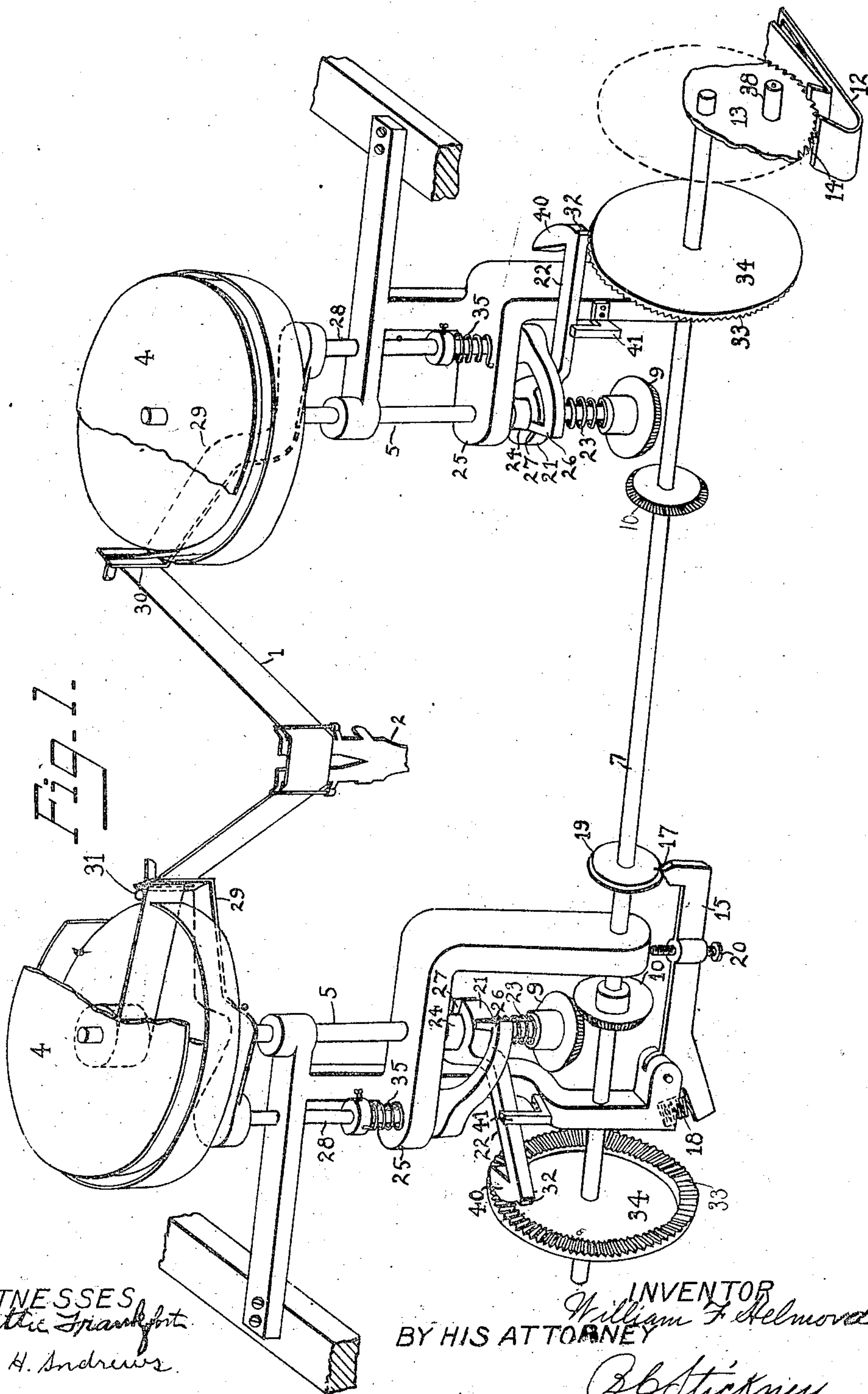


No. 828,548.

PATENTED AUG. 14, 1906.

