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PATENTED AUG. 25, 1908.

F. A. HART.
RIBBON REVERSING MECHANISM.

APPLICATION FILED DEC. 21, 1904.

2 SHEETS—SHEET 1.

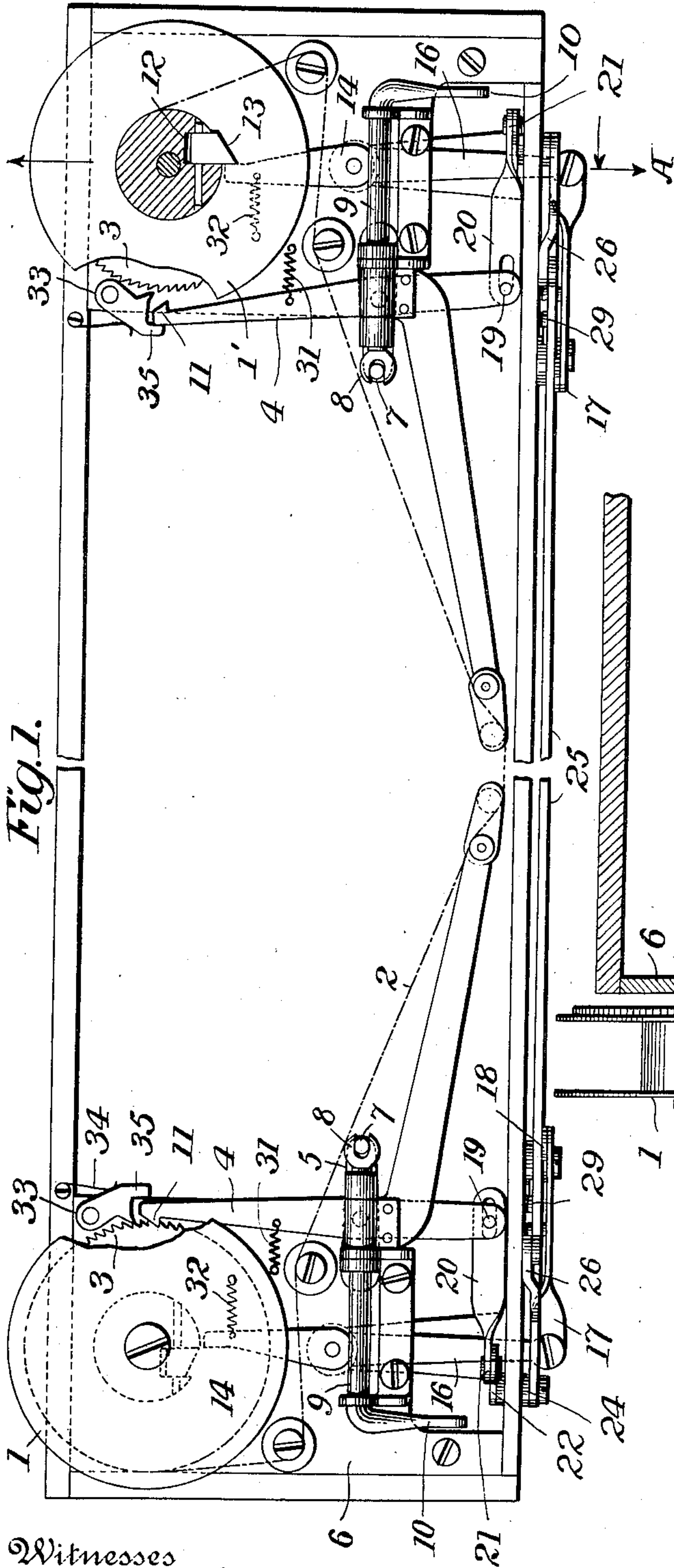


Fig. 1.

