

A. R. MURRAY.
REVERSING MECHANISM.
APPLICATION FILED JAN. 28, 1908.

975,982.

Patented Nov. 15, 1910.

3 SHEETS-SHEET 1.

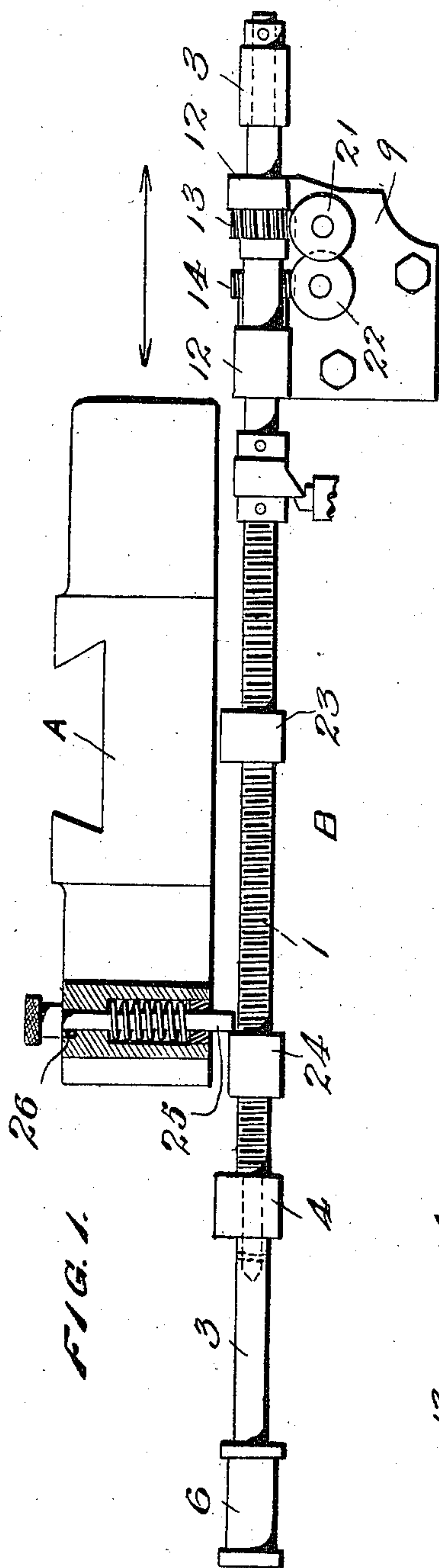


FIG. 1.

WITNESSES

Chas. H. Davis
Ella L. Corbett.

