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2 SHEETS—SHEET 1.

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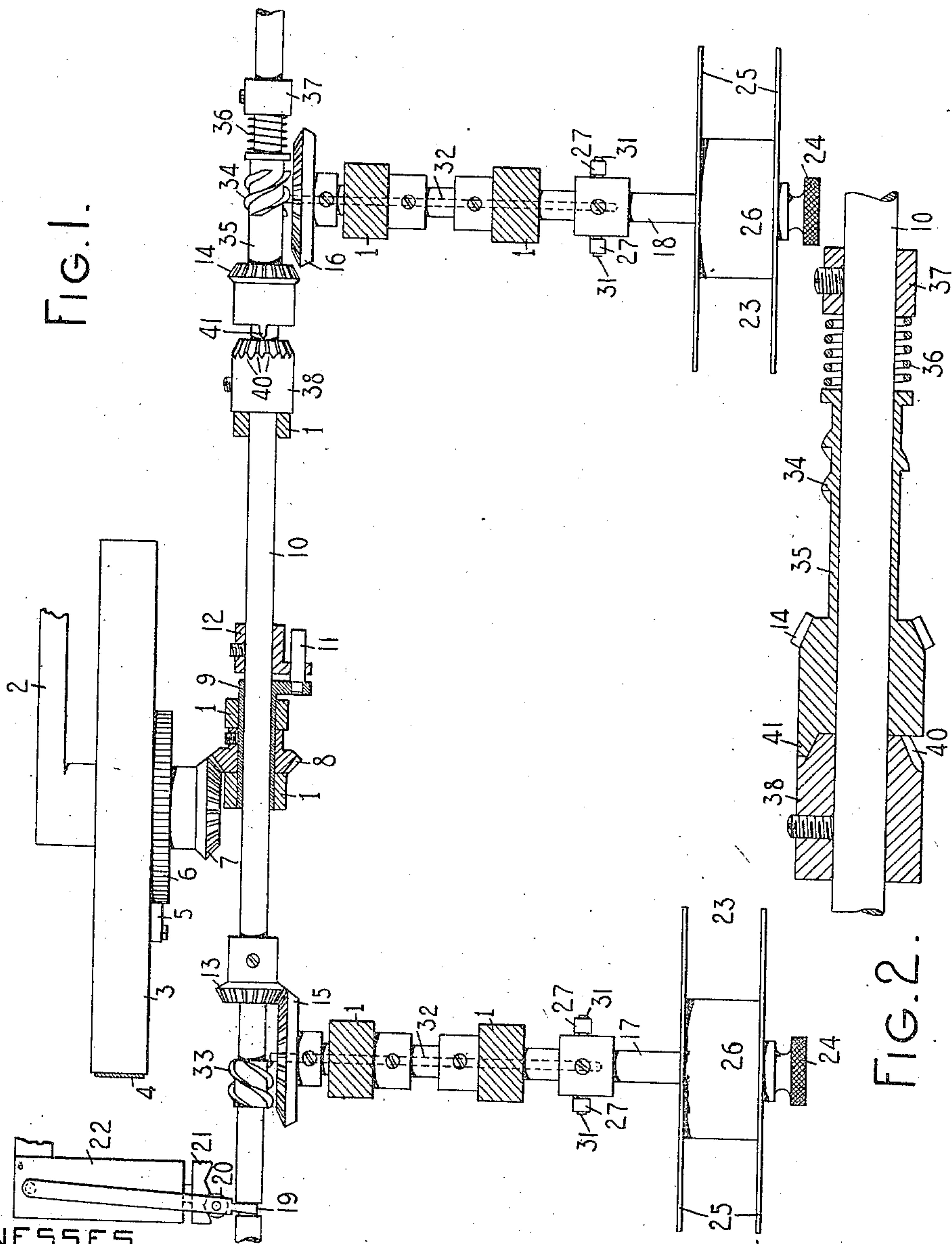


FIG. 2.

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R. H. Brother.

