

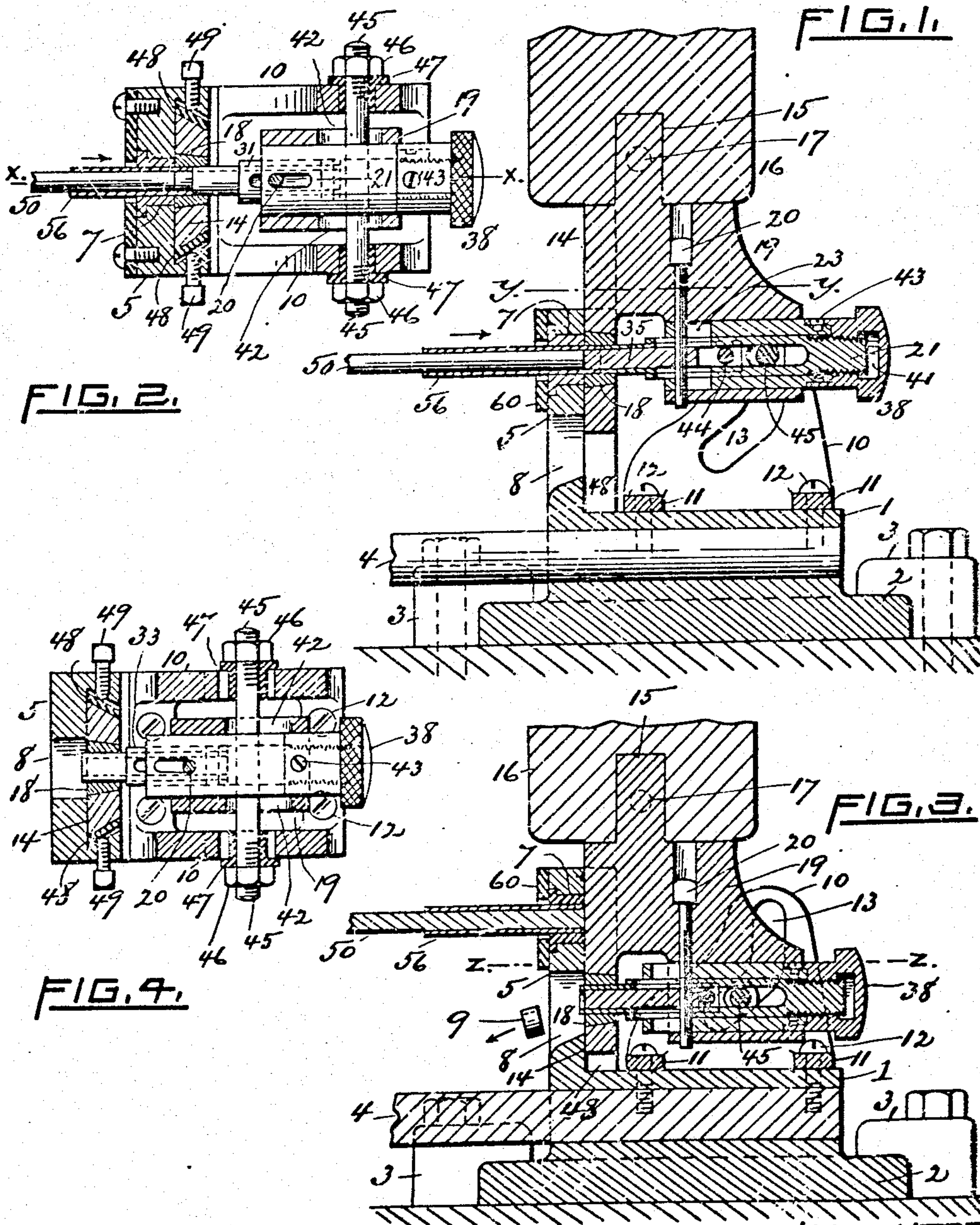
No. 771,752.

PATENTED OCT. 4, 1904.