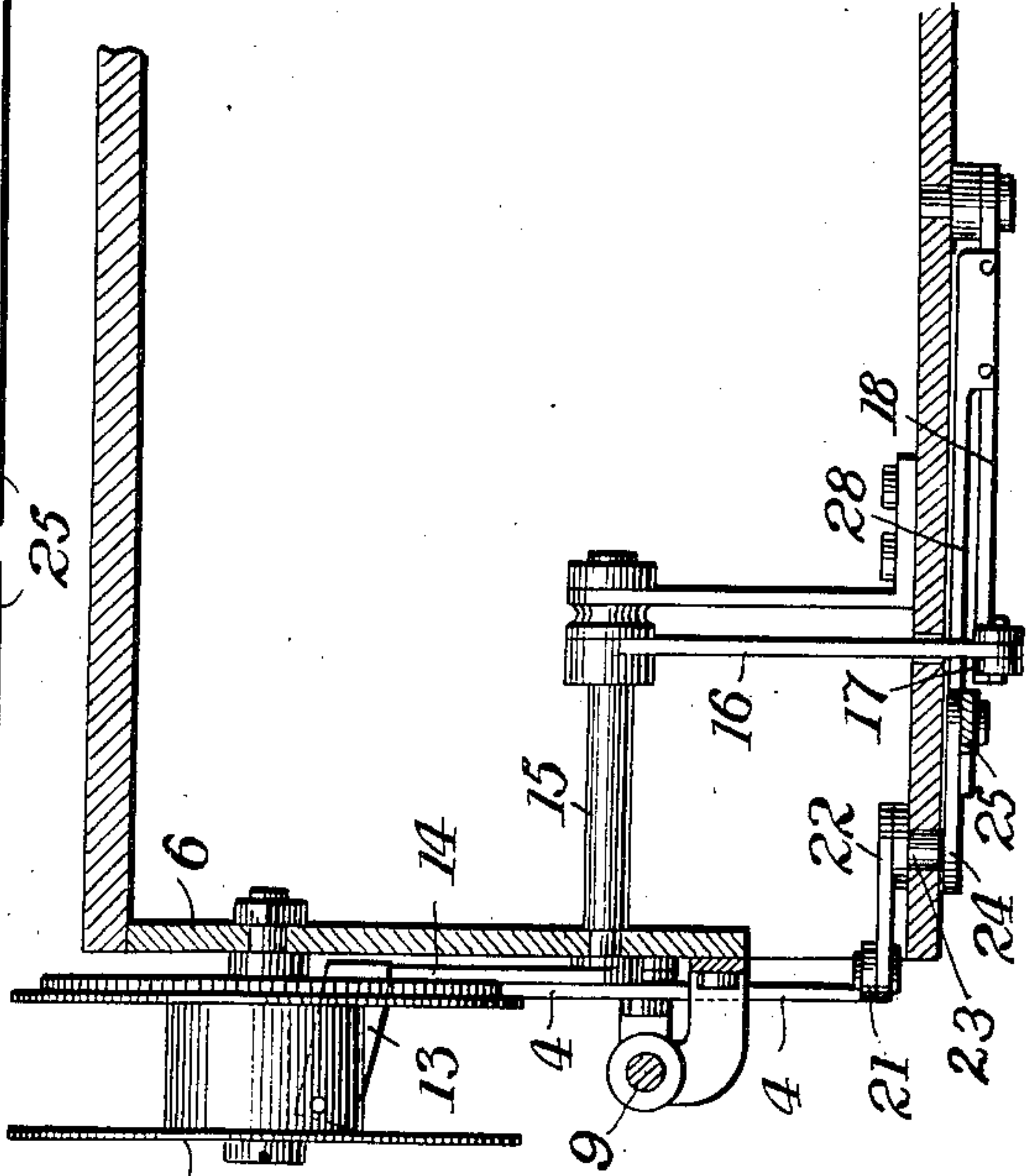


Fig. 2.