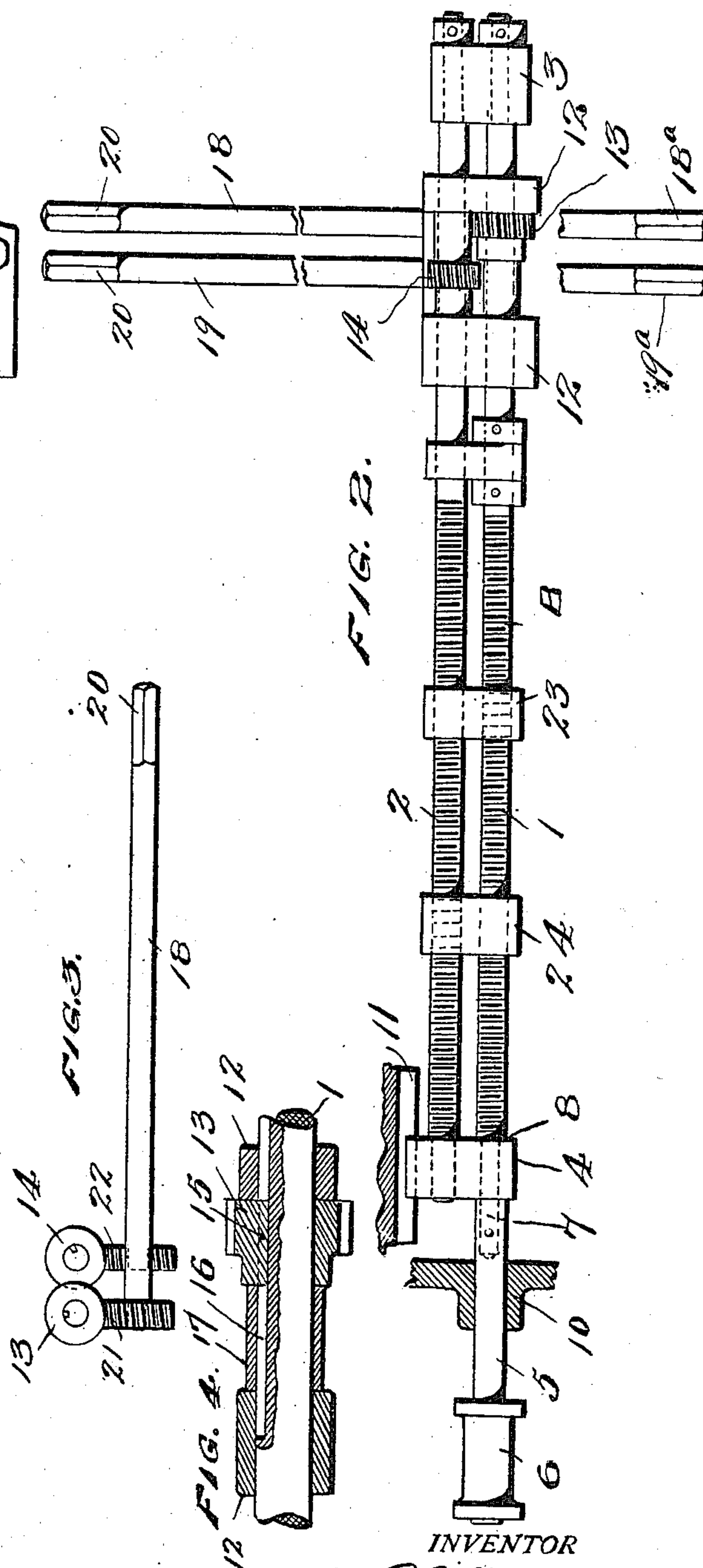


FIG. 2.

