

G. A. GREENWOOD.
TYPE WRITER RIBBON MECHANISM.
APPLICATION FILED MAR. 25, 1911.

996,016.

Patented June 20, 1911.

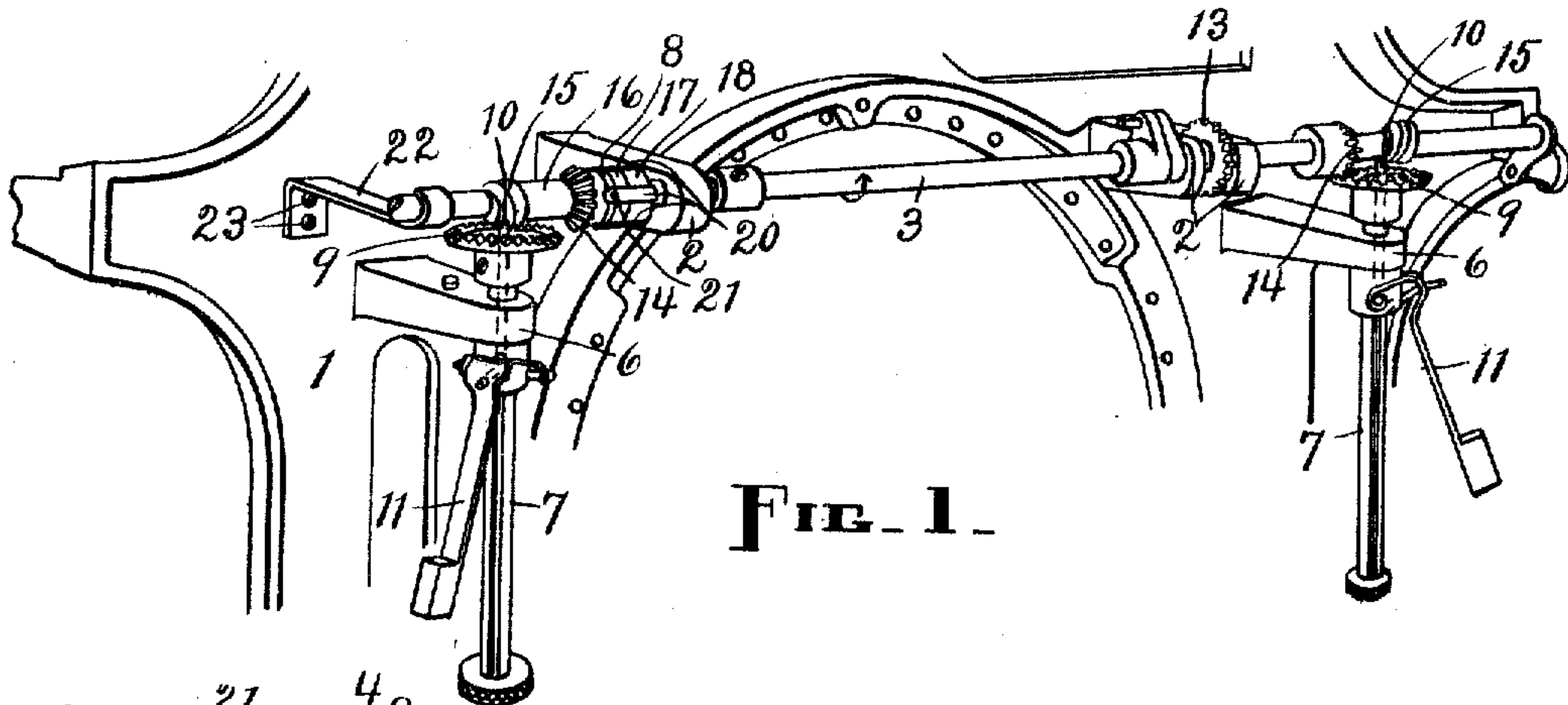


FIG. 1.

