

No. 707,016.

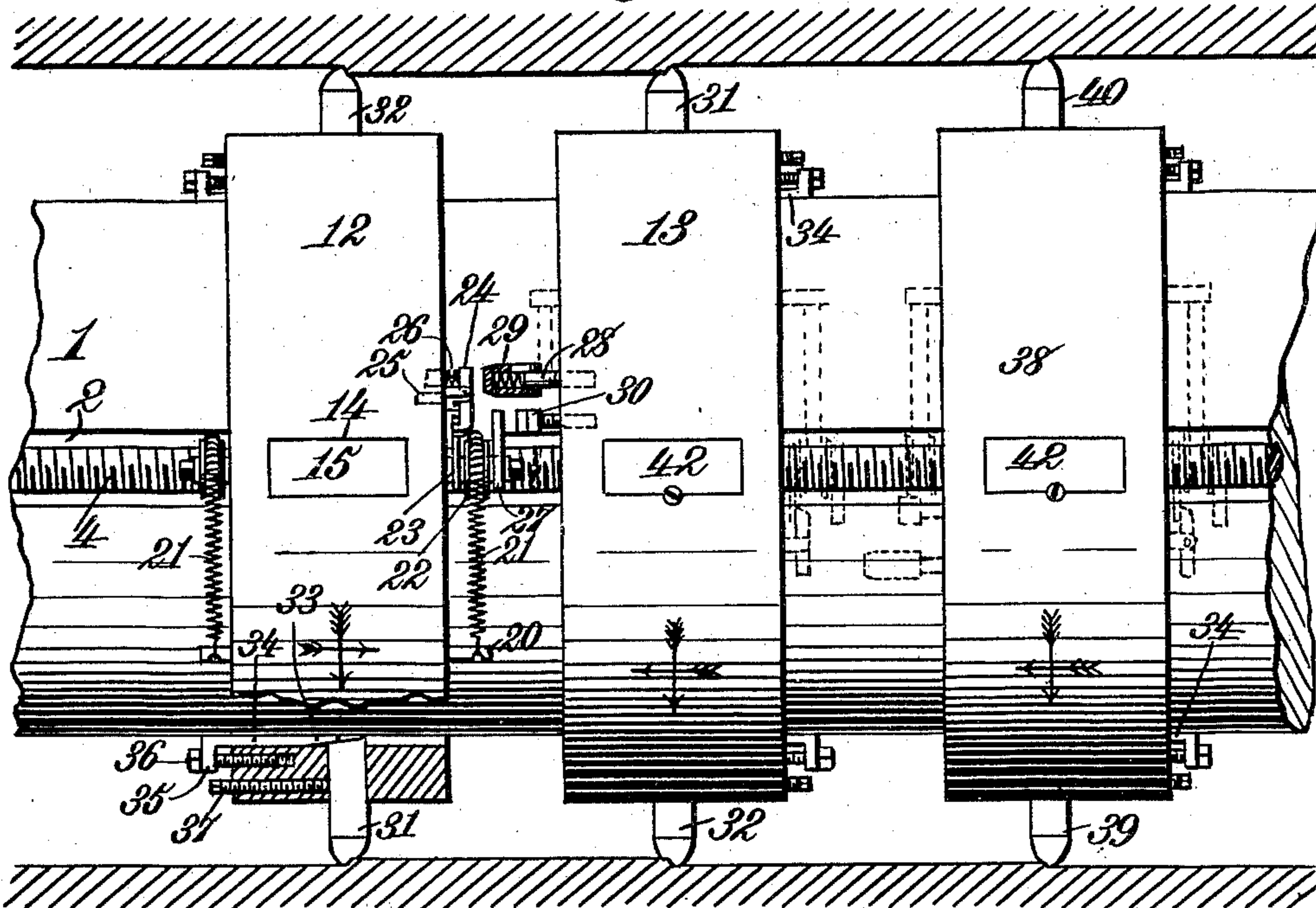
Patented Aug. 12, 1902.