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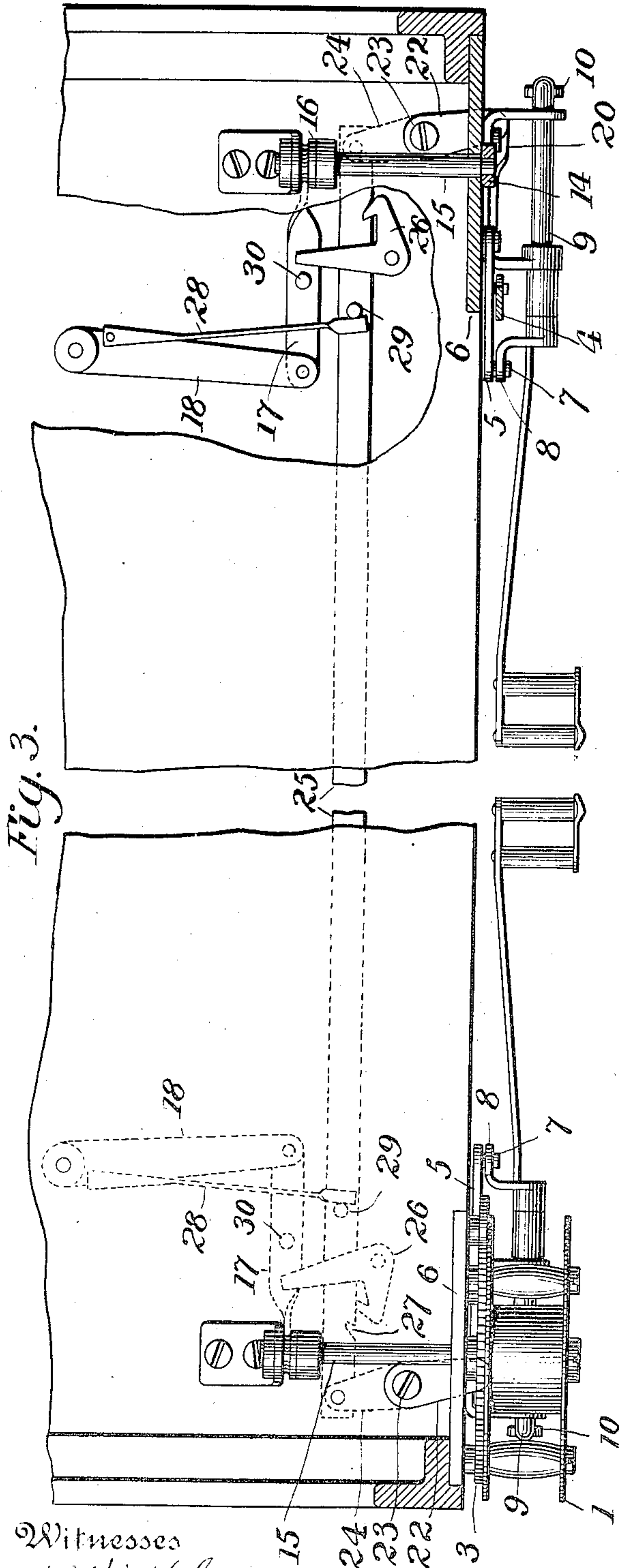
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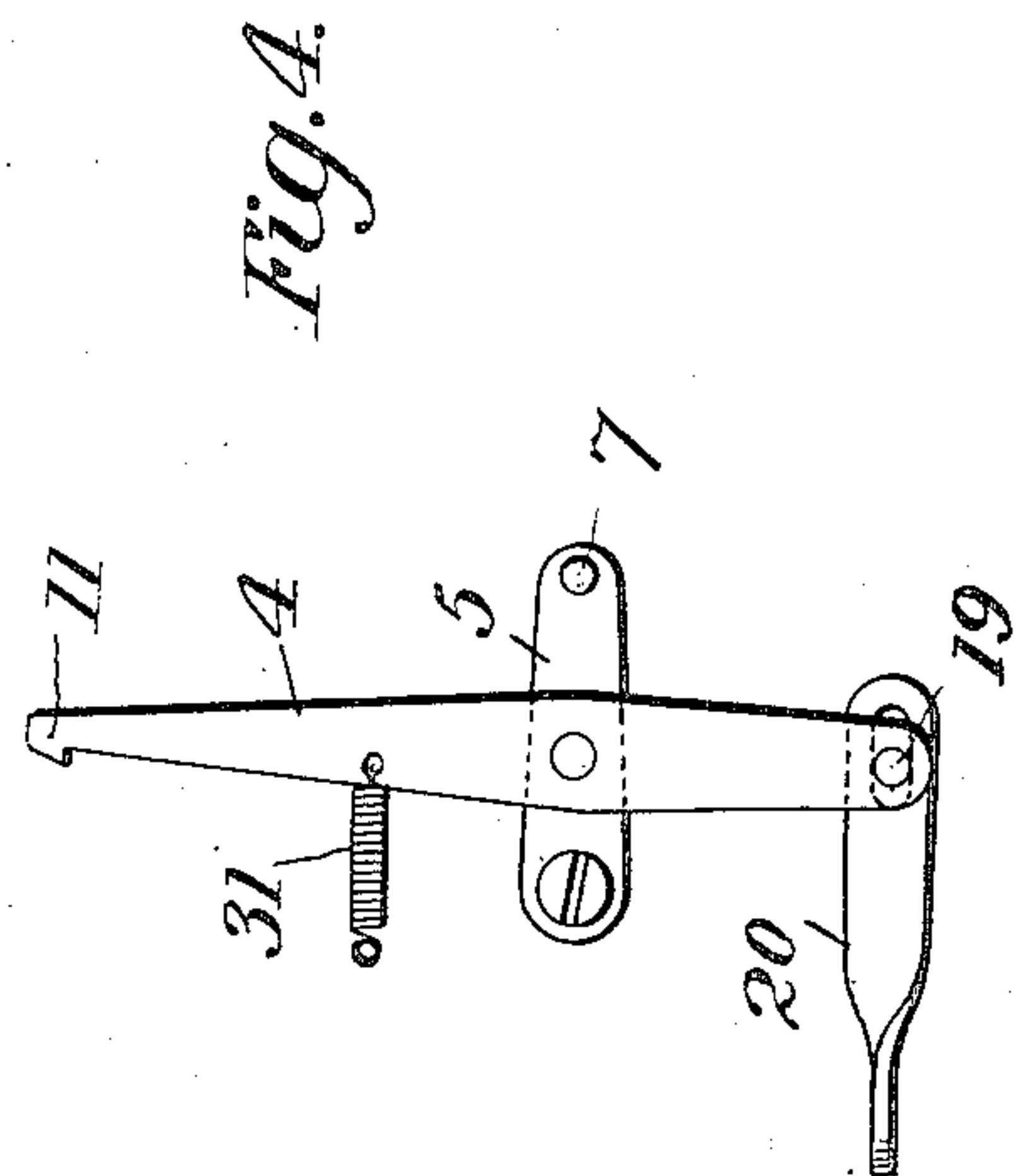
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2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