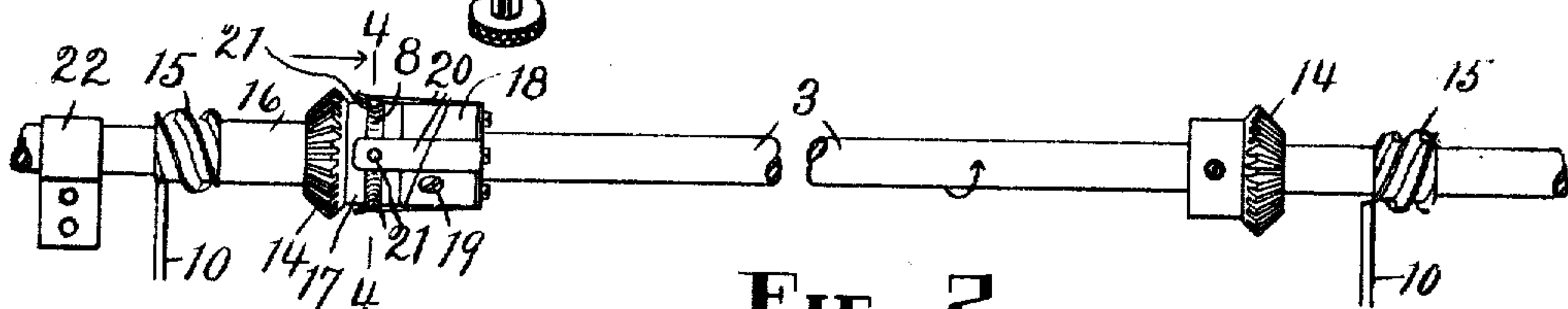


FIG. 2.

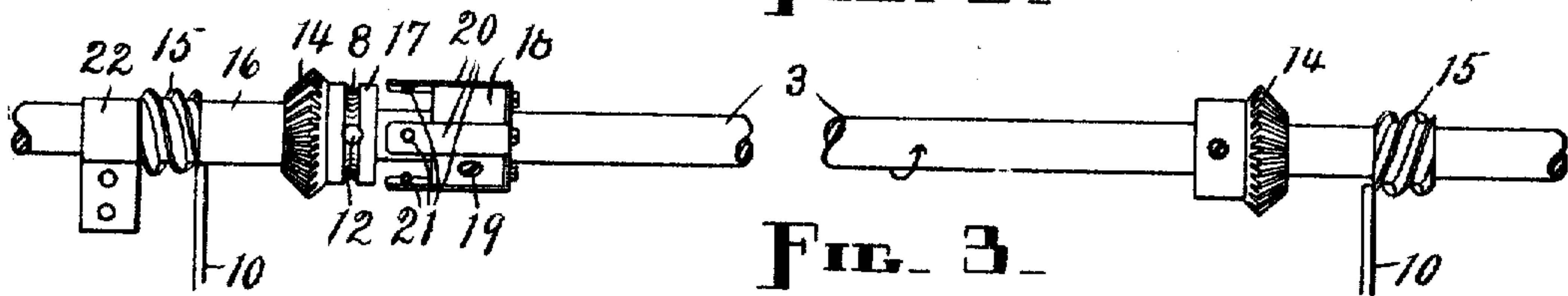


FIG. 3.