C. C. ROBERTS.  
METAL BORING MACHINE.

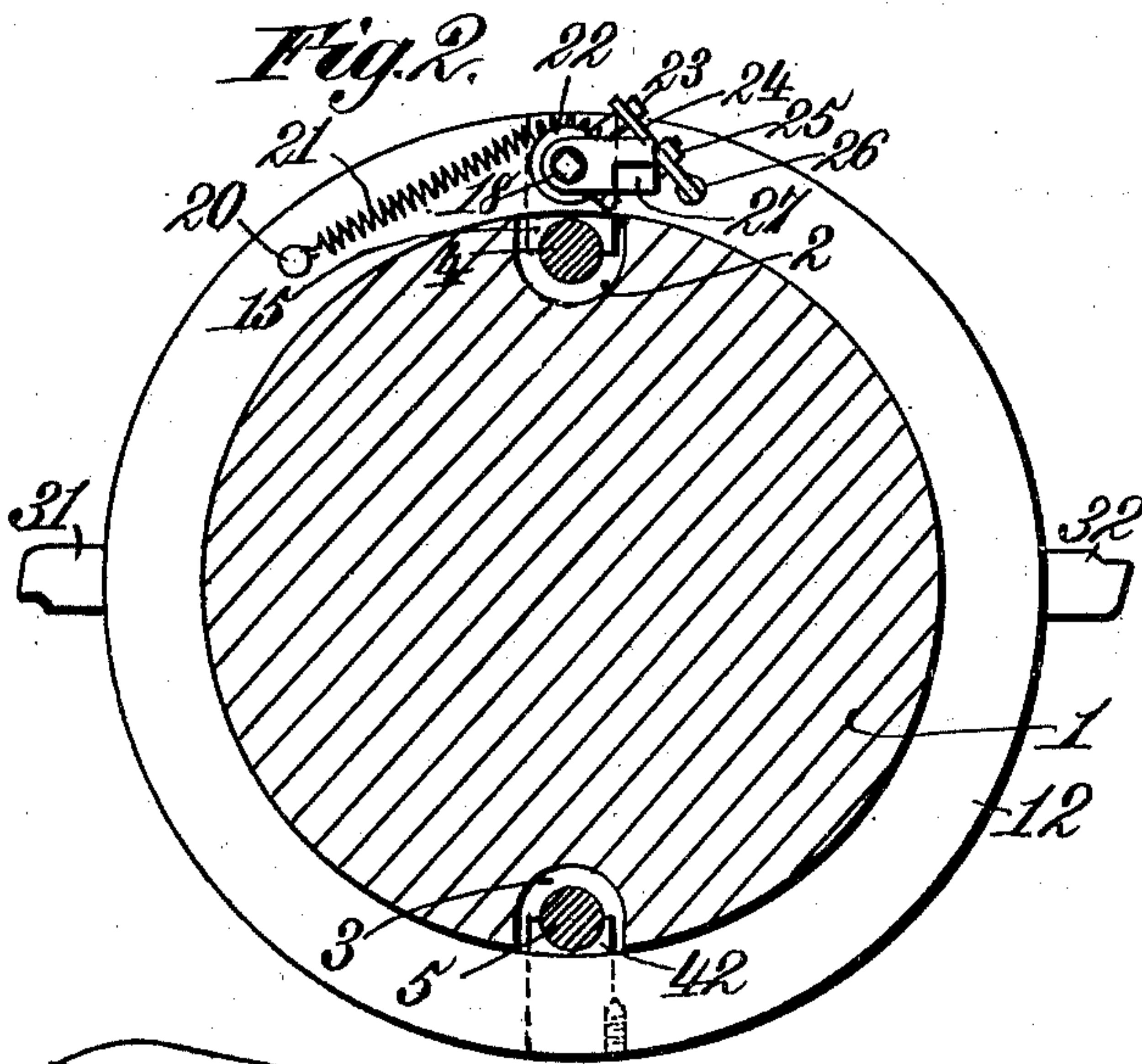
(Application filed Mar. 15, 1902.)

(No Model.)