FREDERICK A. HART, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO NEW YORK ADDING TYPEWRITER COMPANY, OF ORANGE, NEW JERSEY, A CORPORATION OF MISSOURI.

RIBBON-REVERSING MECHANISM.

No. 896,825.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed December 21, 1904. Serial No. 237,829.

To all whom it may concern:

Be it known that I, FREDERICK A. HART, a citizen of the United States, residing at East Orange, Essex county, State of New Jersey, have invented certain new and useful Improvements in Ribbon-Reversing Mechanism, of which the following is a specification.

The present invention relates to improvements in ribbon mechanism for typewriters and particularly to a means for automatically reversing the movement of the ribbon when it has been sufficiently unwound from either of the spools.

In the accompanying drawings,—Figure 1 is a front elevation of the ribbon feeding mechanism of a top strike typewriting machine constructed in accordance with the present invention; Fig. 2 is a sectional view taken substantially on the line A—A of Fig. 1; Fig. 3 is a plan view; Fig. 4 is a detail.

Referring to the drawing, 1, 1' designate the ribbon spools to which the ends of the ribbon 2 are connected, such ribbon being guided between the spools by suitable devices. A ratchet 3 is secured to each spool and a feed pawl 4 is adapted to engage said ratchet to rotate the spool connected therewith. As the parts for operating each feed pawl and for shifting the same relative to its ratchet are the same for both spools but one of such sets of devices will be described.

The feed pawl 4 is pivotally mounted at an intermediate point of its length on a lever 5, one end of which is pivoted to a suitable frame plate 6 while the other end is provided with a laterally projecting pin or stud 7 that extends through a fork formed in an arm 8 secured on one end of a rock shaft 9. The shaft 9 is mounted in suitable bearings on the plate 6 and has at one end an arm 10 which is adapted to be connected with the universal bar of the typewriter, whereby whenever said bar is actuated the shaft 9 will be rocked in its bearings and through the pin 7 and lever 5 the feed pawl will be reciprocated longitudinally to cause its projecting tooth 11 to engage a tooth of the ratchet 3, when said pawl is in position to actuate the ratchet, and rotate the ribbon spool and feed the ribbon.