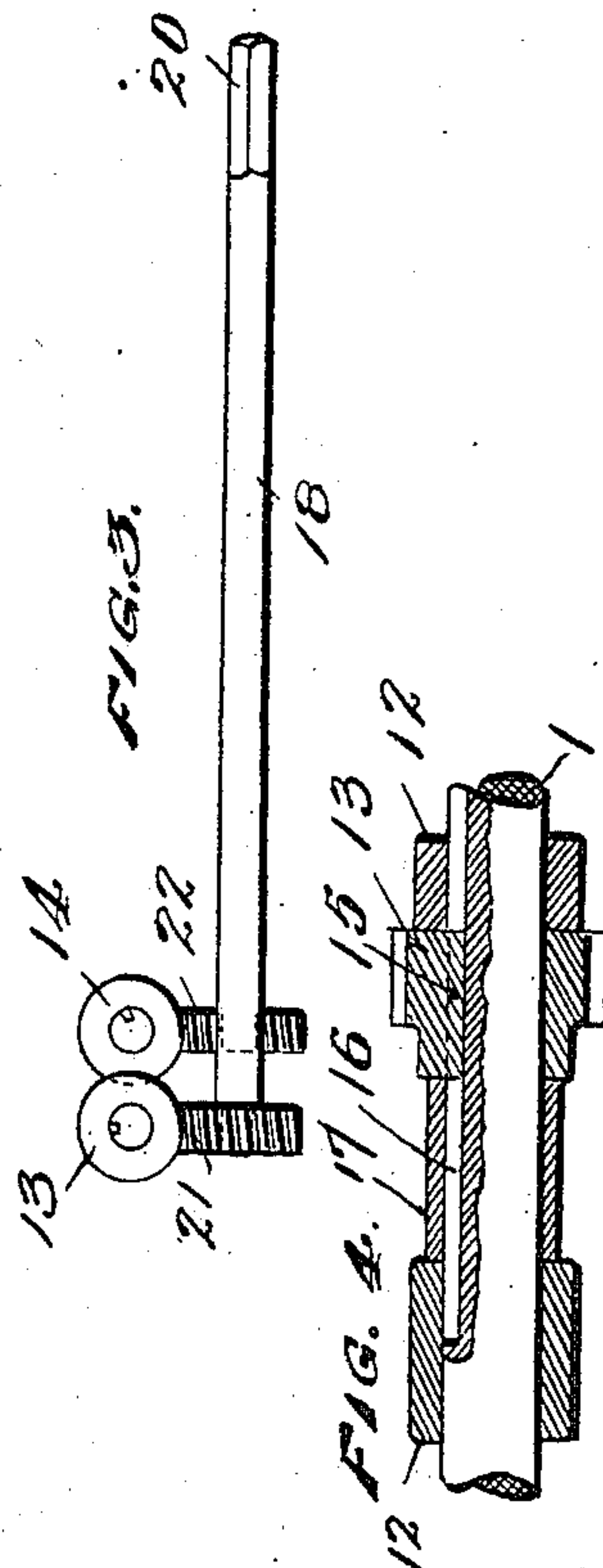


FIG. 3.

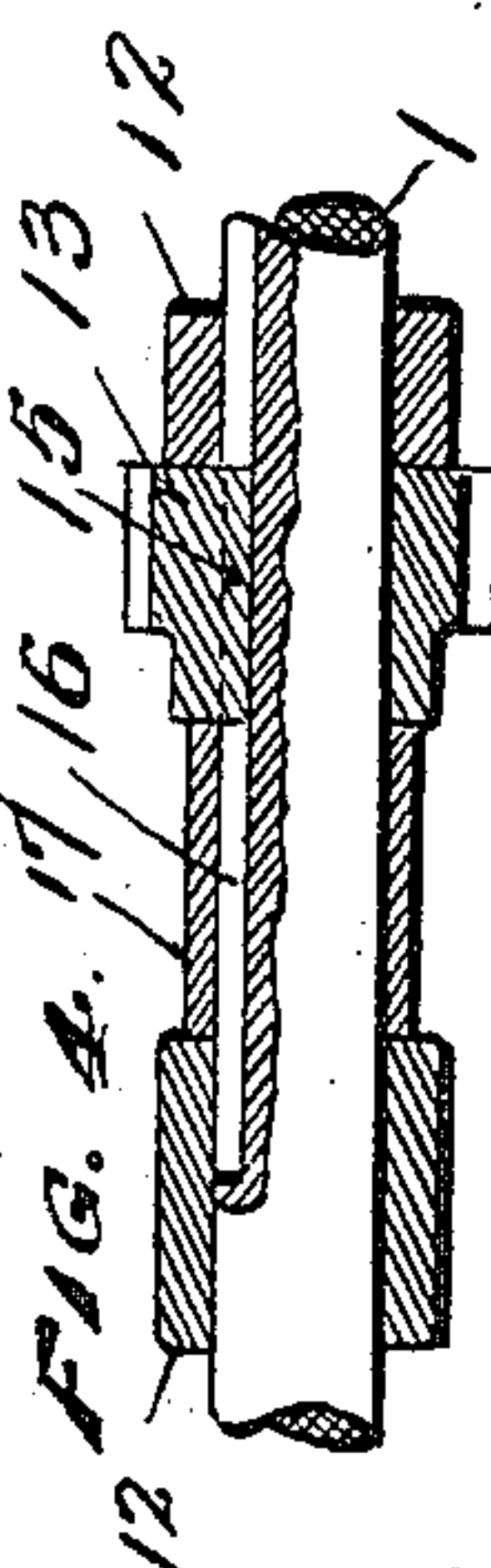


FIG. 4.