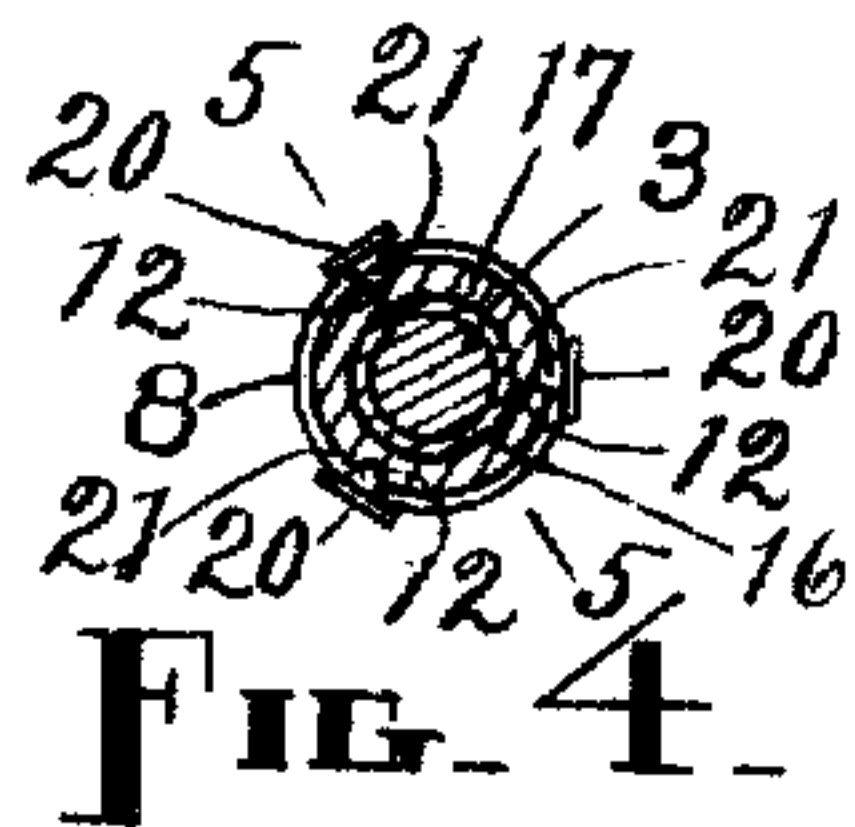


FIG. 4.

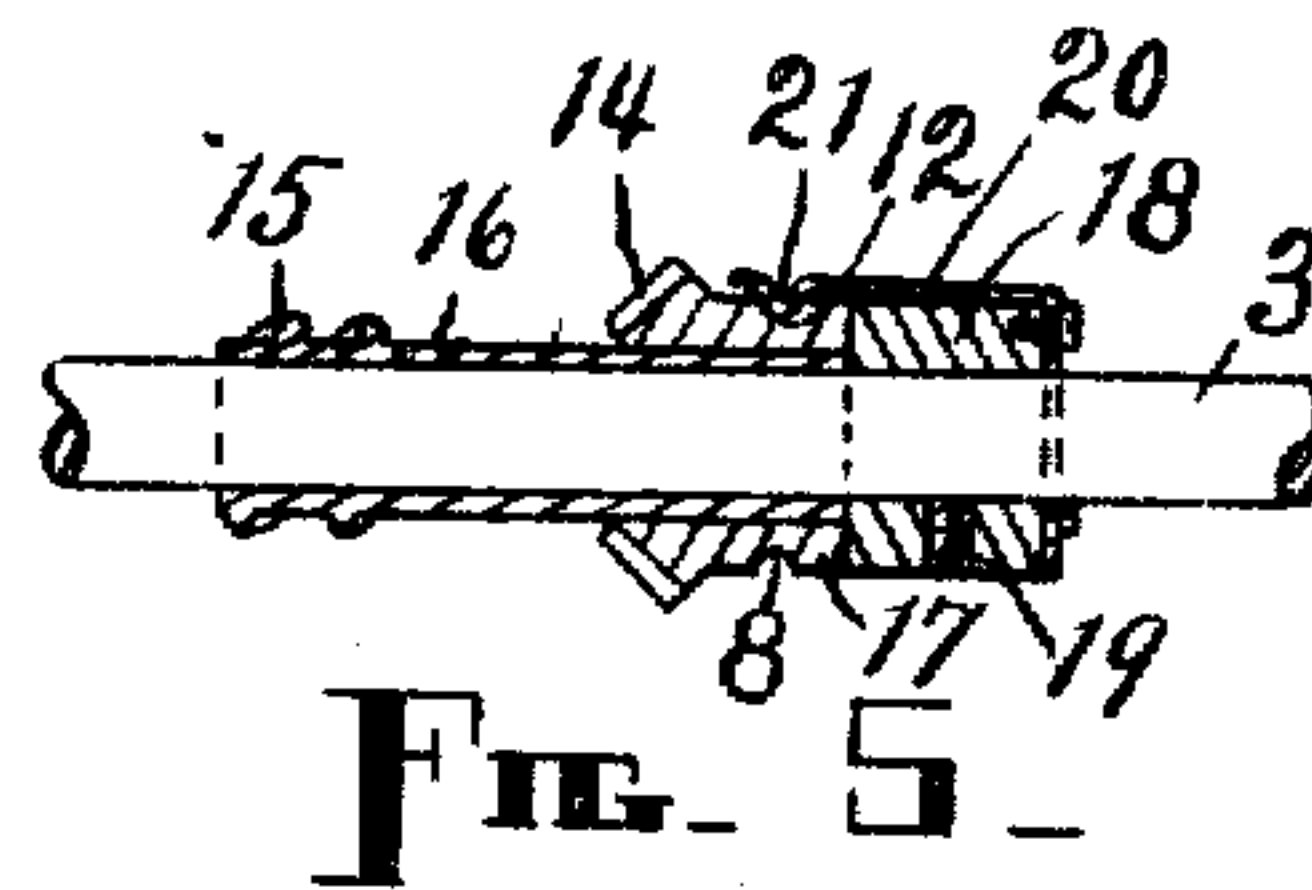


FIG. 5.