The feed pawls 4 are connected by suitable devices whereby they may be simultaneously rocked about their pivotal connections with the levers 5 to move one of such pawls into position to engage its co-acting ratchet 3 and move the other pawl out of engagement with

its ratchet. Means are provided for automatically causing such a shifting of the feed pawls whenever the ribbon has been substantially unwound from either spool. Such means will now be described.

Each spool has a slot 12 formed in its body and extending through one of the heads or flanges thereof and within such slot is pivotally mounted an arm 13 of such length as to project through the opening in the head or flange. Normally such arm is held in a position parallel to the spool axis by the coil of ribbon. When, however, the ribbon has been unwound a sufficient extent to uncover the face of said arm, the latter, as the spool rotates, will automatically fall away from the spool axis into the position shown in Fig. 2 and at the right hand side of Fig. 1. When such arm is in the position last described, its free end, projecting beyond the adjacent face of the spool flange, will contact with an arm 14 mounted on and extending upwardly from one end of a rock shaft 15, to which shaft is also secured a depending arm 16 that extends through a suitable slot in the machine frame and is connected by a link 17 with one end of a lever 18. A pin or stud 19 projecting laterally from the feed pawl 4 extends through a slot formed in a link 20 near one end thereof, the other end of said link being connected as at 21 with one arm 22 of a lever fulcrumed at 23. The other arm 24 of said lever is connected to one end of a shift bar 25 which extends from one spool feeding mechanism to the other and is adapted to be moved longitudinally whenever the movement of the ribbon is reversed.

Means are provided for holding said shift bar at the termination of its movement in either direction, such means, as shown, consisting of holding pawls 26, each adapted to engage a notch 27 formed in one edge of said bar. To the lever 18 is secured a spring arm 28, the free end of which bears against a stud 29 on the shift bar 25.

It will be seen that in the embodiment of the invention illustrated in the accompanying drawing, the lever arms 22, 24 are arranged respectively above and below the horizontal frame plate in which their fulcrum or pivot 23 is mounted and that the shift bar, lever 18 and link 17 are arranged below such plate.

When the arm 13 of either spool is released and by the rotation of the spool in an

unwinding direction is brought against the arm 14, the rock shaft 15 will be turned and the link 17 adjacent the spool from which the ribbon is being unwound will be drawn toward said spool and such movement of the link 17 acting through the lever 18 will place the spring arm 28 under tension but the shift bar 25 is prevented from moving for a limited time in the direction which said spring arm tends to move it by the pawl 26. Continued movement of the link 17, however, brings a trip pin 30 against the tail of the operative holding pawl and rocks such pawl from engagement with the shift bar which is then instantly moved in the direction of the spool from which the ribbon is being unwound by the pressure exerted by the spring arm 28. Longitudinal movement of the shift bar 25, as above explained, rocks the lever arms 24, 22, adjacent both spools and, through the links 20, the feed pawls 4 are rocked about their pivots on the levers 5 to move the one previously engaged with its ratchet to inoperative position and bring the previously disengaged pawl into operative relation to its ratchet. By this means an instantaneous reversal of the movement of the ribbon is effected. Each feed pawl is constantly drawn toward its ratchet 3 by a spring 31 connecting such pawl with the plate 6.

It will be seen that the arm 13 is provided with a beveled face. In case said arm is not fully moved within the slot 12 during the first revolution of the spool in winding, it will be forced into said slot as the beveled surface thereof passes over the arm 14 and after the spool has made a complete revolution the arm will be retained in position by the ribbon wound thereon. To prevent any sudden shock when the arm 13 is passing the arm 14 during such winding, the arm 14 may be mounted to yield slightly in the direction of the winding movement of the spool, a spring 32 acting to restore the arm to the position shown in Fig. 1 after it has been moved by the arm 13 passing thereover.