F. R. STAFFORD.
TUBE CUTTING MACHINE.
APPLICATION FILED JUNE 8, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES,

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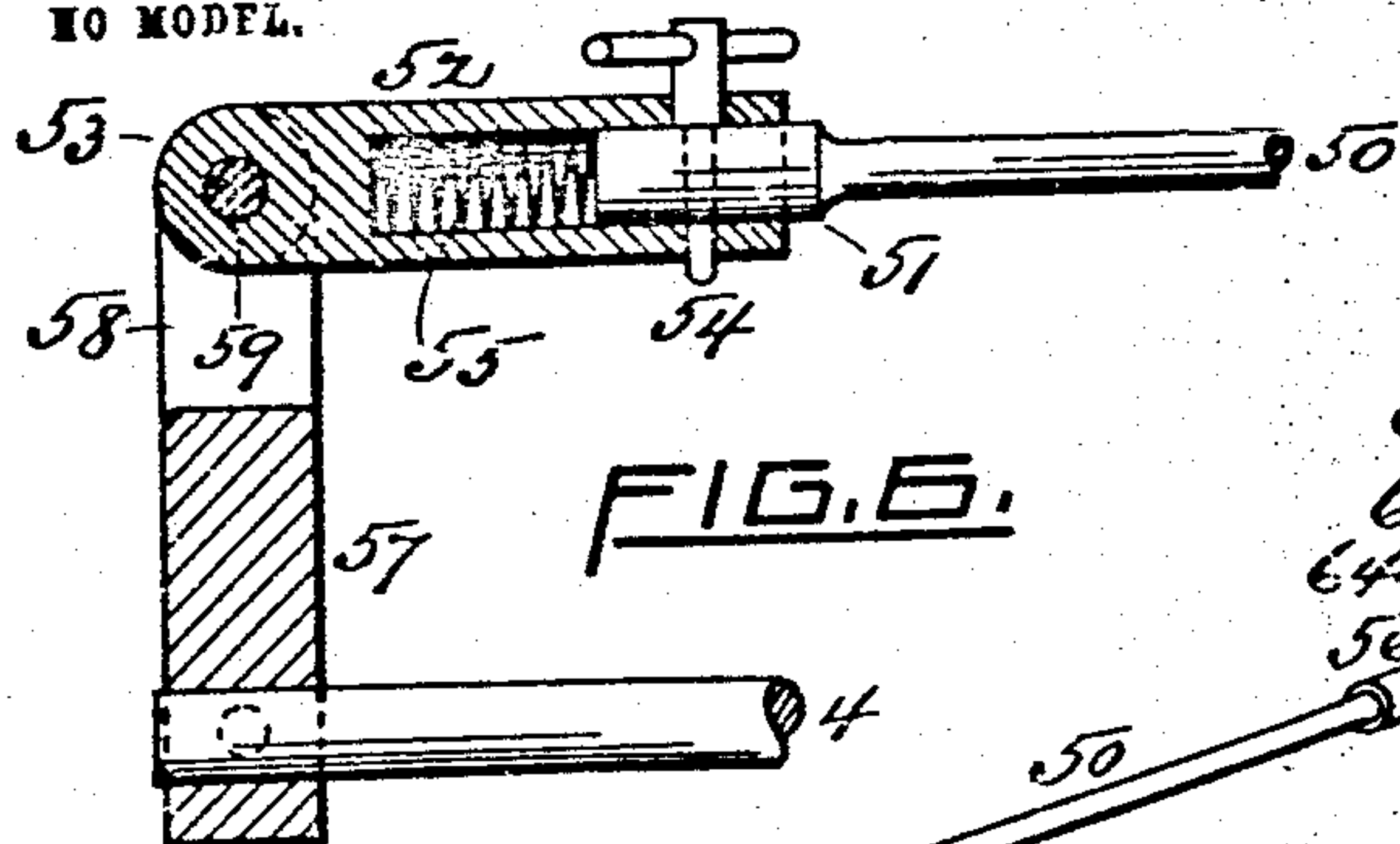


FIG. 6.