WITNESSES:

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TYPE-WRITER RIBBON MECHANISM.

996,016.

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To all whom it may concern:

Be it known that I, GEORGE A. GREENWOOD, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Type-Writer Ribbon Mechanism, of which the following is a specification.

My invention relates to improvements in the actuating and reversing mechanism for ribbons in typewriters such, for example, as those of the Remington type, and resides in means for automatically bringing about the release of a transmission member under certain conditions, such means including such auxiliary or subsidiary parts and members as may be needed to render the same practicable and efficient and applicable to the existing mechanism, all as hereinafter set forth. This ribbon mechanism of a typewriter, or in the Remington machine, the driving shaft thereof, is very liable, due to inexperience or carelessness on the part of the operator, to become locked and immovable in the manner presently to be explained, and not unfrequently considerable time and expense are involved in remedying the trouble by freeing said shaft, owing to the fact that the services of a skilled mechanic who may be at a distance must be employed, and the object of my invention is to remove the possibility of thus crippling the machine and rendering the same useless for the time being. Then the machine is inoperative while the aforesaid shaft is locked against rotation and endwise movement as well is plain, because then the entire ribbon mechanism is prevented from functioning and the machine cannot perform its work without the aid of such mechanism and the ribbon actuated thereby.

A further object is to provide the usual ribbon mechanism with simple but entirely serviceable and practical means for accomplishing the desired end as set forth above, very little change in said mechanism being required for the application thereto of the new features.

Other objects will appear in the course of the following description.

I attain these objects by the means or mechanism illustrated in the accompanying drawings, wherein appears a preferred form or embodiment of the invention, and I will

proceed to describe said invention with relation to said drawings, nevertheless, it is to be understood that the form, construction, arrangement, etc., of the parts in various aspects are not material and may be modified without departure from the spirit of the invention.

In the drawings, in which similar figures refer to similar parts throughout the several views, Figure 1 is a perspective view, from the underside of the ribbon mechanism of a typewriter having my invention embodied therewith, the ribbon and spools being omitted and the ribbon-reverser pin levers being represented in the positions they would assume if the machine were right side up and in the absence of the spools; Fig. 2, a plan of the driving shaft, broken at the middle and ends, and of the clutch members, such shaft being viewed the same as in Fig. 1 and showing the parts in the same positions as in Fig. 1; Fig. 3, a similar plan to that in the preceding view excepting that the clutch is disengaged; Fig. 4, a cross-section taken on lines 4—4, looking in the direction of the associated arrow, in Fig. 2, and, Fig. 5, a longitudinal section on lines 5—5, Fig. 4.

Before describing in detail the new elements, I will briefly refer to the old elements with which said new elements either enter into combination or are more or less intimately associated.

A portion of the top of a typewriter frame is represented at 1 in Fig. 1, as viewed from below, included with which are two hanger bearings 2 for a ribbon-spool driving shaft 3, and two hanger bearings 6 for the same number of shafts 7 upon which at their front ends the ribbon spools (not shown) are directly mounted. The shafts 7 have bevel-gears 9 at their rear terminals, as usual, and are provided with the usual automatic ribbon-reverser movement comprising reverser pins 10, and weighted levers 11 therefor. The operation of this reverser movement being well understood the same will be explained only in connection with and to the extent required by the explanation of the operation of my invention. The shaft 3 rotates in one direction only, that indicated by the arrows in the first three views, and is driven from the main-spring (not shown) of the machine by means of a gear 13 thereon. The customary amount

of endwise movement is permitted to the shaft 3.