INVENTOR

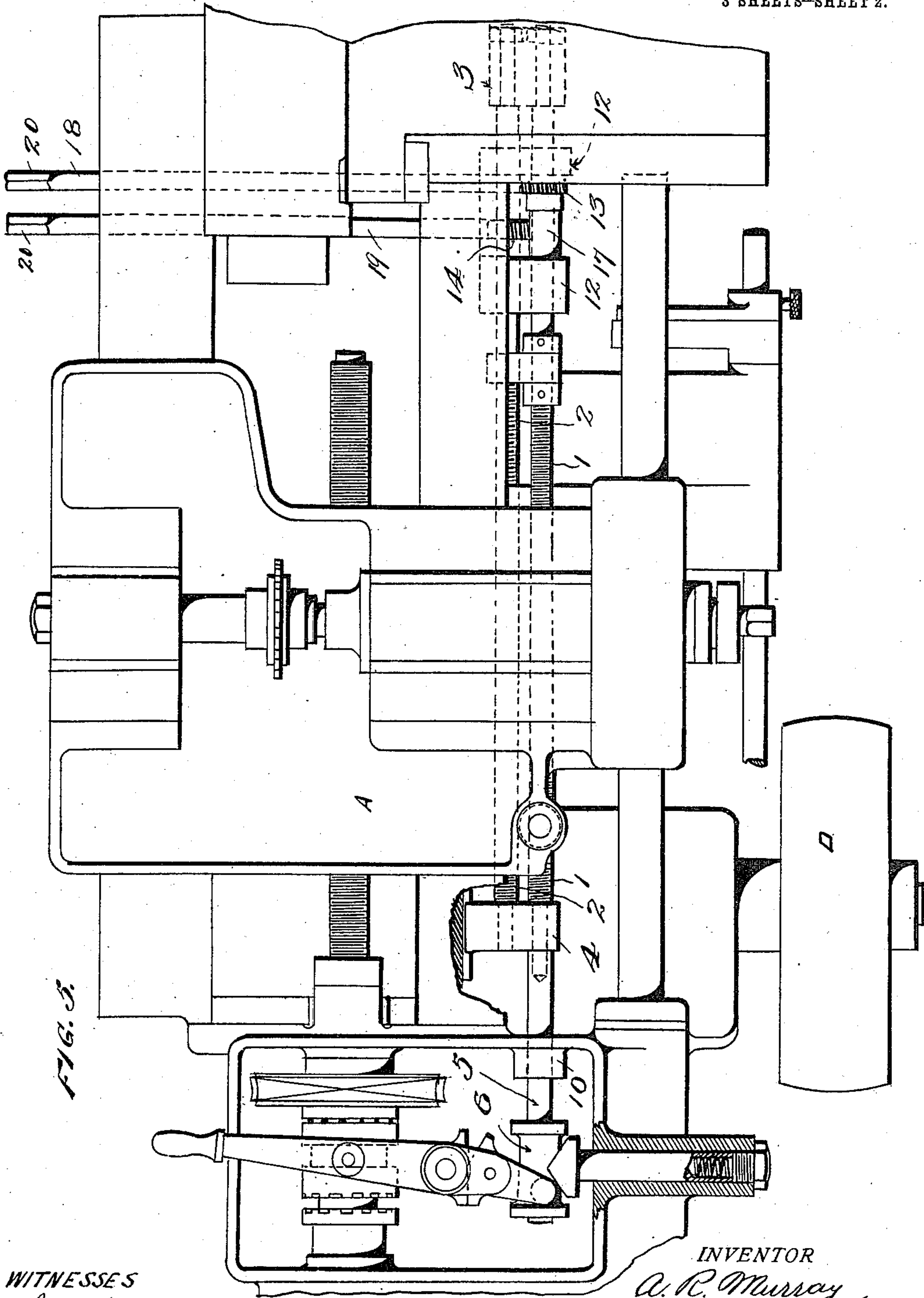
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3 SHEETS—SHEET 2.