INVENTOR:

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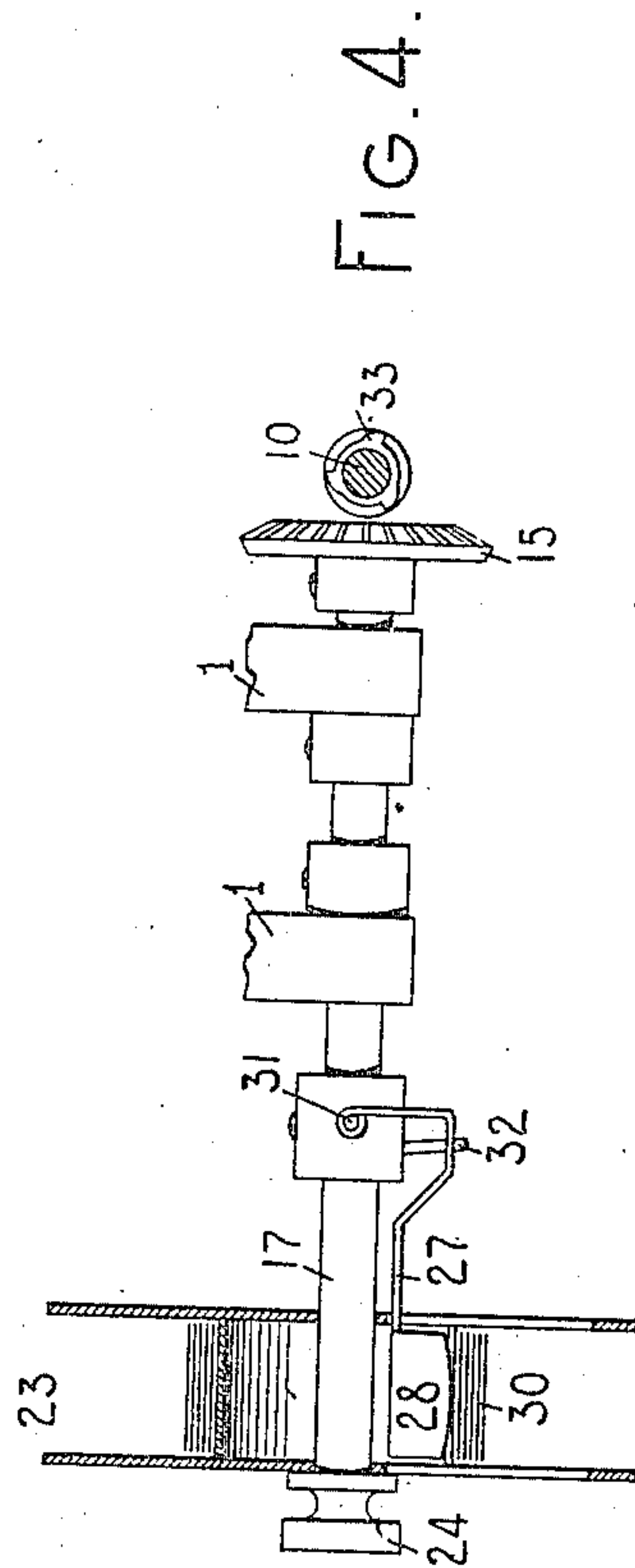
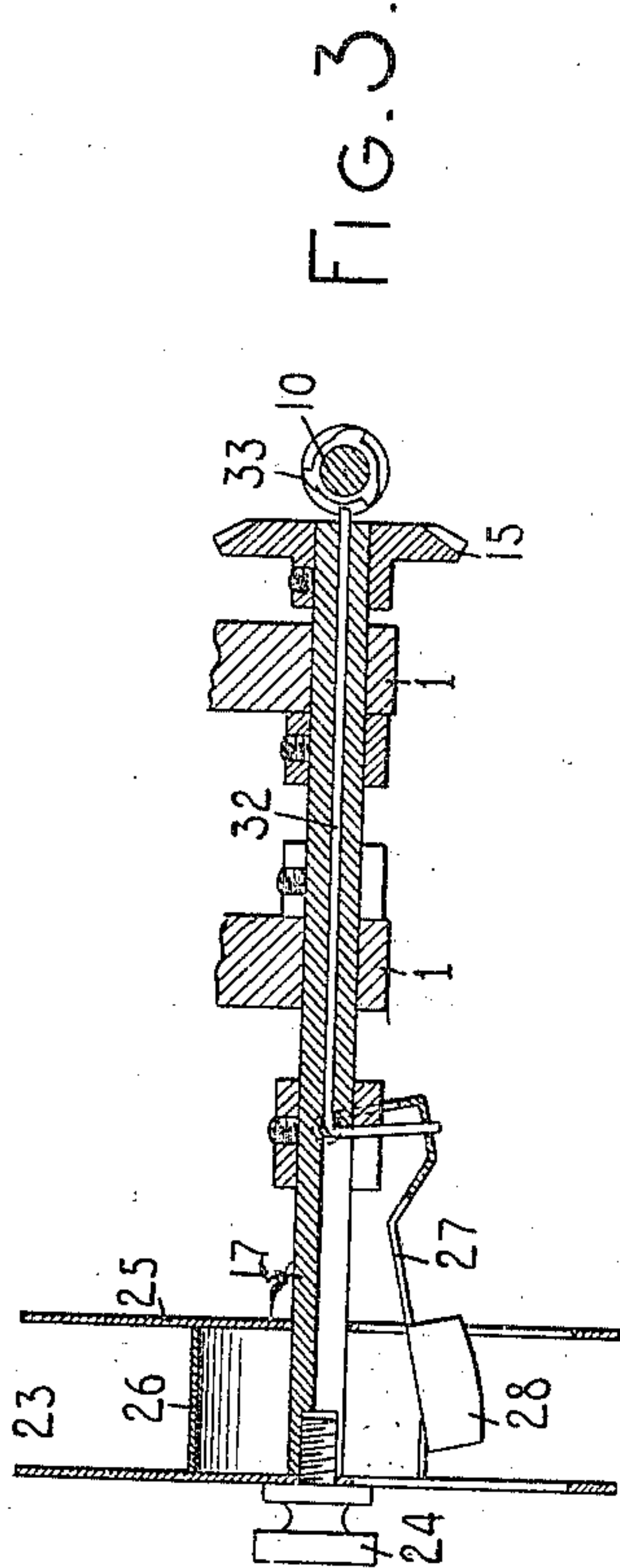
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995,669.