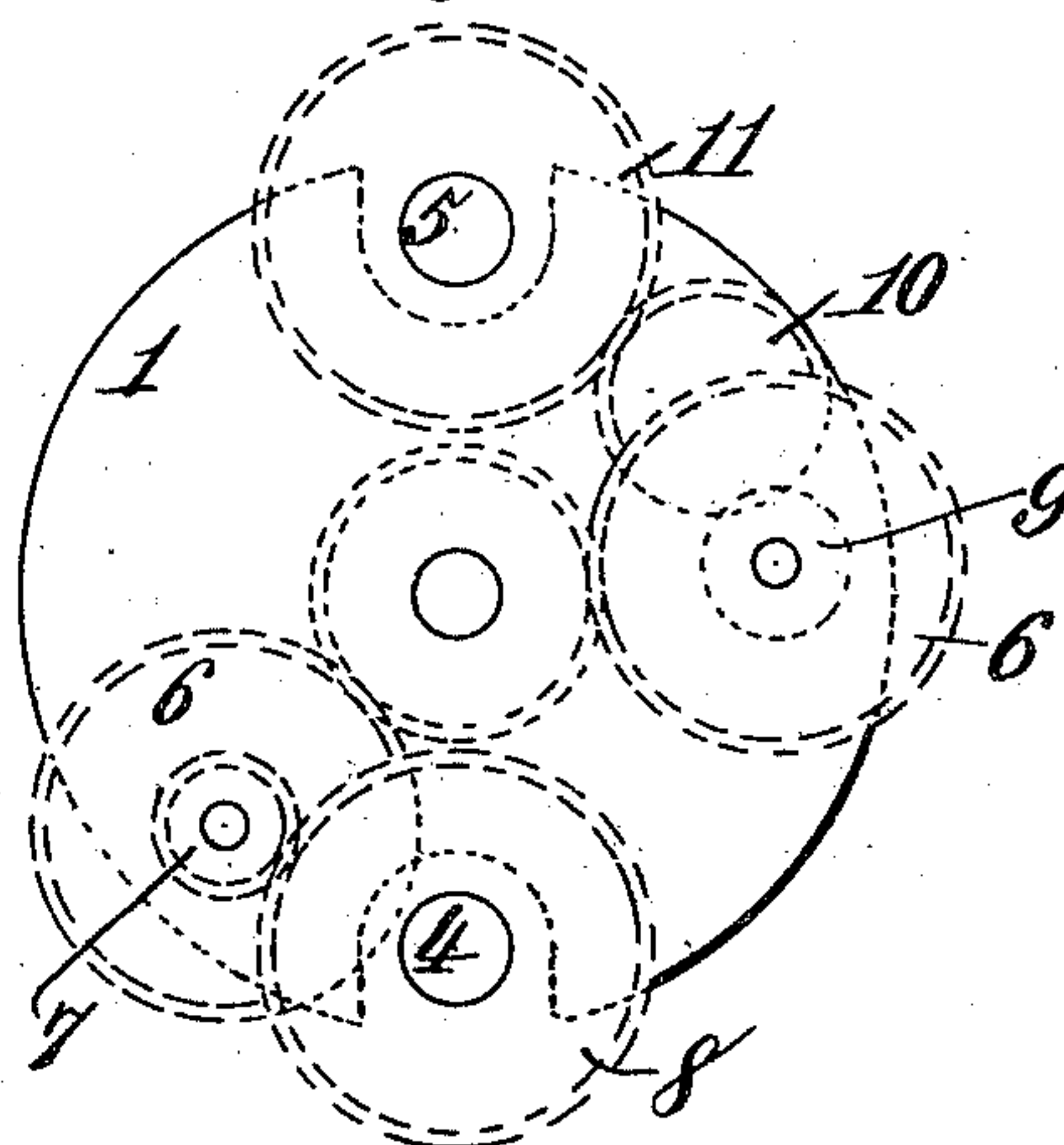
*Fig. 1.*



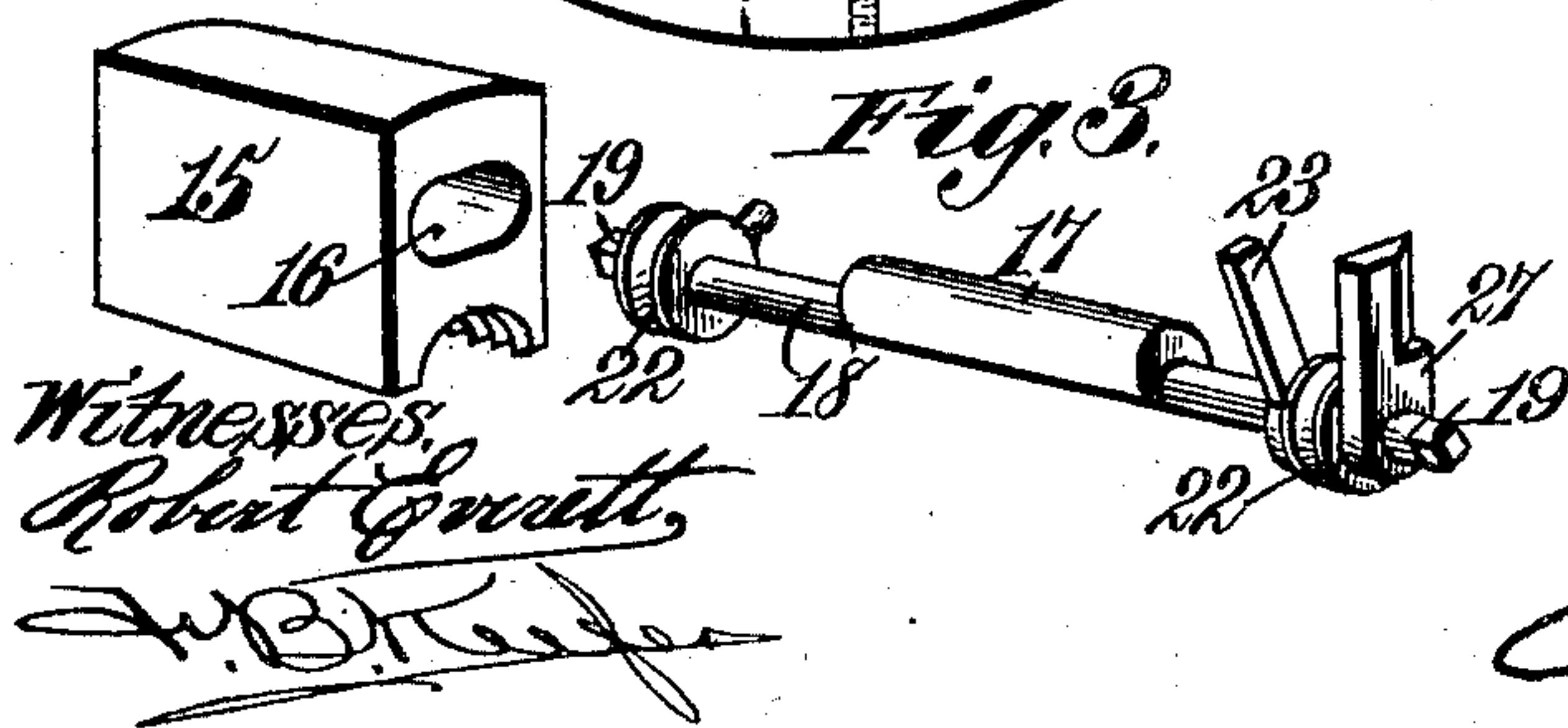
*Fig. 2.*



*Fig. 4.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

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## METAL-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 707,016, dated August 12, 1902.

Application filed March 15, 1902. Serial No. 98,416. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES C. ROBERTS, a citizen of the United States, residing at Ansonia, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Metal-Boring Machines, of which the following is a specification.