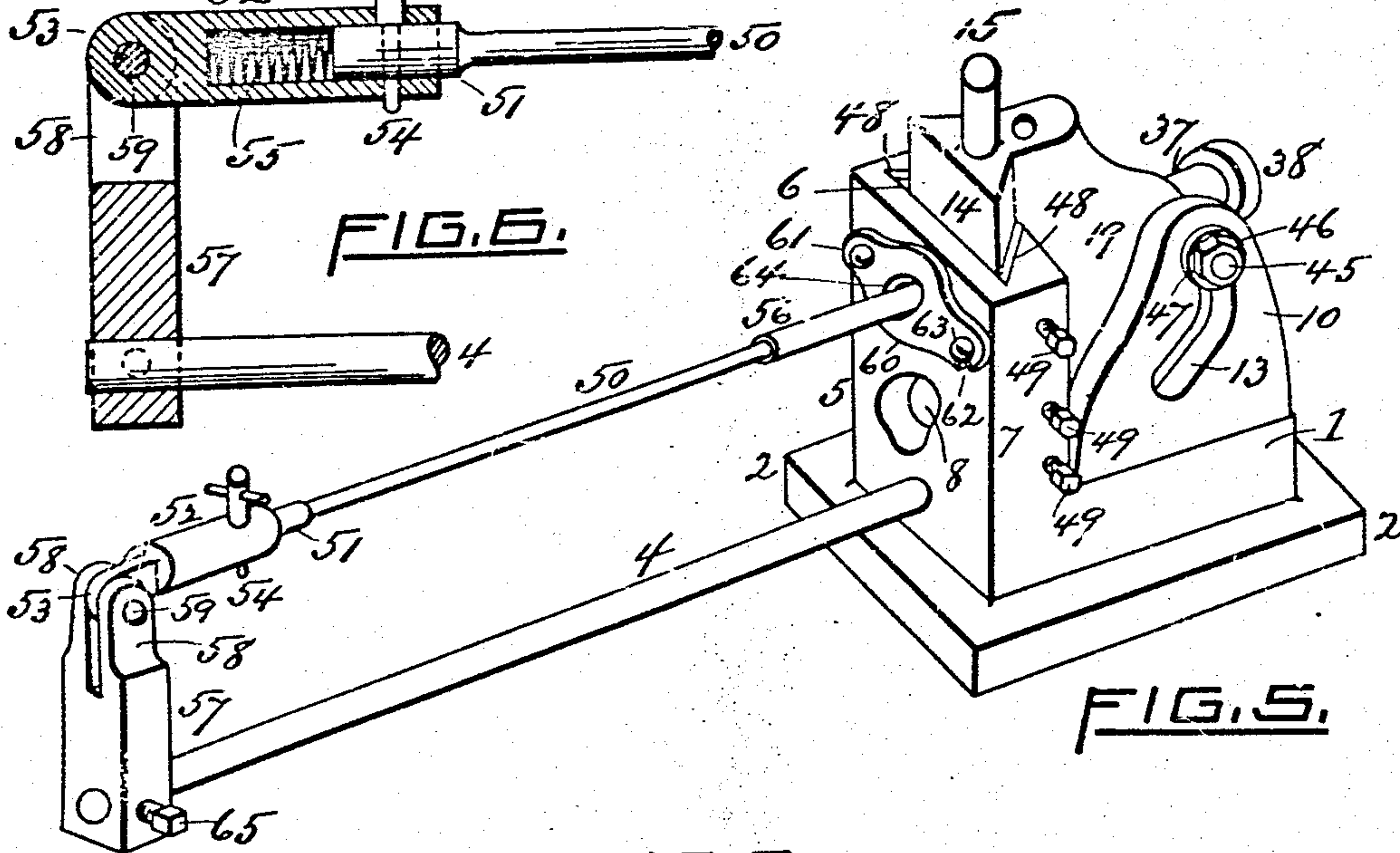


FIG. 5.

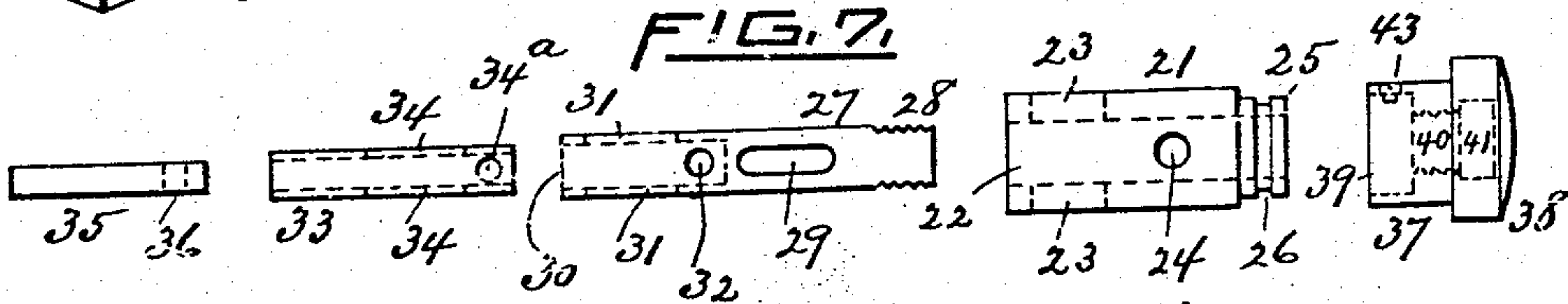


FIG. 7.