A holding dog 33 is provided for engagement with each spool ratchet, such dog being pivotally mounted on the frame of the machine and pressed toward the adjacent ratchet by a spring 34. A projection 35 on said holding dog extends downwardly beyond the upper end of the feed pawl 4 whereby when said feed pawl is rocked about its pivot as above described, it will act to withdraw the holding dog from engagement with the ratchet.

The joint 21 between the link 20 and the lever arm 22 is made sufficiently loose to permit the slight vertical movement of the link 20 required during each reciprocation of the feed pawl. The parts are so arranged that the pin or stud 19 of the feed pawl which is in operation normally stands about

midway of the slot in the link 20 so that such operative feed pawl will be moved from engagement with its ratchet prior to the other pawl being brought into operative position.

From the drawing and the foregoing description it will be seen that the present ribbon feeding mechanism avoids the use of driving shafts and gears for rotating the spools and provides a very simple and rapidly acting reversing means. The initial movement of the reversing devices causes the spring arm 28 to exert pressure on the shift bar, or places such arm under tension and as soon as said bar is released from its holding means the shifting of the feed pawls is instantly accomplished by the movement produced by the spring arm.

In the foregoing description there has been described and the drawing illustrates an embodiment of this invention which has been found satisfactory. It is evident, however, that there may be changes or variations in the construction without departing from or sacrificing any of the advantages of the invention.

Having thus described the invention what I claim is,—

1. In a typewriting machine, the combination with a ribbon spool and a ratchet connected thereto, of a vertically reciprocating feed pawl mounted to rock about a pivot at its lower end to and from a position where it will engage the ratchet when reciprocated, and a movable holding dog normally engaging the ratchet above the feed pawl and having a projection extending into the path of movement of the feed pawl when the latter is rocked about its pivot away from the ratchet, whereby when the feed pawl is moved to inoperative position the holding dog will be disengaged from the ratchet.

2. In a typewriting machine, the combination with a ribbon spool and a ratchet connected thereto, of a reciprocating feed pawl mounted to rock about a pivot to and from a position where it will engage the ratchet when reciprocated, a movable holding dog normally engaging the ratchet and having a projection extending into the path of movement of the feed pawl when rocked about its pivot, whereby when the feed pawl is moved to inoperative position the holding dog will be disengaged from the ratchet, and means controlled by the ribbon on the spool for rocking the feed pawl out of position where it will engage the ratchet.

3. In a typewriting machine, the combination with a ribbon spool and a ratchet connected thereto, of a lever adapted to be vibrated by the universal bar of the machine, a feed pawl pivotally connected to said lever and provided at its free end with means for engaging the ratchet of the ribbon spool, independent means actuated by the ribbon

spool for rocking the feed pawl about its pivot, and a holding dog normally engaging the ratchet and adapted to be moved from engagement therewith by rocking the feed pawl about its pivot.

4. In a typewriting machine, the combination of a ribbon spool having a slot formed in its body and extending through one head or flange, a ratchet connected with the spool, a feed pawl movable to and from a position to engage the ratchet, means for reciprocating said pawl to rotate the ratchet and spool, a movable holding dog adapted to engage the ratchet and to be disengaged therefrom by movement of the feed pawl away from the ratchet, a lever connected with the feed pawl and extending along the outer face of the slotted flange or head of the spool, and an arm pivotally mounted within the slot in the spool and having one end projecting beyond the slotted flange, said arm being normally held out of the path of the pawl shifting lever by the ribbon wound on the spool, whereby as the ribbon is unwound said arm will fall away from the body of the spool, into position to contact with said pawl shifting lever as the spool rotates, and move both the feed pawl and holding dog away from the ratchet.

5. In a typewriting machine, the combination of two ribbon spools and a ribbon connecting the same, of pawl and ratchet devices for rotating the spools, means connecting the feed pawls and adapted to move one of said pawls into operative position as the other is moved from engagement with its ratchet, said means including a longitudinally movable shift bar, two holding pawls adapted to alternately engage said shift bar and hold it at the termination of its movement in opposite directions, and means actuated by the spool from which the ribbon is unwound for releasing the operative holding pawl and shifting said bar and feed pawls connected therewith to reverse the movement of the ribbon.