W. F. HELMOND.  
TYPE WRITING MACHINE.  
APPLICATION FILED SEPT. 20, 1905.

2 SHEETS—SHEET 1.



WITNESSES  
*John Frankfort*  
*C. H. Andrews*

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*William F. Helmond*  
BY HIS ATTORNEY  
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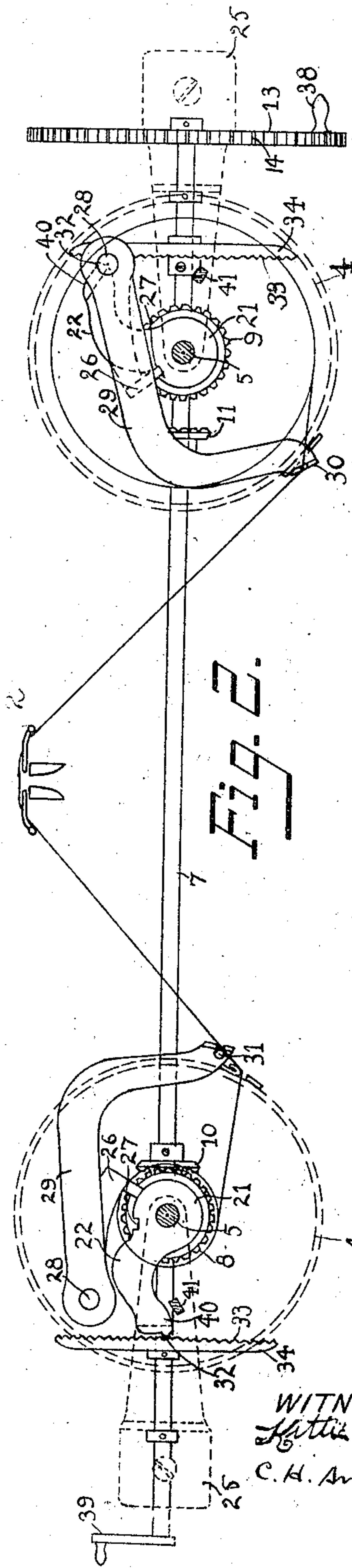


Fig. 2.