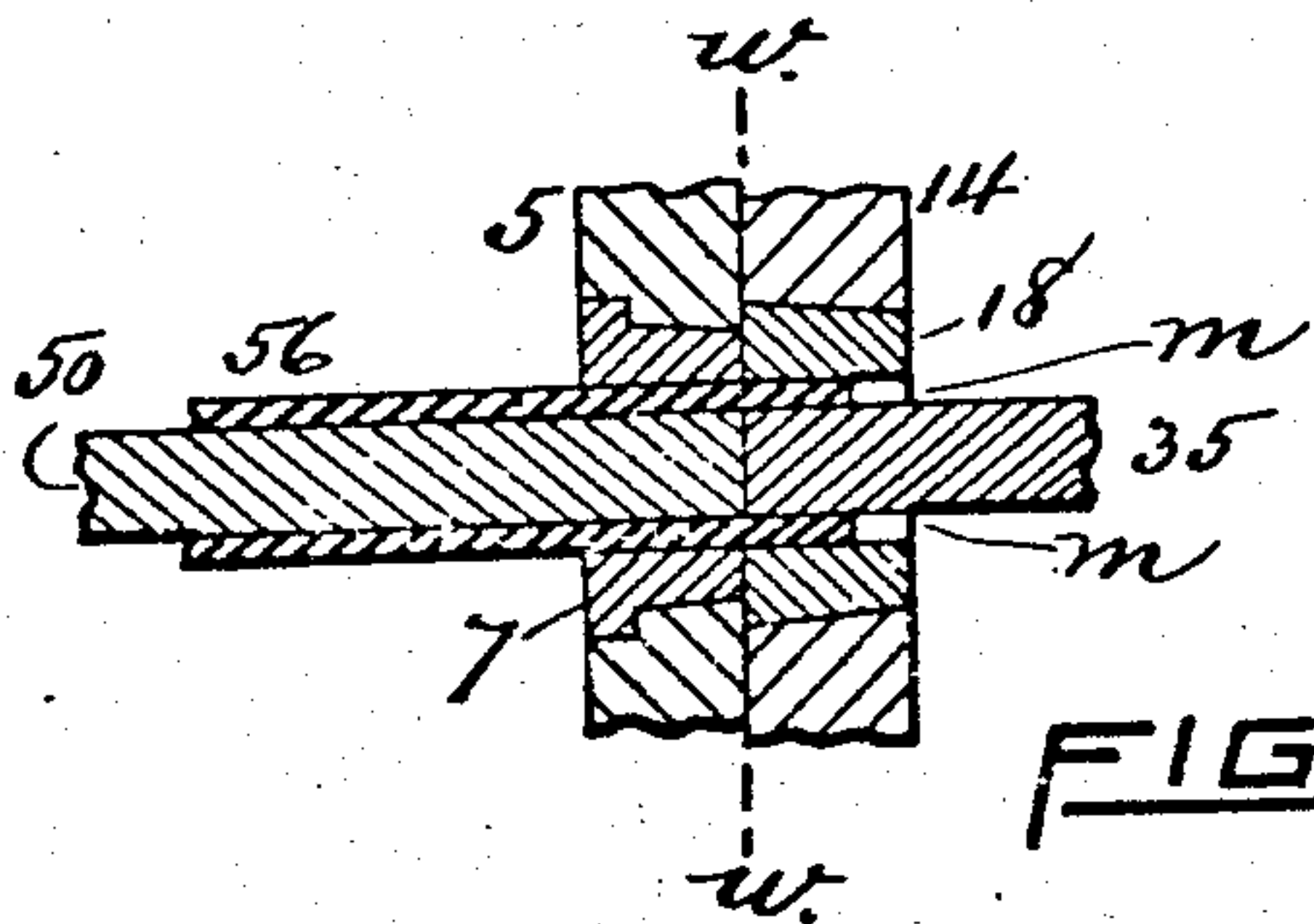


FIG. 8.



FIG. 9.

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UNITED STATES PATENT OFFICE.

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TUBE-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 771,752, dated October 4, 1904.

Application filed June 8, 1903. Serial No. 160,547. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. STAFFORD, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Tube-Cutting Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Like characters indicate like parts.

The purpose of this invention is to provide a machine by which a tube can be cut into ferrules or rings without waste.

Figure 1 is a central vertical section of my improved tube-cutting machine as seen on line *x x* of Fig. 2, the tube which is to be cut, the vertical locking-pin, and the guide-rod being shown in elevation as seen at the beginning of an operation. Fig. 2 is a view of said machine as seen on line *y y* of Fig. 1, the tube which is to be cut, the horizontal locking-pin, the compound telescoping tubes, and cylindrical rod or plug being shown in top plan. Fig. 3 is a central vertical section of said machine as seen on line *x x* of Fig. 2 at the end of an operation. Fig. 4 is a view, partly in top plan and partly in cross-section, as seen on line *z z* of Fig. 3. Fig. 5 is a perspective view of said machine. Fig. 6 is an elevation of the feed-rod and its support. Fig. 7 shows in side elevation the rod or plug, the several tubes, and adjusting-screw. Fig. 8 is a central vertical section of the feed-rod, the plug, the tube mounted in position to be cut, and the cutting-collars and their supports. Fig. 9 is a perspective view of the ring which is cut by the operation of said machine.