6. In a typewriting machine, the combination with a pair of ribbon spools, a ribbon connecting said spools, and means for rotating the spools and adapted to engage them alternately, of means for holding said rotating means in engagement with the spool engaged thereby, a spring connected with said spool rotating means, and means actuated by one of the spools as the ribbon is unwound therefrom adapted to place said spring under tension and thereafter release said holding means and permit the said spring to disconnect the rotating means from the spool previously engaged thereby and connect such means with the other spool.

7. In a typewriting machine, the combination with a pair of ribbon spools, a ribbon connecting said spools, and pawl and ratchet mechanism for rotating the spools, of a bar

connected with the feed pawls of both spools and adapted to be moved longitudinally as said pawls are shifted to connect one or the other of the spools with the pawl actuating devices, means for holding said bar stationary at the limit of its movement in either direction, a spring connected with said bar, and means actuated by either spool as the ribbon is unwound therefrom to place said spring under tension and thereafter release said holding means and permit the spring to shift the bar and feed pawls to reverse the movement of the ribbon.

8. In a typewriting machine, the combination with a pair of ribbon spools, a ribbon connecting said spools, and pawl and ratchet mechanism for rotating the spools, of a bar connected with the feed pawls of both spools and adapted to be moved longitudinally as said pawls are shifted to connect one or the other of the spools with the pawl actuating devices, holding pawls adapted to alternately engage said bar at the termination of its movement in either direction, a spring connected with said bar, and means actuated by the spool from which the ribbon is unwound and adapted to place said spring under tension and thereafter release the holding pawl then engaging said bar and permit the spring to shift said bar and feed pawls to reverse the movement of the ribbon.

9. In a typewriting machine, the combination of a pair of ribbon spools, a ribbon connecting said spools, means for rotating the spools and adapted to engage them alternately including a longitudinally movable bar, two springs connected with said bar, means for normally holding said bar stationary and the spool rotating means connected therewith in engagement with one of the spools, and means actuated by either spool, as the ribbon is unwound therefrom adapted to place one of said springs under tension and thereafter release the holding pawl then engaging said bar and permit the spring to shift said bar to disconnect the rotating means from one spool and connect such means with the other spool.

10. In a typewriting machine, the combination of two spools, a ribbon connecting said spools, means for rotating the spools and adapted to engage them alternately, said means being connected by a longitudinally movable bar, two springs connected with said bar, means for normally holding said bar stationary and the spool rotating means in engagement with one of the spools, an arm pivotally mounted on each spool and adapted to be held in inoperative position by the ribbon wound on said spool, and levers each adapted to be actuated by one of said pivoted arms, when the latter is released by the unwinding of the ribbon from the spool, to place one of said springs under tension and thereafter disconnect the bar from its

holding means and permit the spring to shift said bar and disconnect the rotating means from one spool and connect such means with the other spool.

11. In a typewriting machine, the combination of two spools, a ribbon connecting said spools, means for rotating the spools and adapted to engage them alternately, said means being connected by a longitudinally movable bar, two springs connected with said bar, holding pawls adapted to alternately engage said bar at the termination of its movement in either direction, and retain the spool rotating means in engagement with one of the spools, an arm pivotally mounted on each spool and adapted to be held in inoperative position by the ribbon wound on the spool, and two levers each adapted to be actuated by one of said pivoted arms, when the latter is released by the unwinding of the ribbon from the spool, to place one of said springs under tension and thereafter disconnect the operative holding pawl and permit the spring to shift said bar and disconnect the rotating means from one spool and connect such means with the other spool.

12. In a typewriting machine, the combination of two spools, a ribbon connecting said spools, means for rotating the spools and adapted to engage them alternately, said means including a longitudinally movable bar, two pivotally mounted spring arms each bearing against a projection on said bar, holding pawls adapted to engage the bar at the termination of its movement in either direction, and hold the spool rotating means in engagement with one of the spools, and means controlled by the unwinding of the ribbon from either spool for placing one of said spring arms under tension and then releasing the operative holding pawl and permit said spring arm to shift said bar and disconnect the rotating means from one spool and connect such means with the other spool.

13. In a typewriter, the combination with a ribbon spool, and a ratchet connected thereto, of a rock shaft adapted to be connected to the universal bar of the typewriter, a lever mounted independently of and adapted to be rocked by said shaft, and a feed pawl pivotally mounted on said lever and adapted to intermittently engage the ratchet as the shaft is rocked.