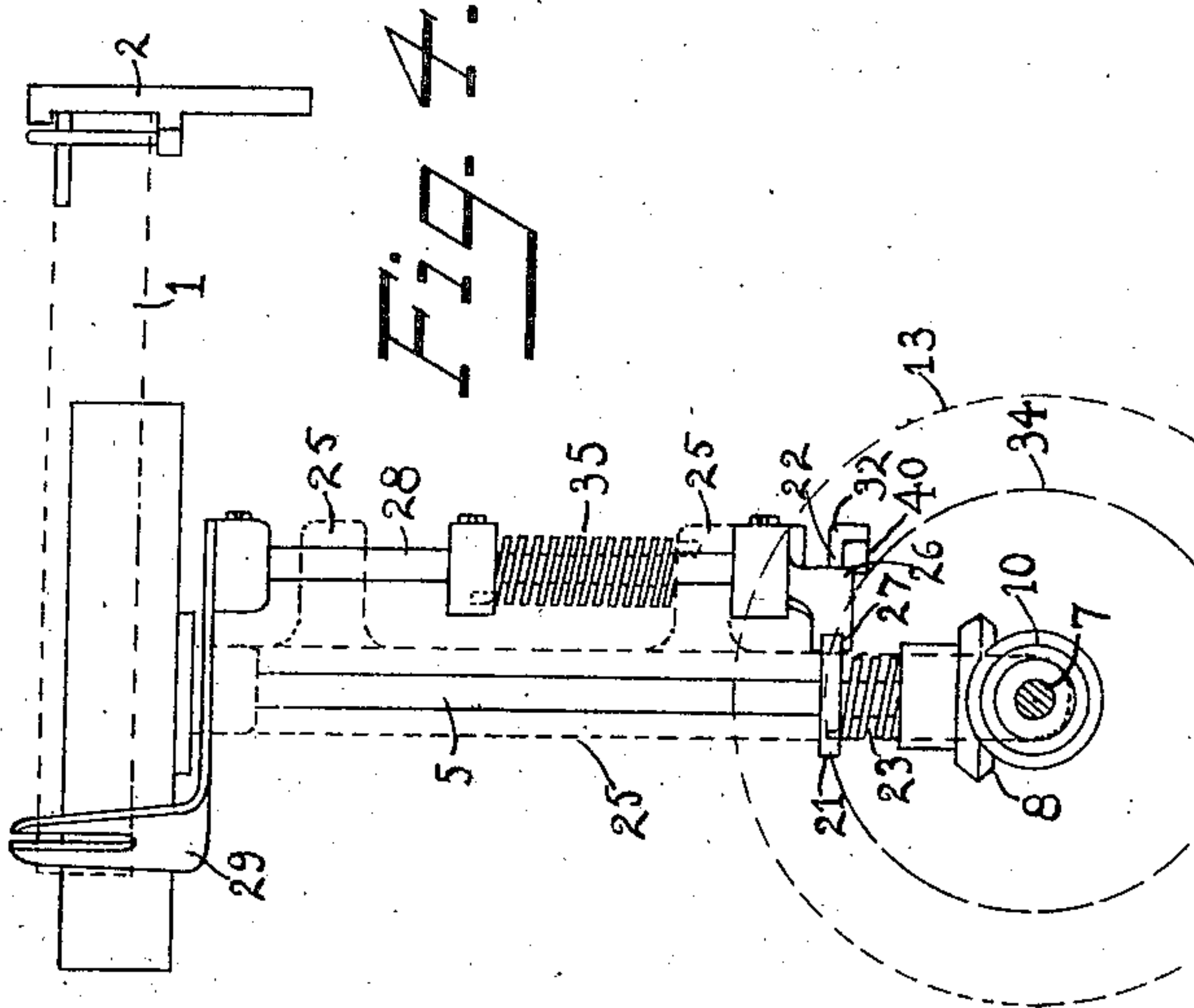


Fig. 4.