My invention relates to machines for cutting rings, ferrules, and similar articles; and it consists of the novel construction and combination of the several parts, as hereinafter described, and specifically set forth in the claims.

In the drawings, 1 represents the base of the machine, which has a flange 2, by which it is held to the bench or other support by clamps 3 or by other suitable means. Said base has a circular bore through it from front to rear, in which is inserted the guide-rod 4.

Integral with the base 1 is the standard 5, which is provided with a vertical guideway 6, whose ends are inwardly beveled convergingly to the rear. In this standard is mounted a fixed cutting-collar 7 in a circular aperture made therefor. This aperture has a concentric enlargement forming an internal shoulder, and the fixed collar 7 has a flange on its outer end which is received in said enlargement of the aperture and abuts said internal shoulders, as seen in Figs. 1, 2, 3, and 8. An opening 8 extends through the lower portion of the standard 5 and allows the ejection of the ring 9 after it has been cut, which is the product of said machine. Upon the base 1 are fastened the two upright sides 10. These upright sides have flanges or feet 11 and are fastened in position by screws 12, which pass through the flanges 11 into the base 1, as seen in Figs. 1 and 4. Each upright side 10 has a slot 13 therein, the upper part of which slot is vertical and the lower part is angularly directed downward and toward the front, as illustrated in Figs. 1, 3, and 5. A plunger 14 has a spindle 15, which enters a socket made therefor in the head 16 of a press and is fastened in position by a pivot 17 or otherwise. The plunger 14 is dovetailed in cross-section, as seen in Figs. 2, 4, and 5, and has a conical transverse bore in which is fastened a cutting-collar 18, as seen in Figs. 1, 2, 3, and 4. The plunger 14 has an integral backward extension 19, which is provided with a vertical bore for the reception of a vertical locking-pin 20 and also with a horizontal bore in which a tube 21 and its contained parts are mounted. The tube 21 has a longitudinal bore 22, two diametrically opposite longitudinal slots 23, and two circular holes 24 near its end and directed diametrically and at right angles to said slots 23, as indicated most plainly in Fig. 7. One end of said tube is concentrically reduced, as seen at 25, and is provided with a circumferential groove 26. A cylindrical bar 27 is mounted movably in the bore 22 of the tube 21, and its end 28 is screw-threaded. Said bar has an elongated diametrical slot 29 through it. For about one-half its length said bar 27 has a tubular socket 30, and

through said tubular part there are two diametrically opposite longitudinal slots 31 and two transverse circular holes 32, directed at right angles with said slots 31. A tube 33 is movably mounted in the tubular socket 30 of the cylindrical bar 27 and is provided with two diametrically opposite longitudinal slots 34 and two diametrically opposite circular holes 34^a. A cylindrical rod 35 or plug is movably mounted in the tube 33 and has a transversely diametrical circular hole 36 through it. A cap 37 has a knurled head 38, a tubular socket 39, a screw-threaded bore 40, and a chamber 41, all concentric with each other. The extension 19 of the plunger has the diametrically opposite slots seen at 42. These parts (shown separated in Fig. 7) are assembled as follows, as shown in Figs. 1, 2, 3, and 4: The locking-pin 20 passes through the slots 23 of the tube 21 and through the slots 31 of the tubular portion 30 of the bar 27 and through the slots 34 of the tube 33 and through the hole 36 of the rod 35. The cylindrical bar 27 passes through the tube 21, and its screw-threaded end 28 engages with the screw-threaded bore 40 of the cap 37 and projects into the chamber 41 of said cap. The reduced end 25 of the tube 21 enters loosely the socket 39 of the cap 37, and a screw 43 through one side of the cap has its inner end projecting into the circumferential groove 26 of the end 25 of the tube 21.

A horizontal locking-pin 44 passes through the holes 32 of the tubular portion 30 of the cylindrical bar 27 and through the holes 34^a of the tube 33. A bolt 45 has screw-threaded ends and passes through the slots 13 of the sides 10 of the base 1 and through the slots 42 of the rear extension 19 of the plunger 14 and through the holes 24 of the tube 21 and through the slots 29 of the cylindrical bar 27. On the ends of the bolt 45 are the nuts 46 and the washers 47, the latter being of a width exceeding the width of the slot 13.