This invention relates to certain new and useful improvements in metal-boring machines; and the object thereof is to provide a machine of this character with a pair of cutter-heads operating simultaneously in opposite directions and toward the center of the material being operated upon, one of the said heads adapted to have its longitudinal movement automatically arrested by the other, so that the finish of the cut or bore will be made by one of the cutter-heads only.

A further object of the invention is to provide the cutter-heads with suitable means adapted when operated to discontinue the longitudinal movement of one of the cutter-heads, so that, as before stated, the finish of the cut or the bore will be made by one cutter-head only.

A further object of the invention is to provide the machine with means adapted to pass through the material after the passage of the cutter-heads for finishing off the cut or bore from end to end.

The invention further aims to construct a metal-boring machine which shall be extremely simple in its construction, strong, durable, efficient in its operation, and comparatively inexpensive to set up; and to this end it consists of the novel combination and arrangement of parts hereinafter more specifically described, illustrated in the accompanying drawings, and particularly pointed out in the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, wherein like numerals of reference indicate corresponding parts throughout the several views, and in which—

Figure 1 is a top plan view, partly in section. Fig. 2 is a side elevation of one of the cutter-heads. Fig. 3 is a detail view of the eccentric-shaft carrying the feed-nut, and Fig. 4 is a diagrammatical view of the gearing operating the feed-screws.

Referring to the drawings by reference-numerals, 1 denotes the operating-shaft, which is revolved in any well-known manner and is cut away at its top and bottom, as at 2 3, respectively, to receive the feed-screws 4 5, respectively. The screw 4 is driven by the gears 6, 7, and 8 and the screw 5 by the gears 6, 9, 10, and 11. The gears are connected to the screws 4 5 in any suitable manner, and they are adapted to cause the operation thereof in opposite directions.

The reference-numerals 12 13 denote the cutter-heads, which are mounted upon the shaft 1, adapted to rotate therewith and move longitudinally thereof in opposite directions toward each other or toward the center of the material being operated upon. The cutter-head 12 consists of a sleeve and is provided in its top with a recess 14, registering with the recess 2 in the shaft 1. Seated in the recess 14 and engaging with the feed-screw 4 is a feed-nut 15. The lower face of the feed-nut is formed in a semicylindrical manner, screw-threaded, and meshes with the screw-threads of the feed-screw 4. When the feed-screw revolves and the feed-nut is in engagement therewith, it will cause not only the longitudinal movement of the cutter-head 12, but the feed-nut will also act as a spline, causing the cutter-head 12 to revolve with the shaft 1.

The feed-nut 15 is formed with a longitudinally-extending opening 16, in which is mounted an eccentric 17, carried by the releasing-shaft 18, extending through the top of the cutter-head, as shown. The shaft 18 projects from each side of the cutter-head, and its projecting ends are squared, as at 19. The function of the eccentric 17 is that when the shaft 18 is turned it will cause the feed-nut 15 to be elevated or rather cause the threads of the feed-nut to disengage from the threads of the screw 4 and arrest the longitudinal movement of the cutter-head 12. The square of the ends of the shaft 18 will permit of their engagement by a wrench for manually rotating the shaft 18 if it is desired to release the feed-nut 15 from its engagement with the feed-screw 4.

Each side of the cutter-head 12 has secured thereto a fastening-pin 20, to which is connected one end of the compression-spring 21. The other ends of the springs 21 are con-



connected to the rollers 22, one of which is secured to each end of the shaft 18. The function of the springs 21 is to normally retain the feed-nut 15 in an elevated position—that is to say, from engagement with the feed-screw—to prevent the longitudinal movement of the cutter-head and also elevate the feed-nut 15 to prevent the rotary movement of the cutter-head 12 through the medium of the shaft 1.