The shaft 3 is provided with bevel-gears 14--14 to mesh with the bevel-gears 9, and with worms 15--15 to be engaged by the reverser pins 10, but in this case one only of said bevel-gears 14 and one only of said worms are rigidly secured to said shaft, instead of all four of these members being so secured as is the case in the old mechanism. The bevel-gear 14 and the companion worm 15 at one end, the left-hand end in the present embodiment of the invention, are rigidly attached to or mounted on a sleeve 16 which with said bevel-gear and worm is entirely loose on the shaft 3, and this is one of the new features of said invention. By "right" and "left" I mean right and left as seen in the drawing, in which the parts are reversed, being viewed from the bottom. The space between the bevel-gear and the worm which are connected by the sleeve 16 is the same as that between the corresponding members which are permanently secured to the shaft 3 without independent movement thereon, consequently, when the former are held or clutched to the shaft, by the means described below, in their normal positions, the operation of the ribbon-reversing movement is the same as heretofore. An annular groove 8 is formed in the periphery of the hub, 17, of the bevel-gear 14 that is on the sleeve 16, and within this grooved portion of said hub are three, more or less, recesses or indentations 12, arranged at equal distances from each other around the hub. The grooved and recessed hub 17 constitutes part of the above-mentioned holding means or clutch. The other elements of the aforesaid clutch are a collar 18 rigidly secured to the shaft 3 by means of a set-screw 19, and resilient fingers 20 which correspond in number to the indentations 12 and have interior projections or fasteners 21 so arranged and located as to enter into locking engagement with said indentations when the hub 17 is brought into contiguity with said collar with the indentations in registry with said fasteners. The fingers 20 are mounted on and securely attached to the sides of the collar 18, they extend beyond the left-hand end of said collar, the fasteners 21 being on such extending portions, and they are so constructed and mounted that they tightly embrace the hub 17 when the latter is pushed or enters between their free terminals, said fasteners at such time first riding over the periphery of said hub and then entering either the indentations 12 or the groove 8. If the fasteners 21 at first enter the groove 8, then it is necessary to partially rotate the hub 17 in one direction or the other until said fasteners slip into the indentations 12, unless the fingers 20 grip the hub 17 so tightly as to turn the pinion by friction.

Thus the groove 8 serves as a guide for the fasteners 21 to the indentations 12, meanwhile affording means by which the hub 17 is held with its right-hand end against the left-hand end of the collar 18. This is the manner, also, in which the hub is held relative to the collar when the fasteners are in the indentations, and the engagement afforded and produced by the clutch members just described is sufficiently strong to lock the sleeve 16 with the bevel-gear and worm carried thereby to the shaft 3, and to enable said bevel-gear and worm to perform their usual functions, but it is not so strong as to prevent disconnection of the parts under the conditions presently to be explained. The free ends of the fingers 20 are turned outward slightly so as to enable the hub 17 to be readily forced between them. As will be clear from the foregoing, the distance from the radial center of each fastener 21 to the adjacent end of the collar 18 is equal to the distance from the radial center of each indentation 12 and of the groove 8 to the right-hand end of the hub 17; and it already will have been seen that said collar is so located on the shaft 3 as to lock the bevel-gear and worm on the sleeve 16 in operative relation to the associated bevel-gear 9 and pin 10, assuming, of course, that the parts be clutched or locked together.

A stop, which here takes the form of a bracket 22 having one terminal fastened at 23 to the frame 1 and the other terminal turned over or around the shaft 3, is provided for the sleeve 16 and its members, to limit the movement away from the collar 18 of such sleeve. In very many not to say most cases the adjacent bevel-gear 9 is capable of checking and holding the sleeve 16 at the right place to insure the proper relocking of the parts, nevertheless I prefer to employ the stop bracket 22 or equivalent member so as to obviate any possible chance of failure or bother, by thus relieving said bevel-gear of this work or duty and providing a member having the required strength and stability and being situated at exactly the right place to receive it. The adjacent terminal of the shaft 3 is represented as being broken off, in Fig. 1, so as to show clearly the stop bracket 22.

Assuming, now, that the ribbon has been taken from both spools, or that the spools themselves have been removed from the shafts 7, so that the weighted levers 11 have shifted their positions and thrust the pins 10 into engagement with both worms 15, as shown in Figs. 1 and 2, it is clear that, with the former construction, the shaft 3 is held against longitudinal movement by said pins and a slight turn of said shaft causes said worms, being as they are right and left hand worms, to bind hard on said pins and so completely to lock the mechanism of the re-