In the guideway 6 on the two beveled sides thereof there are guide-plates 48, extending down longitudinally therein and held in position by the adjusting-screws 49. The plunger 14 slides in contact with these plates, as seen in Figs. 2, 4, and 5.

A feed-rod 50 has a head 51, through which is a transverse hole. A rod-holder 52 has a tubular socket for the reception of the head 51 of the feed-rod 50, and extending axially therefrom is a hinge member 53. A plug 54, having a handle, passes through holes made in the holder 52 therefor and through the transverse hole in the feed-rod, as seen in Figs. 5 and 6. In the socket in the holder 52 is a spiral spring 55. On the rod 50 is slidably mounted the tube 56, which is to be cut into rings by the operation of the machine.

A standard 57 is movably mounted on the bench or other proper support and is provided with two upright parallel ears 58, constitut-

ing a hinge member, between which the hinge member 53 is loosely inserted. The hinge members 53 58 58 are pivotally connected by a pintle 59.

A keeper 60 is pivotally mounted at 61 to the standard 5 of the machine and has a slot 62 at its free end which is adapted to receive a stud or screw 63, extending from the standard 5, as seen in Figs. 1, 3, and 5. The keeper 60 has a central round aperture 64, through which the feed-rod 50 extends with the tube 56.

The standard 57 has a horizontal bore near the bottom, in which the guide-rod 4 is loosely mounted, and a set-screw 65, passing through a hole tapped therefor in the standard 57, holds said rod 4 in its adjusted position.

Having thus described the parts of said machine, I will now explain its operation.

A tube 56, which is to be operated upon by the machine for the purpose of cutting the same into short sections or rings 9, Fig. 9, is mounted on the feed-rod 50, which should have a diameter of such measurement as to fill the bore of said tube 56, but just allowing the tube 56 to be slid thereon, as seen in Figs. 1, 2, 3, and 8. The tube 56 fits slidably, but closely, in the cutter or collar 7 of the standard 5 and also in the cutter or collar 18 of the plunger 14. The inner end of the feed-rod 50 must be in abutment with the outer end of the cylindrical rod or plug 35, as seen in Figs. 1, 2, and 8. The parts of the machine, the feed-rod, and the tube 56 are at the beginning of the operation in the positions illustrated in Figs. 1, 2, and 8. The plunger 14 now descends with power as the press is driven downward in the usual and well-known manner, and thus the cutter or collar 18 is forced down and with a shearing action against the inner edge of the cutter or collar 7 and cuts the tube 56 off transversely on the line marked *ww* in Fig. 8. The cut-off portion, constituting the ring 9, is carried down on the outer end of the cylindrical rod or plug 35 and is ejected from the machine, as represented in Fig. 3, as will be presently explained. The width of the section or ring 9 to be so cut is regulated by the screw-cap 37. As the knurled head 38 of said cap is turned the screw-threaded end 28 of the cylindrical bar 27, being held from rotation by the bolt 45, which passes through the slot 29 of said bar, is drawn or extended according to whichever direction the head 38 is rotated, thus moving the bar 27 longitudinally to the desired extent. The tube 21, however, is not turned by such rotation of the screw-cap 37, because the screw 43 simply moves along in the circumferential channel 26 of the reduced end 25 of said tube 21, and said tube 21 is prevented from rotation by the bolt 45, which extends through the holes 24 thereof. As the plunger 14 descends its rearward extension 19, integral therewith, descends also. The bolt 45 is carried down with said extension 19 and travels first down the

vertical portions of the slots 13 in the sides 10 of the base 1 until said bolt 45 comes to the angularly-directed portion of said slots. The angularly-directed portion of said slots 5 13 serve as cam-surfaces, and so the bolt 45 moves forward and follows down to the bottom of said slots 13. The result is that the bolt 45, extending as it does through the holes 24 of the tube 21, moves said tube 21 forward, 10 but slides along the slot 29 of the bar 27 and also slides along the slots 42 of the rear extension 19. The tube 21, which, as shown in Fig. 1, was in such position that the forward end of its slots 23 were in abutment against the locking-pin 20, moves to the position shown in Fig. 3, where the rear end of the slots 23 are in abutment with the locking-pin 20, and the tubes 30 and 33, which, as shown in Fig. 1, had their slots 31 and 34 in such position that 20 the locking-pin 20 passes through said slots about midway their length, move to the positions shown in Fig. 3, where said slots 31 and 34 have their rear ends in abutment with the locking-pin 20, as shown in Figs. 3 and 4. 25 The horizontal locking-pin 44, as shown in Fig. 1, extends through the holes 32 of the tube 30 and through the holes 34* of the tube 33, so that the tubes 30 and 33 move together as the bolt 45 when coming to the lowest portion 30 of the slots 13 brings all these tubes to the position shown in Fig. 3, where it is seen that the bar 27 has moved forward and the tube 33, which is seated in the socket of the tubular part 30 of said bar and connected therewith 35 by the locking-pin 44, is moved from the position illustrated in Figs. 1 and 8, where its forward end is in the line *ww*, to the advanced position shown in Fig. 3. In other words, the tube 33 is thus slid outwardly on the rod 40 35, so as to project therefrom in front, and thus the ring 9 is forcibly pushed off of the rod 35, as seen in Fig. 3. The rise of the plunger 14 and its connected rearward extension carries the parts back from the position shown in Fig. 45 3 to the position shown in Fig. 1, and then the tube 56 is fed to the machine along the rod 50 again, and another ring is cut in the same manner.