The reference-numeral 23 denotes a releasing-lever which is keyed to one end of the shaft 18, and it is engaged by means of a trigger 24, pivoted to the stud 25, and retained in its engaging position through the medium of the spring 26, which is arranged between one end of the trigger 24 and the cutter-head 12. The studs 25 are suitably connected to one side of the cutter-head, as shown. The trigger 24 engages the free end of the releasing-lever 23, so as to keep the feed-nut 15 in engagement with the feed-screw 4, or, in other words, it retains the releasing-lever in a lowered position, so that the feed-nut will not be engaged by the eccentric 17, allowing the feed-nut, as before stated, to engage with the feed-screw 4, so that the cutter-head will be given a longitudinal movement. When the trigger 24 is released from its engagement with the lever 23, the action of the springs 21 will turn the shaft 18, causing the eccentric to engage the feed-nut 15 and disengage the same from the feed-screw as well as elevating the feed-nut, so that the longitudinal movement of the cutter-head will be discontinued.

Mounted upon one end of the shaft 18, adjacent to the roller 22, is a beveled lever 27, the function of which will be hereinafter set forth.

The cutter-head 13 has secured to its inner side a pin 28, carrying a spring-pressed cap 29, which is adapted to be brought into contact with one end of the trigger 24 to release the same from its engagement with the lever 23, so that the springs 21 will turn the shaft 18 in a manner as before set forth. In case the action of the springs 21 is ineffective—that is, to cause the operation of the shaft 18—the inner side of the cutter-head 13 is provided with a bevel-headed bolt 30, which engages with the lever 27 and turns the shaft 18, thereby operating the eccentric. The lower side of the cutter-head 13 is formed with a recess similar to the cutter-head 12, the same reference-numeral being applied thereto. The cutter-head 13 is provided with a feed-nut, eccentric, and shaft of the same construction and arrangement as the cutter-head 12, the same reference-numeral being applied thereto. The cutter-head 13 is provided with the releasing-springs, levers, and trigger in the same manner as the cutter-head 12, the same reference-numeral being applied thereto.

Each of the cutter-heads 12 13 is provided with a pair of cutters 31 32, which extend

therethrough and have their inner ends beveled and adapted to be engaged by the beveled end 33 of the gib 34. The gib 34 has its end 35 bent at an angle to the remaining portion and has extending therethrough the fastening-screw 36, this screw projecting into the cutter-head for securing the gib and cutter in position. The cutter 31 can be adjusted by moving the gib inward or outward at will.

The reference-numeral 37 denotes a binding-screw extending in the cutter-head and engaging the cutter 31 for securing it in its adjusted position.

The reference-numeral 38 denotes a cutter-head carrying the finishing-tools 39 40. This cutter-head is of the same construction as the cutter-heads 12 13 and is provided with a similar releasing mechanism, the same reference-numerals being applied thereto.

The operation of the device is as follows: Assuming that the cutter-heads are revolving and moving in a longitudinal direction toward each other or toward the center of the material being acted upon, when the cap 29 of the cutter-head 13 will be brought into engagement with the trigger 24 of the cutter-head 12, releasing the lever 23, turning the shaft 18, through the action of the springs causing the eccentric to engage with the feed-nut 15, elevating the feed-nut, causing thereby a discontinuance of the longitudinal movement of the cutter-head 12, owing to the fact that the feed-nut 15 will be moved out of engagement with the screw 4, as well as out of engagement with the shaft 1. The cutter-head 13 will then finish the cut or bore and as it moves longitudinally will carry the cutter-head 12 therewith. The cutter-head 13 can be shifted back to its normal position by releasing its lever, so that its feed-nut will be brought out of engagement with the feed-screw 5. After the cutter-heads 12 13 have performed their function the cutter-head 38 will be passed through the object to finish the same, the cutter-head being provided with suitable finishing-tools, as hereinbefore stated.

Each of the cutter-heads, if desired, may be provided with a recess diametrically opposite the recess 14 and having mounted therein a nut 42, which engages with the feed-screw; but these nuts 42 are not screw-threaded, but act as a feather, releasing the feed-nuts 15 from pressure.

It will be obvious that by providing the cutter-heads with the mechanism hereinbefore described the action of one cutter-head upon the other will automatically release the same, so that its longitudinal and rotary movement will be discontinued and that the finishing of the cut will be made by one cutter-head. By the employment of such mechanism a pair of cutter-heads operating in opposite directions toward each other or toward the center of the material can be employed, which, it is obvious, will cause the boring



or cutting of the object, obtaining thereby a considerable saving in time, and it is thought that the many advantages of such a construction can be readily understood from the foregoing description, taken in connection with the accompanying drawings, and it will also be noted that various changes may be made in the details of construction without departing from the general spirit of my invention.