14. In a typewriter, the combination with a ribbon spool, and a ratchet connected thereto, of a rock shaft adapted to be connected to the universal bar of the typewriter, a lever adapted to be rocked by said shaft, and extending substantially parallel with said rock shaft, and a feed pawl pivotally mounted on said lever and adapted to intermittently engage the ratchet as said shaft is rocked.

15. In a typewriter, the combination with a ribbon spool, and a ratchet connected thereto, of a rock shaft adapted to be connected to the universal bar of the typewriter, a lever adapted to be rocked by said shaft, a feed pawl pivotally mounted at an intermediate point of its length on said lever and having adjacent one end a projection adapted to intermittently engage the ratchet as said shaft is rocked, and means controlled by the ribbon on the spool for vibrating said pawl on its pivot to move the projection thereon away from the ratchet.

16. In a typewriter, the combination with a ribbon spool, and a ratchet connected thereto, of a rock shaft adapted to be connected to the universal bar of the typewriter, a lever mounted independently of and adapted to be rocked by said shaft, a feed pawl pivotally mounted on said lever and adapted to intermittently engage the ratchet as said shaft is rocked, a holding dog adapted to engage the ratchet to prevent movement thereof in a direction opposite that in which it is moved by the pawl, and means controlled by the ribbon on the spool for moving both said pawl and dog from the ratchet.

17. In a typewriter, the combination with a ribbon spool, and a ratchet connected thereto, of a rock shaft adapted to be connected to the universal bar of the typewriter, a lever adapted to be rocked by said shaft, a feed pawl pivotally mounted on said lever and adapted to intermittently engage the ratchet as said shaft is rocked, a holding dog adapted to engage the ratchet to prevent movement thereof in a direction opposite that in which it is moved by the pawl, and means controlled by the ribbon on the spool for moving the pawl away from the ratchet, said pawl being adapted during such movement to withdraw the said dog from engagement with the ratchet.

18. In a typewriter, the combination of two spools, a ratchet mounted on each spool, a ribbon connecting the spools, feed pawls adapted to be reciprocated and intermittently engage the ratchets and each adapted to be rocked about a suitable pivot to and from a position where it will engage the ratchet when reciprocated, means connecting said feed pawls including a longitudinally movable bar, having notches formed therein near its ends, holding pawls each adapted to engage one of said notches, said pawls alternately engaging said bar, pivotally mounted spring arms engaging said bar at points between said notches, and means controlled by the unwinding of the ribbon from either spool for placing one of said spring arms under tension and then releasing the operative holding pawl and permit the spring arm to shift said feeding pawls and reverse the movement of the ribbon.

19. In a typewriter, the combination of

two spools, a ratchet connected to each spool, feed pawls adapted to engage said ratchets, means connecting said feed pawls and including a longitudinally movable bar, holding
5 pawls adapted to alternately engage said bar, pivotally mounted spring arms engaging said bar, and means adapted to be actuated by either spool as the ribbon is unwound therefrom to place one of said spring arms
10 under tension and thereafter release the operative holding pawl and permit said spring arm to shift the feed pawls and reverse the movement of the ribbon.

20. In a typewriter, the combination of
15 two spools, a ratchet connected to each spool, feed pawls adapted to engage said ratchets, means connected to said feed pawls and including a longitudinally movable bar, holding pawls adapted to alternately engage said
20 bar, levers 18 mounted at one side of said bar, spring arms connected at one end to said

levers and having their other ends engaging said longitudinally movable bar, and links connecting said levers with means adapted to be moved by the spools as the ribbon is un- 25 wound therefrom, each of said links being adapted to move one of the holding pawls to inoperative position, whereby when the ribbon is unwound from either spool one of said spring arms will be placed under tension and 30 thereafter the operative pawl will be disengaged from the longitudinally movable bar and the latter shifted by the spring to reverse the movement of the ribbon.

In testimony whereof I have signed my 35 name to this specification in the presence of two subscribing witnesses.

FREDERICK A. HART.

Witnesses:

JNO. T. LANGHORNE,
E. C. BOTAILE.