Patented June 20, 1911.

2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE A. GREENWOOD, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO REMINGTON TYPEWRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

995,669.

Specification of Letters Patent. Patented June 20, 1911.

Application filed April 25, 1911: Serial No. 623,202.

To all whom it may concern:

Be it known that I, GEORGE A. GREENWOOD, citizen of the United States, and resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to the ribbon feed mechanism of such machines.

The object of the invention is to overcome a difficulty that has been experienced with certain classes of mechanism for automatically reversing the direction of ribbon feed. In the ordinary operation of such reversing mechanisms one of the spools becomes filled with ribbon and the other one becomes nearly or entirely empty, and the empty spool causes devices to be thrown into operation to shift the drive from the full spool to the empty spool. The difficulty referred to occurs when the ribbon is removed entirely from the machine either by unwinding it from both spools or by removing the spools themselves from the machine. In such a case the reversing devices for both spools are liable to come into operation to act both ways at once, thus locking the mechanism against operation. In some instances the parts bind and tie the machine up in such a way that it is necessary to call in a skilled workman to restore it to operative condition.

The purpose of the present invention is to prevent this locking and tying up of the machine.

To the above ends my invention consists in certain features of construction and combinations and arrangements of parts which will be fully set forth herein and particularly pointed out in the claims.

One form of my invention is illustrated in the accompanying drawing in which—

Figure 1 is a top plan view of the ribbon feed mechanism of a Remington No. 19 typewriter, parts being shown in section and the top plate of the machine being sectioned away. In this figure the ribbon spools are

shown in place on their shafts but they are both empty and both reversing pins are in engagement with the reversing worms used in this type of machine. Fig. 2 is an enlarged sectional view of certain devices mounted on the driving shaft. Fig. 3 is a longitudinal section through one of the ribbon spools and its shaft and through the driving shaft, the spool being empty. Fig. 4 is a similar section of the same spool but with ribbon wound thereon and with the associated parts shown in side elevation.