The keeper 60 serves to confine the cutter 50 or collar 7 in position, as can be understood by examining Figs. 1, 3, and 5. When it is desired to remove said cutter or collar 7, as when a tube 56 of a different diameter is used, the keeper 60 is lifted from the stud 62 and 55 swung up and over out of the way, thus giving access to the cutter or collar 7 for the purpose of such removal. When another cutter or collar 7 is put in operative position, the keeper 60 is swung down and over the outer 60 end thereof and holds it from displacement. The cutter or collar 18 can be removed from the plunger 14 when said plunger is in the position shown in Fig. 3.

The width of the ring 9 to be cut can never

exceed the length of the bore of the cutter or 65 collar 18; but by turning the screw-cap 37 38 the forward end of the tube 33 may be protruded, as into the spaces marked *m*, in Fig. 8, and said end will serve as a stop to limit the length to which the tube 56 may be slid 70 upon the cylindrical rod 35 to be cut.

By the use of this machine a tube may be cut into rings or ferrules of the desired length and absolutely without any waste. For this reason the machine is well adapted to make 75 seamless finger-rings from solid-gold tubes or from gold-plated tubes or tubes or pipes of any metal.

It is obvious that instead of having one cutting-collar mounted in a fixed support and the 80 other cutting-collar mounted in a vertically-movable support either or both of said supports may be rotatable or otherwise movable.

I claim as a novel and useful invention and desire to secure by Letters Patent— 85

1. In a tube-cutting machine, the combination of two properly-mounted supports, tubular cutters mounted therein respectively with their cutting edges capable of shearing action, a cylindrical rod loosely mounted in 90 each of said tubular cutters with their contiguous ends in alinement with each other and with the working edges of said cutters, and means for moving either or both said supports, substantially as described. 95

2. In a tube-cutting machine, the combination of a cutting-collar mounted in a fixed standard and a cutting-collar mounted in a movable support in shearing contact with the 100 first-named collar and a cylindrical rod loosely mounted in each of said collars adapted to support the tube which is to be cut and with their contiguous ends in alinement with the contiguous ends of said collars, substantially as specified. 105

3. In a tube-cutting machine, the combination of a cutting-collar mounted in a fixed support, a plunger movable in suitable ways, a cutting-collar mounted in said plunger with its working edge in line with the working edge 110 of the first-named collar and a cylindrical rod in each of said collars adapted to support a tube which is to be cut and the contiguous ends of which rods are in line with the working edges of said collars, substantially as 115 shown.

4. In a tube-cutting machine, the combination of a fixed support having a transverse circular aperture, a detachable cutting-collar 120 mounted in said aperture, a plunger movable in suitable ways and provided with a transverse circular aperture, a detachable cutting-collar mounted in said aperture of the plunger, with the working edge of the last-named cutting-collar in alinement with the working 125 edge of the first-named cutting-collar and a cylindrical rod in each of said collars adapted to support a tube which is to be cut and

with the contiguous ends of said rods in alignment with the working edges of said collars, substantially as described.

5. In a tube-cutting machine, the combination of a fixed support having a transverse circular aperture, a detachable cutting-collar mounted in said aperture, a pivotally-mounted keeper on said support adapted to confine said collar in position from longitudinal displacement, a plunger movable in suitable ways and provided with a transverse circular aperture, a detachable cutting-collar mounted in said aperture of the plunger, with the working edge of the last-named cutting-collar in alignment with the working edge of the first-named collar, and a cylindrical rod in each of said collars adapted to support a tube to be cut and with the contiguous ends of said rods in alignment with the working edges of said collars, substantially as described.