versing or reverser movement, some little experience and skill being needed in order to free the locked parts without breaking or otherwise injuring the machine. Such locking of the mechanism, however, cannot occur when my improved features are present, because, as the shaft 3 is turned, the sleeve 16 with its bevel-gear and worm is pried as it were out of locking engagement with said shaft and all serious binding of the parts is prevented. What actually does occur, when the shaft 3 is turned, is this: The right-hand pin 10 holds the worm 15 which is engaged thereby, while the worm 15 on the sleeve 16 is forced to the left by the engaging pin 10, taking with it said sleeve and the bevel-gear 14 connected with said sleeve and so withdrawing the grooved and recessed portion of the hub 17 from the fasteners 21. Usually, during this operation, the worm on the sleeve 16 is actuated along the shaft 3, by the engaging pin 10, until the stop 22 is reached, by which time the hub 17 and the fingers 20 have parted company. The members are now disposed as represented in Fig. 3. Upon forcing the shaft 3 to the left by hand the fingers 20 again grasp the hub 17 and, after turning the latter if necessary to get the fasteners 21 into the indentations 12, the sleeve and its members are once more locked to said shaft in readiness for their intended functions and, when the occasion arises, for a repetition of the operation just explained. It is during the act of throwing in the clutch, so to speak, that the stop 22 becomes of material assistance, since it then forms an abutment for and maintains the sleeve at the right place for the reengagement of the clutch members. In Fig. 1 the right-hand bevel-gear 14 is the active gear, being in mesh with the bevel-gear 9 on the right-hand shaft 7, therefore, if that shaft is the one which it is still desired to drive, the shaft 3 must be drawn to the right until the necessary connection is made, after the aforesaid relocking operation takes place. On the other hand, if the left-hand shaft 7 is the one to be next driven, the shaft 3 is in position to do this without shifting it again. When the shaft 3 is in the position to have the left-hand bevel-gear 14 mesh with the corresponding bevel-gear 9 to drive the left-hand shaft 7, such position being that last above noted, and both pins 10 engage both worms, the left-hand pin 10 holds the worm on the sleeve 16 together with the other sleeve members, upon the turning of said shaft 3, and the right-hand pin 10 causes said shaft 3 with the collar 18 to move to the right and at the same time to draw the fasteners 21 out of the indentations 12 and the fingers 20 off of and away from the hub 17. As in the other instance so in this there is no locking of the worms by the pins or undue binding between them. The clutch is

thrown in or reset by moving the shaft 3 to the left in precisely the same way as before.

It will be perceived that I have provided a yielding connection which is arranged to transmit a shifting motion from one end of the shaft 3 to the other under normal conditions but to yield in case the automatic shifting means are brought into operation to act both ways at once. It will also be perceived that the two pinions 14 constitute drivers for the respective ribbon spools and that there is means associated with each spool for automatically connecting the associated driver with said spool when the latter is empty; that connections including a spring are provided and adapted to yield in case both automatic means are in operation at once; and that the driving mechanism is adapted to drive the spools alternatively.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In typewriter-ribbon mechanism, a longitudinally-movable driving shaft, driven shafts provided with reverser pins, means on said driving shaft to coöperate with said pins to shift the position of said driving shaft, and means to break the connection when said first-mentioned means are engaged by both of said pins.

2. In typewriter-ribbon mechanism, a longitudinally-movable driving shaft, driven shafts provided with reverser pins, members mounted on said driving shaft to coöperate with said pins to shift the position of said driving shaft, and means to disconnect automatically one of said members from locking engagement with said driving shaft when both of said members are engaged by said pins.

3. In typewriter-ribbon mechanism, a longitudinally-movable driving shaft, driven shafts provided with reverser pins, and means on said driving shaft to coöperate with said pins to shift the position of said driving shaft, such means consisting in part of clutch members adapted to release automatically said driving shaft when both of said pins are in engagement with said means.

4. The combination, in typewriter-ribbon mechanism, of a longitudinally-movable driving shaft, a tight and a loose worm mounted on said shaft, means carried by said shaft to lock said loose worm thereto and release it therefrom, and shafts driven from said driving shaft and provided with reverser pins to coöperate with said worms.

5. The combination, in typewriter-ribbon mechanism, of a longitudinally-movable driving shaft, a tight and a loose worm mounted thereon, means carried by said shaft to lock said loose worm thereto and release it therefrom, a stop for said loose worm when unlocked from said shaft and during the relocking operation, and shafts

driven from said driving shaft and provided with reverser pins to cooperate with said worms.

6. The combination, in typewriter-ribbon mechanism, of a longitudinally-movable driving shaft, a worm and a collar fast to said shaft, said collar being provided with clutch fingers, a worm free on said shaft and provided with a part adapted to be grasped by said fingers to lock it to said shaft and to be released from such locking engagement, and shafts driven from said first-mentioned shaft and provided with reverser pins to cooperate with said worms.