My invention is applicable or adaptable to various typewriters and other machines that use an ink ribbon, such, for example, as recording adding machines. It is here illustrated as applied to a Remington No. 10 typewriter, the ribbon mechanism of which is one of those that is subject to the difficulty above mentioned. The Remington No. 10 machine has a top plate from which depend certain brackets or hangers 1 which support the ribbon feed mechanism, these brackets being shown in horizontal section in Fig. 1. The machine frame also comprises a bracket 2 which supports a spring drum 3 having a strap 4 which impels the carriage in its travel toward the left. Said spring drum carries a pawl 5 which engages a ratchet wheel 6 mounted concentrically with the spring drum 3 and rigidly connected with a bevel gear 7, said ratchet wheel and gear being thus arranged to turn only when the carriage is moved toward the left. The gear 7 meshes with a pinion 8 rigidly mounted on a sleeve 9 that is loose on a transverse ribbon driving shaft 10. The pinion 8 is situated between two branches of one of the brackets 1 so that it does not move endwise of or with the shaft. The sleeve 9 carries a pin 11 having sliding connection with a collar 12, rigid on the shaft 10. Said shaft carries two bevel pinions 13 and 14 adapted to mesh respectively with bevel gears 15 and 16 on the rear ends of ribbon spool shafts 17 and 18, said pinions constituting drivers adapted to be connected with their respective spools alternatively, the driving shaft being thus geared to one or the other

of said spool shafts by shifting said driving shaft endwise. Said shaft is located in either of its positions by means of a pivoted arm 19 engaging in a groove in the shaft and carrying a roller 20 that meshes with a notched spring-pressed plunger 21 mounted in a fixed bracket 22.

Each of the shafts 17 and 18 carries at its forward end a ribbon spool 23 which is detachably secured to the forward end of the shaft by a thumb-screw 24. The left-hand ribbon spool comprises two flanges 25 and a drum 26, and said drum and flanges are formed with registering cut-outs into which projects an arm 27 having a weight 28 that is normally held up by the coils of ribbon 30 in the position shown in Fig. 4. The arm 27 is pivoted at 31 to a collar on the spool shaft and said arm is of the angled shape shown so as to engage the outwardly bent end of a wire or pin 32 that extends longitudinally through the center of the shaft and has its rear end adapted to be projected into engagement with a worm 33 fixed to the driving shaft 10. This reversing pin 32 is normally held out of the worm by the ribbon as shown in Fig. 4 and when the ribbon is exhausted from the spool the weight 28 drops down as shown in Fig. 3 and projects the pin into the path of the worm. The right-hand spool shaft 18 and the devices mounted thereon, are like those just described. With the exception of the pinion 14, the parts thus far referred to are of the ordinary Remington construction. The right-hand pin 32 is adapted to engage a worm 34 which is like the worm 33 but pitched in the opposite direction. In the Remington machine as heretofore constructed where both worms are rigid on the shaft, if the ribbon is entirely removed, either by unwinding from both spools or by removing the spools themselves, both weights 28 are liable to be dropped down at once as indicated in Fig. 1. If the shaft 10 happens, as shown in said figure, to be in its left-hand position, the right-hand pin 32 will engage the right-hand worm and tend to pull the shaft 10 toward the right but the left-hand pin 32 will prevent the shaft from sliding so that the two pins together will lock the driving shaft against turning and thus lock the spring drum also.

In practice it has been found that the parts sometimes get wedged in so tightly that it is a matter of some difficulty to get the pins out of the worms and unlock the machine without breaking or otherwise injuring some of the parts. In order to cure this difficulty I have modified the mechanism at one end of the shaft. It can be similarly modified at the other end, of course, but I deem it sufficient to change one end. At the right-hand end of the shaft 10 I have shown

the worm 34, instead of being rigid on the shaft 10, as made on a sleeve 35 that is loose on said shaft so that it can slide endwise with relation to said shaft. In the present instance I have shown the right-hand pinion 14 as either integral with said sleeve or rigidly mounted on it but this is not essential. A spring 36 is coiled about the shaft 10 and compressed between the outer end of the sleeve 35 and a collar 37 rigidly mounted on the shaft. The motion of the sleeve 35 to the left under the impulse of this spring is limited by another collar 38 also rigidly mounted on the shaft 10. Suitable means are provided for causing the pinion 14, sleeve 35 and worm 34 normally to turn with the shaft 10. This can be accomplished in a variety of ways but in the present instance it is brought about by a clutch which consists of a series of teeth 40 formed on the right-hand end of the collar 38 and a tooth 41 projecting from the left-hand end of the hub of the pinion 14.