10 Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a boring-machine, a pair of cutter-heads operating toward each other, and means  
15 carried by one of the said cutter-heads and operated by the other of said cutter-heads for discontinuing the operation of one of the said cutter-heads.

2. In a boring-machine, a pair of rotary and  
20 longitudinally-moving cutter-heads operating toward each other, means for operating the said heads, and means operated by one of the said cutters for automatically discontinuing the operation of the other of said heads.

25 3. In a metal-boring machine, a pair of cutter-heads operating toward each other, means carried by the said heads for causing a rotary and longitudinal movement thereof, and mechanism operated by one of the said heads  
30 for discontinuing the cutting movement of the other of the said heads.

4. In a boring-machine, a pair of oppositely-moving cutter-heads, feed-nuts for operating the same, means engaging the feed-nuts for  
35 causing the operation of the heads, and mechanism operated by one of the heads for automatically disengaging one of the feed-nuts to arrest the movement of its respective cutter-head.

40 5. In a metal-boring machine, a pair of cutter-heads moving toward each other, a feed-nut carried by each of the said heads, means engaging the feed-nuts for causing the operation of the cutter-heads, means for retaining  
45 the feed-nuts in engagement with said operating means, and means carried by one of the said cutter-heads and adapted to engage and operate the said retaining means carried by the other of the cutter-heads for  
50 discontinuing the movement of the latter.

6. In a metal-boring machine, a pair of cutter-heads moving toward each other, mechanism carried by each of the said cutter-heads for imparting a longitudinal and a rotary  
55 movement thereto, and means carried by one of the cutter-heads and adapted to engage and operate the mechanism carried by the other of the cutter-heads for discontinuing the movement of the latter.

60 7. In a metal-boring machine, the combina-

tion with an operating-shaft carrying a pair of feed-screws, of a pair of cutter-heads mounted upon said shaft and adapted to move toward each other, feed-nuts carried by the cutter-heads and engaging the feed-screws for moving the said cutter-heads toward each other,  
65 a spring-actuated means carried by one of the cutter-heads for disengaging its feed-nut from its respective feed-screw, and means carried by the other cutter-head and engaging said  
70 mechanism for automatically operating the same.

8. In a metal-boring machine, cutter-heads adapted to move toward each other, mechanism carried by one of the cutter-heads and  
75 adapted when operated to discontinue the movement of the said cutter-head carrying said mechanism, and means carried by the other of said cutter-heads and adapted to engage said mechanism for operating it.

9. In a metal-boring machine, a pair of cutter-heads moving in opposite directions toward each other, means for rotating said cutter-heads, a feed-screw for imparting a longitudinal movement to said cutter-heads simultaneously with the rotary movement thereof,  
85 feed-nuts carried by the cutter-heads and engaging the said screws for causing the said longitudinal movement to be given thereto, a shaft provided with an eccentric carried by  
90 the cutter-heads and engaging the said nuts for releasing them from their engagement with the feed-screws, means for retaining the said nuts in engagement with the said screws, and means carried by one of the cutter-heads and  
95 adapted to engage the said retaining means for operating it to release one of the feed-nuts from its engagement with its respective screw to arrest the movement of one of the cutter-heads.

10. In a metal-boring machine, a pair of cutter-heads operating toward each other in opposite directions, and mechanism carried by one of the said heads and operated by the other of said heads for discontinuing the movement of one of the said heads.

11. In a metal-boring machine, a pair of cutter-heads operating in opposite directions and toward each other, mechanism carried by one of the said heads for discontinuing the movement thereof, and means carried by the other of the said heads and adapted to engage the said mechanism for automatically operating it.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES C. ROBERTS.

Witnesses:

AUSTIN P. KIRKHAM,  
SADIE E. MANVILLE.