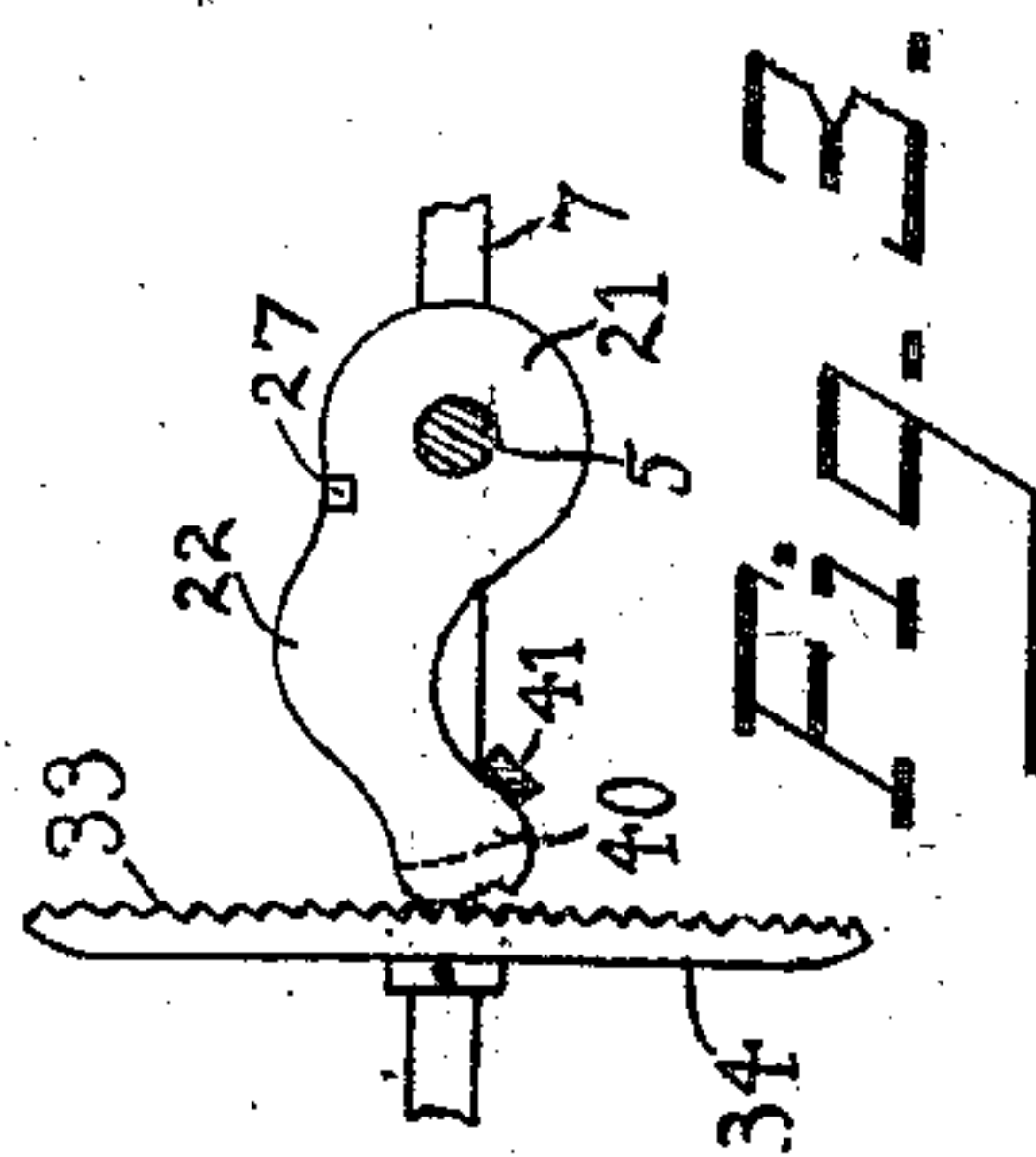


Fig. 3.

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# UNITED STATES PATENT OFFICE.

WILLIAM F. HELMOND, OF HARTFORD, CONNECTICUT, ASSIGNOR TO  
UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A  
CORPORATION OF NEW JERSEY.

## TYPE-WRITING MACHINE.

No. 828,548.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed September 20, 1905. Serial No. 279,295.

*To all whom it may concern:*

Be it known that I, WILLIAM F. HELMOND, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to means for feeding and automatically reversing the inking-ribbons of type-writing and other machines, and its object is to provide a device for this purpose which is simple in construction and reliable in operation, inexpensive to manufacture, and not liable to get out of order.

I illustrate my invention as applied to the well-known "Underwood" front-strike writing-machine, in which the spools are mounted in front of the platen and the ribbon is threaded through a carrier which vibrates up and down at the type-strokes to cover and uncover the printing-point. These spools are mounted upon vertical shafts, and I drive the latter by means of a horizontal transverse shaft, which is shiftable endwise to connect to either spool-shaft. When either spool becomes depleted of ribbon, the shifting of the driving-shaft is effected automatically. The power for effecting the shifting is supplied by the driving-shaft itself, upon each end of which I affix a wheel having crown-teeth adapted to be engaged by a shifter-arm, which is pivoted in such relation to said wheel that when it engages the teeth thereof the wheel rides upon the arm and is simultaneously forced in axial direction by the swinging of the arm, whereby the shaft is shifted. The arm is normally held out of use by a latch, and the latch is releasable by means of an obstruction placed upon the traveling ribbon.

In the accompanying drawings, Figure 1 is a perspective view of my improvements as applied to an Underwood front-strike writing-machine. Fig. 2 is a sectional plan of parts seen at Fig. 1. Fig. 3 illustrates a position which a shifter-arm may assume when the driving-shaft is being manually turned during the shifting operation. Fig. 4 is a sectional side view of the ribbon mechanism.