6. In a tube-cutting machine, the combination of a fixed support having a transverse circular aperture, a cutting-collar mounted in said aperture, a head having a vertical guideway, two detachable guide-plates on both sides of said guideway, adjusting-screws passing through said head and bearing at their inner ends against said plates, a plunger mounted movably in said guideway between said plates and provided with a transverse circular aperture, a cutting-collar mounted in the aperture of the plunger, with its working edge in alignment with the working edge of the first-named collar, and a cylindrical rod in each collar adapted to support a tube to be cut and with the contiguous ends of said rods in alignment with the working edges of said collars, substantially as specified.

7. In a tube-cutting machine, the combination of a fixed support, a cutting-collar mounted therein, a head having a guideway, a plunger mounted in said guideway, a cutting-collar mounted in said plunger with its working edge in alignment with the working edge of the first-named collar, a cylindrical rod mounted in the first-named collar with its inner end in alignment with the working edge of the first-named collar and adapted to support slidably a tube to be cut into rings, a cylindrical rod mounted in the second-named collar with its outer end in alignment with the working edge of the second-named collar and adapted to support slidably said tube, and means adapted to adjust said tube on said rods for regulating the width of the ring to be cut, substantially as described.

8. In a tube-cutting machine, the combination of a fixed support, a cutting-collar mounted therein, a head having a guideway, a plunger mounted in said guideway, a cutting-collar mounted in said plunger, a cylindrical rod in each of said collars, adapted to support a tube to be cut into ring-sections, the contiguous ends of which rods as also the working

edges of which collars are all in the same plane, and means adapted to eject the ring-section from the machine after the cutting operation, substantially as described.

9. In a tube-cutting machine, the combination of a fixed support, a cutting-collar mounted therein, a movable member, a cutting-collar mounted therein in shearing contact with the first-named collar, a cylindrical rod in each collar adapted to support the tube which is to be cut into ring-sections, said rods having their contiguous ends and said tubes having their shearing edges all in the same plane, and means adapted to remove the ring-section from the machine after the cutting operation, substantially as specified.

10. In a tube-cutting machine, the combination of a standard upon a base, a cutting-collar mounted in said standard, a head having a guideway, a plunger mounted in said guideway, a cutting-collar mounted in said plunger with its working edge in alignment with the working edge of the first-named collar, a rearward extension of said plunger having a transverse aperture, two upright parallel sides on said base and provided each with a curved slot, a cylindrical rod in the first-named collar adapted to support a tube which is to be cut into ring-sections and having its inner end in alignment with the working edge of first-named collar, a cylindrical rod in the second-named collar adapted to support said tube and having its outer end in alignment with the working edge of the second-named collar, a holder for holding said second-named rod and a bolt passing through said holder and through the transverse aperture of the rearward extension of the plunger and through the curved slots of said two upright sides, substantially as described.

11. In a tube-cutting machine, the combination of a movable plunger properly mounted and having a rearward extension which has a transverse aperture, a collar mounted in said plunger, a base with two parallel upright sides provided each with a curved slot, a screw-cap having a tubular socket and a concentric bore of smaller diameter and screw-threaded in said bore, a tube having two opposite round transverse holes and also two opposite longitudinal slots and provided with a concentrically-reduced end which is circumferentially grooved and fits in the socket of the screw-cap, a screw through one side of the socketed portion of the screw-cap and having its inner end loosely projecting into the circumferential groove of said tube, a cylindrical bar loosely mounted in the last-named tube and provided with a socket at one end which has two opposite round transverse holes and two opposite longitudinal slots through its socketed portions and also a longitudinal slot through its solid portion and also provided at its solid end with screw-threads whereby said

bar is engageable in said screw-cap, a tube mounted in the last-named socket and provided with two opposite round transverse holes and two opposite longitudinal slots, a cylindrical rod having a round transverse hole and fitting loosely in the last-named tube and adapted to support in said collar the tube which is to be cut, a bolt passing through the curved slots of said upright sides and through the two round transverse holes of the first-named tube and through the longitudinal slot in the solid part of the cylindrical bar, a locking-pin passing through the round transverse holes of the socketed portion of said bar and through the round transverse holes of the second-named tube, and a locking-pin passing through the rearward extension of the plunger and through the slots of the first-named tube and through the longitudinal slots of the socketed portion of said cylindrical bar and through the longitudinal slots of the second-

named tube and through the transverse hole of said cylindrical rod, substantially as described.

12. In a tube-cutting machine having a plunger and cutting devices, the combination therewith of a feed-rod adapted to support and present to the machine the tube which is to be cut, a standard, a holder for said feed-rod pivotally connected with said standard and adapted to receive detachably said feed-rod, and a guide-rod movably mounted at one end in said machine and loosely and adjustably mounted at its opposite end in said standard, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK R. STAFFORD.

Witnesses:

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