bores 25 against the resistance of compression springs 26. The work piece 15 is presented to the bit 7 which engages the kerf in that work piece and proceeds to drive it into the internally threaded body 24. Further movement of the work piece 24 and holder 9 to the right brings the holder almost against the stop pin 28 where the two components are tightened. Rotation of the work piece 15 and the bit ceases when the parts are properly tightened although the driving head 29 of the clutch 5 continues to rotate with the continuously rotating motor 1. Slip occurs in the clutch 5 between the driven tool carrying member 6 and the driving head 29 at the predetermined maximum torque. The operator releases his pressure on the work piece 24

and the springs 26 return the work slide to its original position as shown in Fig. 1. The assembled unit is removed from the holder 9 and the operation is repeated with new components. The clutch 5 will slip when an attempt is made to assemble articles having non-conforming threads thus preventing injury to the respective articles.

This assembling device is designed to allow considerable flexibility. The clutch 5 is adjustable over a wide range of torque settings. It is also quickly detachable from the shaft 4 to permit the employment of different size chucks as the nature of the work requires. The driven end 6 will accommodate tools of different sizes and configurations and a simple pin lock 40 facilitates their use or removal.

Cradle 10 is adapted to receive work holders of various shapes. Removal of the keys 11 permits the insertion of a holder which is shaped to conform to the type of work pieces being assembled.

I claim:

In a machine of the character described, including a power driven, rotatable shaft, a clutch fixed to said shaft comprising a body having a plurality of axial bores internally threaded at their outer ends and a forward extension, a friction ring in said extension, a slidable disk in each bore bearing against said ring, a spring in each bore bearing against the disks, an adjusting screw in each bore in engagement with the springs to regulate their tension, a tool holding member in said body and formed with a flange abutting said friction ring, a second friction ring spaced from the first by said flange, and a nut threaded on the front of said body in engagement with the second friction ring, the springs, friction rings and nut cooperating with the tool holding member to maintain it in frictional relation to the power driven shaft.

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