The ribbon 1 is threaded through a vibrator 2 and wound upon spools 4 4, the latter carried by vertical shafts 5 5, which are rotated

alternately by means of a transverse horizontal shaft 7. On the lower end of the spool-shafts are miter-gears 9 9 to mesh with gears 10 10, fixed upon driving-shaft 7, which is movable endwise to enable either pair of miter-gears to mesh. Said shaft 7 is rotated during the type-strokes by means of a pawl 12, engaging a ratchet-wheel 13, which is fixed upon the shaft, said reciprocating pawl having a tooth 14 of sufficient width to accommodate the axial movement of the ratchet-wheel as the shaft shifts. The shaft is held at either end of its shifting movement by a yielding detent consisting of a bar or lever 15, pivoted at 16 upon the framework and having a double-bevel tooth 17, which is caused by a spring 18 to engage a double-bevel collar 19, fixed upon the shaft 7, an adjustable stop-screw 20 limiting the throw of the lever 15. Each vertical spool-shaft 5 passes loosely through a hub 21 of a shift bar or arm 22. A compression-spring 23, coiled around the lower end of said shaft, bears at its lower end upon the gear 9 and at its upper end upon the hub 21 of said shifter-bar, whereby the latter is given a tendency to rotate with the shaft, said spring 23 pressing said hub against a collar 24, provided upon the shaft just beneath a fixed bearing 25. Said shifter-arm 22, however, is normally locked against rotation by means of a latch 26, fitting in a notch 27 in said hub 21. This latch is releasable, being fixed upon the lower end of a vertical rock-shaft 28, which has an arm 29 extending beneath the spool 4 and provided at its free end with a ribbon-guiding fork 30, through which the ribbon 1 is threaded. Obstructions 31 are provided upon the ribbon near its ends, and one of them will engage said fork 30 and rock the arm 29 and shaft 28 in a direction to withdraw the latch 26 from the notch 27. The latch is shown locked at the right hand and released at the left hand of Figs. 1 and 2. In this manner when the ribbon is nearly all paid off from the spool the shifter-arm 22 is freed from restraint and is caused by the friction-spring 23 to rotate with the shaft 5. By this means a tooth 32, formed upon the free end of said arm, is swung into engagement with crown-teeth 33, formed upon a wheel 34, fixed upon the driving-shaft 7. This wheel is always positively rotated by the shaft 7, and when it catches



the toothed end of the shifter-bar 22 it causes said bar to swing still further upon shaft 5.

As will be understood by reference to Fig. 2, the wheel 34 and the arm 22 act together togglewise—that is, the wheel rides upon the arm and the tooth 32 swings in such an arc that the wheel is gradually forced away from shaft 5—that is, in a direction axially of shaft 7. Wheel 34 and shaft 7 thus shift together until the detent-collar 19 on the shaft is forced over the point of the yielding tooth 17, whereupon the reaction of the spring 18 completes the endwise throw of the shaft and the gears 9 and 10 are brought into mesh and the ribbon begins to wind on the other spool. The friction-spring 23 causes the arm 22 to travel back with the shaft 5 at the reverse rotation of the latter and restores the arm 22 to normal position, and the latch 26 is again forced into the notch 27 by a spring 35. When the ribbon becomes all wound off from the spool, a similar reversing operation takes place at the other spool.

When it is desired to wind the ribbon manually, it is only necessary to turn either a crank 38, provided upon the wheel 13, or a crank 39, fixed upon the other end of the driving-shaft 7. Of course during such winding the direction of travel of the ribbon will become reversed in the manner already described, and it may happen that owing to the endwise pressure exerted unintentionally by the operator on the driving-shaft 7 the teeth 33 of the shifter-wheel (as seen at the left of Fig. 1) will be prevented from releasing the tooth 32 of the shifter-bar, but instead will tend to swing said shifter-bar still farther away from its normal position. In order to avoid any difficulty from this source, I provide upon each shifter-bar a heel 40, upon which the crown-teeth 33 may run without becoming locked against rotation, and I provide a stop 41 for preventing any greater overthrow of the shifter-bar, so that the winding of the ribbon will proceed properly notwithstanding the abnormal position in which the shifter-bar is thus unintentionally detained by the operator. At this time it will be seen at Fig. 3 that the shifter-bar or interponent 22 supports the shifter-wheel and shaft against accidental axial movement, or, in other words, locks the gears 10 in the positions to which they have just been shifted. Upon the release of the crank 38 or 39 the spring-detent moves the shaft 7 axially to the left from the Fig. 2 position a trifle—just enough to permit the wheel 34 to clear the shifter-bar—and the bar may thereupon be returned to normal position (seen at the right-hand portions of Fig. 1 and 2) by its shaft 5. It will be understood, however, that the heel 40 does not come into use when the reversing is effected through the agency of the devices which mechanically wind the ribbon, nor does the arm 22 swing forwardly