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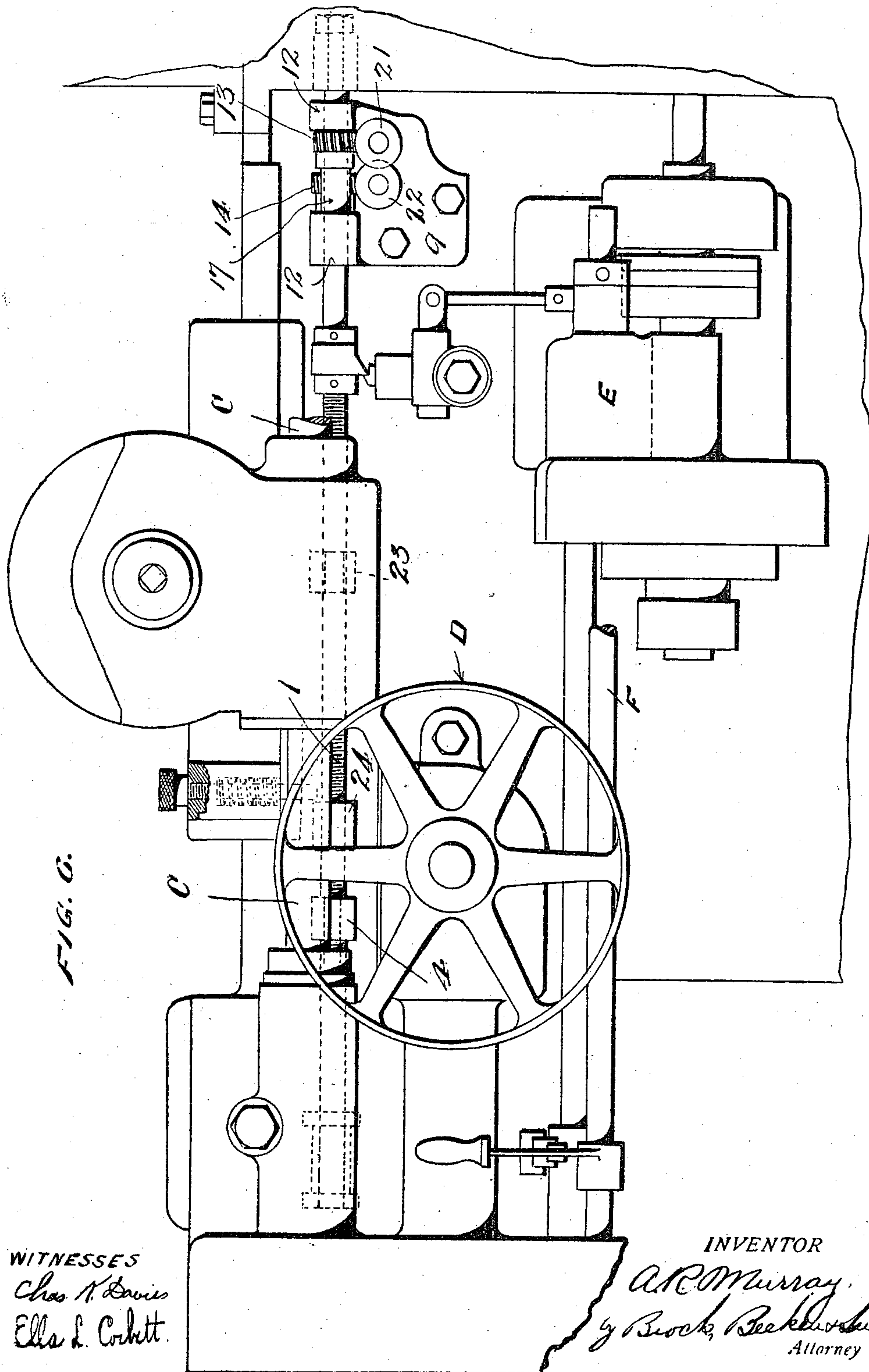
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

ARISTIDES R. MURRAY, OF CINCINNATI, OHIO, ASSIGNOR TO THE CINCINNATI SHAPER COMPANY, OF CINCINNATI, OHIO.

REVERSING MECHANISM.

975,982.

Specification of Letters Patent. Patented Nov. 15, 1910.

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To all whom it may concern:

Be it known that I, ARISTIDES R. MURRAY, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Reversing Mechanism, of which the following is a specification.

My invention relates to reversing mechanism especially adapted to be employed in machine tools having a reciprocating table and mechanism acted on by the table for reversing its direction of motion automatically.

The invention more particularly consists in novel shifting mechanism for effecting this reversal of movement, including dogs which may be easily adjusted even when the dogs themselves are difficult of access and whose adjustment may also be effected while the table is reciprocated.

As an exemplification, I have applied the invention to a gear cutting machine. This exemplification will now be particularly described.

In the drawing: Figure 1 is a side view of mechanism embodying my invention, certain parts being broken away. Fig. 2 is a plan view of the mechanism of Fig. 1. Fig. 3 is an end view taken from the right hand end of Figs. 1 and 2. Fig. 4 is a detail sectional view. Fig. 5 is a plan of a portion of a gear cutter with my invention applied, and Fig. 6 is a side elevation of Fig. 5.

Referring first to Figs. 1 to 4 inclusive, A designates a table which reciprocates in the directions shown by the double arrow and in the case of a gear cutter carries a tool to act upon stationary work.