The parts are normally in the position shown in Fig. 2 with the tooth 41 engaging the teeth 40 so that the shaft and the pinion are constrained to turn together. The ordinary operation of the mechanism is identical with that of the construction heretofore employed. When the right-hand spool is exhausted and its pin 32 engages the worm 34 the said worm is forced toward the right. The spring 36 is sufficiently stiff to cause the shaft 10 to be moved with the worm so that in this operation the worm acts in every respect as if it were rigid on the shaft as heretofore. In case, however, both pins 32 are projected at the same time so that the shaft is being pulled both ways at once the spring 36 is further compressed as shown in Fig. 1 until the tooth 41 is drawn out of engagement with the teeth 40. The shaft 10 is then free to turn without turning the worm 34. It is not essential that said shaft be thus free to turn independently of the worm, but it is of this advantage, that otherwise the sleeve 35 would continue to move toward the right until it had run free of the pin 32. By the present construction it is not necessary to compress the spring 36 to such an extent as that. It will be seen that, with the yielding connection described, it is impossible for the machine to become locked up in the manner that has been heretofore referred to. As soon as the ribbon is wound on one of the spools or in case the spools have been removed, as soon as they have been replaced, one of them with ribbon on it, the pin 32 is easily withdrawn from the worm and the sleeve 35 is automatically snapped back into normal position by the spring 36 and the mechanism is ready for operation as usual.

I have devised another form of mecha-

nism for the same general purpose as the one above described and which other form of mechanism is described and claimed in my pending application filed Mch. 25, 1911, Serial No. 16,910. In that form of my invention, however, when the loose worm has been moved out of its normal relation to the shaft it is necessary to restore it by hand. The present form of the invention is preferable to that, in the respect that means are here provided for automatically restoring the parts to normal relation so that the mechanism does not require any attention on the part of the operator.

The broad principle of the present invention is applicable to various styles of automatic ribbon reversing mechanisms in which the difficulty hereinbefore referred to is liable to manifest itself. I therefore do not wish to limit my broader claims to the precise details of the construction shown nor to the precise sort of automatic reverse here shown. The invention itself is capable of modification and it is also capable of application to different styles of ribbon reversing mechanism.

What I claim as new and desire to secure by Letters Patent, is:—

1. 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, and to restore the parts automatically to normal relation when one or both of said automatic connecting means are thrown out of operation.

2. 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 means including a spring for transmitting the shifting motion under normal condition, said spring arranged to yield in case the automatic shifting means are brought into operation to act both ways at once and to restore the parts to normal relation when said shifting means are thrown out of operation.

3. 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 spring 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 and to resume its normal condition when said shifting means are thrown out of operation.

4. 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, a clutch connecting one of said drivers with said operating means, said clutch being disconnectible in case said automatic means is brought into operation to act both ways at once, and means for automatically restoring the clutch members to operative relation.

5. 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, a clutch connecting one of said drivers with said operating means, said clutch being disconnectible in case said automatic means is brought into operation to act both ways at once, and a spring for normally holding the clutch members in engagement and for restoring said clutch members to engagement when said automatic means are thrown out of operation.

6. 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, one of said spools arranged to yield in case said automatic means are brought into operation to act both ways at once, and means for automatically restoring said yielding part when the said automatic means are thrown out of operation.

7. 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 driving shaft for said spools having two pinions thereon, and said shaft being shiftable to cause said pinions to 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 a spring for holding said sleeve in and restoring it to normal relation with said shaft.

8. In a machine of the class described, the combination of a pair of ribbon spools, a driving shaft shiftable endwise to connect it with one or the other of said spools, a worm mounted on said shaft and slidably

endwise of said shaft, means for engaging
said worm to shift the shaft, a spring press-
ing said worm endwise along the shaft for
the purpose specified, and means for limit-
5 ing the motion of said worm along said shaft
under the impulse of said spring.

Signed at Springfield, in the county of

Hampden, and State of Massachusetts, this
21st day of April, A. D. 1911.

GEORGE A. GREENWOOD.

Witnesses:

F. A. CUTTER,

A. C. FAIRBANKS.