7. The combination, in typewriter-ribbon mechanism, of a longitudinally-movable driving shaft, a worm and a collar tight on said shaft, said collar being provided with clutch fingers, a worm free on said shaft and provided with a part adapted to be grasped by said fingers to lock it to said shaft and to be released from such locking engagement, a stop arranged to form an abutment for said free worm when unlocked from its shaft and during the relocking operation, and shafts driven from said first-mentioned shaft and provided with reverser pins to cooperate with said worms.

8. The combination, in typewriter-ribbon mechanism, of a longitudinally-movable driving shaft; a bevel-gear, worm and collar tight on said shaft, said collar being provided with clutch fingers; a bevel-gear, a worm and a connecting sleeve all free on said shaft, said last-mentioned members having a part engageable by and releasable from said fingers; and shafts provided with bevel-gears to mesh with said first-mentioned bevel-gears, and with reverser pins to operate in conjunction with said worms.

9. The combination, in typewriter-ribbon mechanism, of a longitudinally-movable driving shaft; a bevel-gear, worm and collar tight on said shaft, said collar being provided with clutch fingers; a bevel-gear, a worm and a connection sleeve all free on said shaft, said last-mentioned members having a part engageable by and releasable from said fingers; a stop arranged to form an abutment for said sleeve and its members when unlocked from its shaft and during the relocking operation; and shafts provided with bevel-gears to mesh with said first-mentioned bevel-gears, and with reverser pins to operate in conjunction with said worms.

10. In a machine of the class described, the combination with automatically driven spools for a ribbon, a part shiftable to change the drive from one spool to the other, and means for shifting said part automatically, of a yielding connection arranged to transmit the shifting motion under normal conditions but to yield in case the automatic

shifting means are brought into operation to act both ways at once.

11. In a machine of the class described, the combination of a pair of ribbon spools, two drivers, one for each spool, connections between said drivers to cause them to be connected with their respective spools alternatively, and automatic means for shifting said drivers to reverse the feed, said connections including a yielding device arranged to transmit the shifting motion to one of said drivers under normal conditions but to yield in case said automatic shifting means are brought into operation to act both ways at once.

12. In a machine of the class described, the combination of a pair of ribbon spools, two drivers, one for each spool, means associated with each spool for automatically connecting the associated driver with said spool when said spool is empty and connections for disconnecting the driver of the other spool, said connections including a spring adapted to yield in case both automatic connecting means are in operation at once.

13. In a machine of the class described, the combination of a pair of ribbon spools, two drivers, one for each spool, means for operating both of said drivers, means for automatically shifting said drivers to connect them alternatively with their respective spools, and a clutch connecting one of said drivers with said operating means, said clutch being automatically disconnected in case said automatic means is brought into operation to act both ways at once.

14. In a machine of the class described, the combination of a pair of ribbon spools, a driving shaft for said ribbon spools, means for automatically gearing said driving shaft with said spools alternatively, and a part included in the connections between said shaft and one of said spools arranged to yield in case said automatic means are brought into operation to act both ways at once.

15. In a machine of the class described, the combination of a pair of ribbon spools, two gears, one connected with each of said spools, a shiftable driving shaft, pinions on said shaft adapted by the shifting of said shaft to mesh with said gears alternatively, means for automatically shifting said shaft to reverse the ribbon feed, and a clutch connection between said shaft and one of said pinions arranged to yield in case said automatic means are brought into operation to act both ways at once.

16. In a machine of the class described, the combination of a pair of ribbon spools, a driving shaft for said spools shiftable endwise to gear it to said spools alternatively, two worms on said shaft, and means automatically brought into operation to engage

said worms to cause the shaft to be shifted, one of said worms being yieldingly mounted on the shaft for the purpose described.

17. In a machine of the class described, 5 the combination of a pair of ribbon spools, two gears, one connected with each of said spools, a driving shaft for said spools having two pinions thereon and said shaft being shiftable to cause said pinions to 10 engage said gears alternatively, two worms on said shaft, and means automatically

brought into engagement with said worms to shift the shaft to reverse the ribbon feed, one of said worms being on a sleeve slidably mounted on the shaft, and yielding 15 means for holding said sleeve in normal relation with said shaft.

GEORGE A. GREENWOOD.

Witnesses:

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