B designates as a whole the shifter mechanism. The shifter consists of rods 1, 2, screw threaded for a portion of their length. At one end these rods are secured together by a block 3 and suitable fastenings. Near the other end the rods are similarly secured by a block 4. One of the rods, 1, is provided with an extension 5 carrying a member 6 which acts on the reversing lever of the machine. The extension 5 conveniently consists of a separate rod bored at one end to receive the reduced end 7 of rod 1 which is pinned in position. Block 4 is in this way held between a shoulder 8 on rod 1 and the end of extension 5. Rods 1 and 2 are revolvable in blocks 3 and 4. The rods are

carried at one end by a bracket 9 secured to the bed of the machine. The rods 1 and 2 pass through bearings formed in the bracket in which they may rotate and reciprocate. The other end of the rods is supported by bearing 10 in the bed of the machine through which extension 5 passes and a guide 11 on the bed engaged by one end of block 4. The bracket is provided with two arms 12. Between these arms on shaft 1 is mounted a gear 13 and between the arms on rod 2 is a gear 14. The gears are provided with keys 15 (see Fig. 4) engaging key-ways 16 in their rods so that each rod and its gear rotate together. The gears are restrained from end movement by any suitable means such as sleeves 17 on the rods.

Operating shafts 18, 19 corresponding respectively to rods 1 and 2 are revolubly mounted in any suitable way and are generally arranged at right angles to the rods. In the structure shown, shafts 18, 19 are mounted at one end in bracket 9 and are also revolubly supported in bearings carried by the bed of the machine. The ends 20 of the shafts are shaped to receive a crank wrench. Shaft 18 carries a gear 21 engaging gear 13 and shaft 19 carries a gear 22 engaging gear 14. The sets of gears 13—21, and 14—22 may be spiral or worm gears.

Mounted on rods 1 and 2 are dogs 23, 24. The rods pass through holes formed in the dogs and the hole in dog 23 which contains rod 1 is screw threaded to engage the screw on the rod while the other hole in the dog which accommodates rod 2 is bored smooth so that the dog may reciprocate freely on the rod. In this way rod 2 serves simply as a guide for the dog. The holes in dog 24 are oppositely arranged so that the dog engages the screw on rod 2 and slides freely on rod 1.

By applying a wrench to either shaft 18 or 19, say 18 for example, and turning the shaft its gear 21 turns gear 13 on rod 1 and rotates the rod and its screw. The screw acting on the screw thread formed in dog 23 causes the dog to move axially in relation to rods 1 and 2 in a direction corresponding to the direction of rotation of shaft 18. In this way the dog is adjusted longitudinally on the rod. Dog 24 may be adjusted in a similar manner by acting on shaft 19. During these adjusting movements and at all times rods 1 and 2 are free to reciprocate in bracket 9 and in relation to gears 13 and 14

without disturbing the adjusted position of the dogs or interfering with the adjusting movement, by reason of the splined connection of gears 13 and 14 with the rods.

5 As seen in Fig. 1, the upper faces of dog 23 and block 4 are made higher than the similar face of dog 24. The slide A carries a tappet 25 which has two positions. As shown it is in its lowermost position so
10 that it engages the dogs 23 and 24. The head of the tappet is provided with a pin 26 which in the position shown rests in a recess formed in the slide. By raising the tappet and turning it slightly, pin 26 is
15 caused to rest upon the surface of the slide and the tappet is held in its second position with its end clear of dog 24. The tappet then engages block 4 and dog 23 and clears dog 24 entirely. The lower position of the
20 tappet as shown in Fig. 1 is the ordinary working position. Assuming that the slide is moving toward the right as seen in this figure, the tappet strikes dog 23 and moves the shifter to the right, causing a reversal
25 of the position of the reversing lever. The slide thereupon moves to the left until the tappet strikes dog 24 moving the shifter to the left and again reversing the drive, and these actions continue indefinitely. During
30 the movement of the slide and the consequent actions of the shifter, the dogs may be adjusted in the manner which has been described, without interfering with the operation of the machine.

35 It is frequently desirable to temporarily increase the length of stroke of the slide. To accomplish this the tappet is retracted and retained in its second or raised position in the manner which has been described.
40 With the tappet in this position on the left hand stroke of the slide the tappet clears dog 24 and at the limit of the stroke strikes block 4 and this block in turn moves the shifter and effects reversal of the slide. The
45 tappet is readily returned to ordinary working position by rotating the head until pin 26 enters its socket.