quite so far as seen at the left of Fig. 1, since the spring-tooth 17 snaps over the crown of the wheel 19 before the arm 22 quite reaches the forward position at the left of Fig. 1. The shifting parts at the right-hand side of Fig. 1 are in normal position. Those at the left-hand side are in positions to which they are brought abnormally by a careless action of the operator in continuing to wind the ribbon after its automatic reversal and simultaneously maintaining a manual endwise pressure upon the shaft 7 to prevent the normal endwise shifting movement of the latter. Ordinarily at the automatic reversing operation the arm 22 swings forwardly no farther than seen at the left side of Fig. 2, where the tooth on said arm stands in the same vertical plane as the axis of the shaft 7, and during the normal reversing operation the heel or guard 40 performs no function.

Having thus described my invention, I claim—

1. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable endwise to connect with either spool-shaft, toothed crown-wheels upon said driving-shaft, normally idle shifter-arms associated with said crown-wheels, and means controlled by the longitudinal movements of the ribbon for causing said shifter-arms alternately to move into engagement with the teeth of said crown-wheels and cooperate therewith to reciprocate said driving-shaft.

2. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a driving-shaft movable to connect with either spool-shaft, a pair of normally idle shifters, means called into action by the longitudinal movement of the ribbon for moving said shifters alternately into effective position, and a pair of devices mounted upon said driving-shaft to be engaged by said shifters so as to actuate the latter, and so as to be caused by reason of such actuation to reciprocate said shaft.

3. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a driving-shaft movable to connect with either spool-shaft, a pair of normally idle pivoted shifter-arms, wheels fixed on said driving-shaft and engageable by said shifter-arms in a manner to effect reciprocation of said shaft, and means controlled by the longitudinal movements of the ribbon for causing said shifter-arms alternately to move into engagement with said wheels.

4. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a driving-shaft movable endwise to connect with either spool-shaft, a pair of normally idle pivoted shifter-arms, a pair of wheels mounted upon said driving-shaft in position to engage and turn said shifter-arms and simultaneously ride thereon in such a



manner as to force said driving-shaft endwise, and means controlled by the longitudinal movements of the ribbon for effecting movement of the shifter-arms alternately into engagement with said wheels.

5. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a driving-shaft movable endwise to connect with either spool-shaft, a pair of normally idle pivoted shifter-arms having teeth, a pair of wheels mounted upon said driving-shaft and having teeth to engage the teeth on said shifter-arms and turn the latter so that said wheels and shaft are forced in endwise direction, means controlled by the longitudinal movements of the ribbon for effecting movement of the shifter-arms alternately into engagement with said wheels, and a spring for holding said driving-shaft at the extremes of its endwise movements.

6. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a driving-shaft movable endwise to connect with either spool-shaft, a pair of normally idle pivoted shifter-arms having teeth, a pair of wheels mounted upon said driving-shaft and having teeth to engage the teeth on said shifter-arms and turn the latter so that said wheels and shaft are forced in endwise direction, means controlled by the longitudinal movements of the ribbon for effecting movement of the shifter-arms alternately into engagement with said wheels, a spring for holding said driving-shaft at the extremes of its endwise movements; a ratchet-wheel fixed upon said driving-shaft, and a pawl reciprocated at the key-strokes and having a tooth of sufficient width to engage said ratchet-teeth at all positions of said driving-shaft.

7. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable into connection with either spool-shaft, wheels upon said driving-shaft, a pair of arms mounted loosely upon said spool-shafts, friction devices between said spool-shafts and said arms whereby the former may move the latter into engagement with said wheels, the latter being caused to ride upon said arms in a manner to shift said driving-shaft, and ribbon-controlled latches normally preventing engagement of said arms with said wheels.

8. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable into connection with either spool-shaft, wheels upon said driving-shaft, a pair of shifter-arms mounted loosely upon said spool-shafts, friction devices between said spool-shafts and said shifter-arms whereby the former may move the latter into engagement with said wheels, the latter being caused to ride upon said arms in a manner to shift said driving-shaft, a pair of rock-shafts, latches

fixed upon said rock-shafts and normally occupying notches in said shifter-arms, and arms upon said rock-shafts and having portions in the path of the ribbon so as to be operated by the latter.

9. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable endwise into connection with either spool-shaft, toothed wheels fixed upon said driving-shaft, arms mounted loosely upon said spool-shafts and frictionally connected thereto so as to be movable thereby into engagement with said wheels, the latter by riding upon said arms being caused to effect endwise movements of said driving-shaft, a pair of rock-shafts having latches to engage notches in said arms, a pair of arms projecting from said rock-shafts in position to be operated by obstructions placed upon the ribbon, springs for returning said rock-shafts to normal position, and yielding means for detaining said driving-shaft at the extremes of its endwise movements.

10. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable endwise to connect with either spool-shaft, wheels upon said driving-shaft, shifter-arms frictionally connected with said spool-shafts, means locking said arms against rotation, and ribbon-controlled means for releasing said arms to permit them to move into engagement with said wheels, the latter being capable of effecting further movement of said driving-arms and constructed to be forced by such further movement in a direction to carry said driving-shaft endwise.

11. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable to connect with either spool-shaft, wheels upon said driving-shaft, shifter-arms mounted concentrically with said spool-shafts and frictionally connected thereto, latches locking said shifter-arms against rotation, movable arms having eyes through which the ribbon is threaded, whereby obstructions placed upon the ribbon may move said arms, and connections from said movable arms to said latches to enable the ribbon to release the latter, to permit said shifter-arms to move into engagement with said wheels, the latter capable of effecting further movement of said arms, and constructed to be forced by such further movement in a direction to shift said driving-shaft.

12. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable to connect with either spool-shaft, wheels upon said driving-shaft, shifter-arms mounted upon said spool-shafts and frictionally connected thereto, latches locking said shifter-arms against rotation in either direction,



rock-shafts upon which said latches are mounted, returning-springs for said rock-shafts, and arms mounted upon said rock-shafts and extending into the path of the ribbon so as to be moved by the latter in a direction to withdraw said latches, to permit said shifter-arms to be moved by said spool-shafts into engagement with said wheels, the latter capable of both actuating and riding upon said shifter-arms in a direction to shift said driving-shaft.

13. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spools, of a driving-shaft movable into connection with either of said spools, a pair of wheels upon said driving-shaft, a pair of supports, a pair of normally idle interponents between said wheels and said supports, and means for enabling the longitudinal movement of the ribbon to move said interponents alternately into engagement with said wheels; the latter constructed to both actuate and ride upon said interponents in a direction to shift said driving-shaft.

14. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spools, of a driving-shaft movable into connection with either of said spools, a pair of interponents between said wheels and said supports, frictional devices operating at the longitudinal movements of the ribbon tending to move said interponents into engagement with said wheels, latches holding said interponents idle, and latch-releases controlled by the longitudinal movement of the ribbon; said wheels constructed to both actuate and ride upon said interponents in a direction to shift said driving-shaft.

15. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable endwise to connect with either spool-shaft, a yielding detent for holding said shaft at the limits of its endwise movements, toothed crown-wheels upon said driving-shaft, toothed shifter-arms frictionally connected with said spool-shafts, means holding said shifter-arms normally idle, and ribbon-controlled releases for said shifter-arms, the construction and arrangement being such that when released said shifter-arms swing into engagement with the teeth of said crown-wheels, and are thereupon continued in motion by the latter, and the relation of the shifter-arms to the crown-wheels being such that during the operation of the arms upon the wheels, the latter are forced axially together with said driving-shaft.

16. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable endwise to connect with either spool-shaft, a yielding detent for holding said shaft at the limits of its endwise movements, toothed crown-wheels upon said driving-shaft, toothed

shifter-arms frictionally connected with said spool-shafts, means holding said shifter-arms normally idle, ribbon-controlled releases for said shifter-arms, the construction and arrangement being such that when released said shifter-arms swing into engagement with the teeth of said crown-wheels, and are thereupon continued in motion by the latter, and the relation of the shifter-arms to the crown-wheels being such that during the operation of the arms upon the wheels, the latter are forced axially together with said driving-shaft; a crank upon said driving-shaft, and heels provided upon said shifter-arms to ride upon the teeth of said crown-wheels to keep the teeth of the shifter-arms out of engagement with the crown-wheels, for the purpose specified.

17. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a transverse driving-shaft movable endwise to connect with either spool-shaft, a yielding detent for holding said shaft at the limits of its endwise movements, toothed crown-wheels upon said driving-shaft, toothed shifter-arms frictionally connected with said spool-shafts, means holding said shifter-arms normally idle, ribbon-controlled releases for said shifter-arms, the construction and arrangement being such that when released said shifter-arms swing into engagement with the teeth of said crown-wheels, and are thereupon continued in motion by the latter, and the relation of the shifter-arms to the crown-wheels being such that during the operation of the arms upon the wheels, the latter are forced axially together with said driving-shaft; a crank upon said driving-shaft, and heels provided upon said shifter-arms to ride upon the teeth of said crown-wheels to keep the teeth of the shifter-arms out of engagement with the crown-wheels, for the purpose specified; the construction and arrangement being such that when said wheels are in operation, said shifter-arms extend longitudinally of said driving-shaft, and serve to lock the latter against accidental shifting during the turning of said crank.

18. In a ribbon-reversing mechanism, the combination with a ribbon-spool, of a driving-shaft movable endwise to connect therewith, a toothed crown-wheel upon said driving-shaft, a normally idle shifter-arm, and means controllable by a longitudinal movement of the ribbon for causing the shifter-arm to move into engagement with the teeth of said crown-wheel and cooperate therewith to connect said driving-shaft with said spool.

19. In a ribbon-reversing mechanism, the combination with a ribbon-spool, of a driving-shaft therefor, a normally idle shifter, means controllable through the movement of the ribbon for moving said shifter to effective position, a device mounted upon said driving-shaft to be engaged by said shifter so as



to actuate the latter, and so as to be caused by reason of said actuation to shift said shaft.

20. In a ribbon-reversing mechanism, the combination with a ribbon-spool, of a driving-shaft, said spool and shaft being relatively shiftable to enable said shaft to drive said spool, a normally idle shifter-arm, a wheel upon said shaft engageable by said shifter-arm in a manner to effect relative shifting movement between said spool and said shaft, and means controllable through the longitudinal movement of the ribbon for moving said shifter-arm into engagement with said wheel.

21. In a ribbon-reversing mechanism, the combination with a ribbon-spool shaft, of a driving-shaft connectible thereto, a normally idle shifter-arm, a wheel mounted upon said driving-shaft in position to engage and turn said shifter-arm and simultaneously ride thereon in such a manner as to effect relative shifting movement between said spool-shaft and said driving-shaft, and means controllable through the movements of the ribbon for effecting a movement of said shifter-arm into engagement with said wheel.

22. In a ribbon-reversing mechanism, the combination with a ribbon-spool, of a driving-shaft, a normally idle shifter-arm having

a tooth, a wheel mounted upon said driving-shaft and having teeth to engage said arm-tooth and turn the latter and thereby effect a relative shifting movement between said spool and said driving-shaft, means controllable through the movement of the ribbon for causing engagement between said wheel and said shifter-arm, and means for detaining said driving-shaft in connection with said ribbon-spool.

23. In a ribbon-reversing mechanism, the combination with a ribbon-spool, of a driving-shaft, a wheel connected to said driving-shaft, an arm frictionally connected to said spool, means releasable through the ribbon movement for holding said arm in idle position, said arm when released being movable during the ribbon movement into engagement with said wheel, and the latter being constructed to ride in axial direction upon said arm while turning the latter, and means for enabling such axial movement of the wheel to effect connection between said shaft and said spool.

WILLIAM F. HELMOND.

Witnesses:

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EDWIN C. SMITH.