It has been made clear that an important
50 advantage of the invention consists in its provision of means for adjusting the dogs while the machine is in continuous operation. Another advantage, that of making it possible to readily adjust the dogs when they
55 are themselves difficult of access, is made clear by reference to Figs. 5 and 6, which show the invention in position in a gear-cutting machine. For structural and operative considerations it is frequently desirable
60 to place the shifting mechanism on the same side of the machine with shaft C which drives the cutter, pulley D which drives the entire mechanism of the machine, index friction driving mechanism E, and shafts F
65 which pertain to the indexing mechanism. These various parts all located on the same

side of the machine make the dogs very difficult of access and a great deal of time and trouble are required to effect adjustment of the dogs as ordinarily constructed and in the manner familiar in the art.

My invention provides operating means for adjustment of the dogs placed on the opposite side of the machine from the various parts of the mechanism mentioned and in a very accessible location. If it is de-
75 sired, and if other parts of the machine do not prevent, the shafts 18 and 19 may be extended also to the right hand side of the machine. Extensions 18^a, 19^a are shown in proper position in Fig. 2 for this purpose.

I claim:

1. In reversing mechanism for machine tools, a shifter comprising a first rod and a second rod, said rods being provided with screw threads, dogs mounted on the rods, one of the dogs engaging the thread on the first rod and being arranged to slide on the other rod without engagement and the other dog engaging the thread on the second rod and being arranged to slide on the first rod without engagement, a stationary operating device for rotating each rod, worm gearing connecting each operating device with its rod, said gearing being constructed and arranged to permit the reciprocation of the shifter, a reciprocable table and a part carried by the table adapted to engage the dogs.

2. In machine tools, the combination of a reciprocating table, a tappet thereon, means for reciprocating the table means for reversing the direction of movement of the table, shifting mechanism connected with said reversing means comprising two screw threaded rods reciprocally mounted, dogs mounted on the rods each having a thread engaging the thread on one of the rods and each loosely mounted on the other rod, the dogs being arranged to be acted on by the tappet, a gear splined to each of the rods, means for holding the gears stationary in an axial direction, operating shafts mounted in stationary bearings and gears thereon engaging the gears first mentioned.

3. In a gear cutter, the combination of a bed, a table reciprocally mounted thereon, means for reciprocating the table, shifting mechanism comprising adjustable dogs mounted on one side of the bed, and operating devices arranged to be acted on upon the opposite side of the bed and constructed and arranged to adjust the position of the dogs.

4. The combination of a pair of screws, supporting means for the screws permitting them to rotate and move endwise to a limited extent, a pair of dogs mounted on the screws each dog engaging a different one of the screws and being guided by the other, stationary means for rotating the screws to adjust the dogs, a reciprocable table and a

member carried by the table and adapted to engage the dog.

5 The combination of a pair of screws, supporting means for the screws permitting them to rotate and move endwise to a limited extent, a pair of dogs mounted on the screws, each dog engaging a different one of the screws and being guided by the other, a stationary bracket, rotatable members 10 mounted in the bracket, one of said members being splined to each of the screws and the members being restrained from end movement, a reciprocable table and a tappet carried by the table adapted to engage the 15 dogs.

6. In a machine tool, the combination of a pair of parallel screws supported so that they may be rotated and moved longitudinally a limited distance, a pair of dogs each 20 engaging a different one of the screws and guided by the other, a gear splined on each of the screws, means for preventing the gears from movement in an axial direction,

operating shafts arranged transversely to the screws and provided with gears engaging the gears on the screws, a reciprocable 25 table and a tappet carried by the table and adapted to engage the dogs.

7. The combination of a pair of screws, supports for the screws permitting them to rotate and move longitudinally to a limited extent, a pair of dogs each engaging a different one of the screws and guided by the other and means for rotating the screws to 30 adjust the dogs. 35

8. The combination of a pair of screws, supports for the screws permitting them to rotate and move longitudinally, a pair of dogs each engaging a different one of the screws and guided by the other and means 40 for rotating the screws to adjust the dogs.

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Witnesses:

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