June 28, 1938. R. G. BOWER 2,121,853

TYPEWRITER

Filed Dec. 4, 1936 2 Sheets-Sheet 1

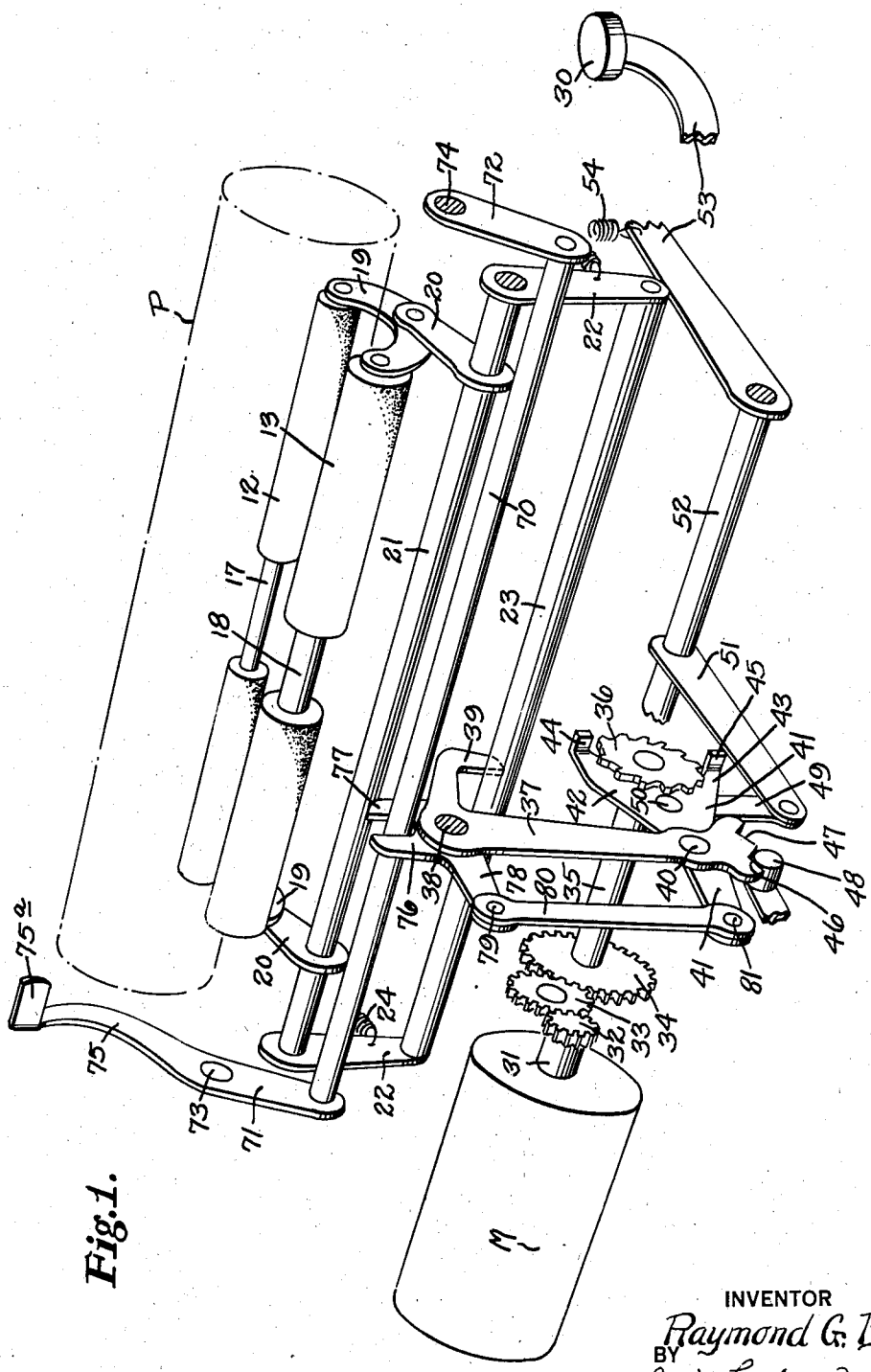


Fig. 1.

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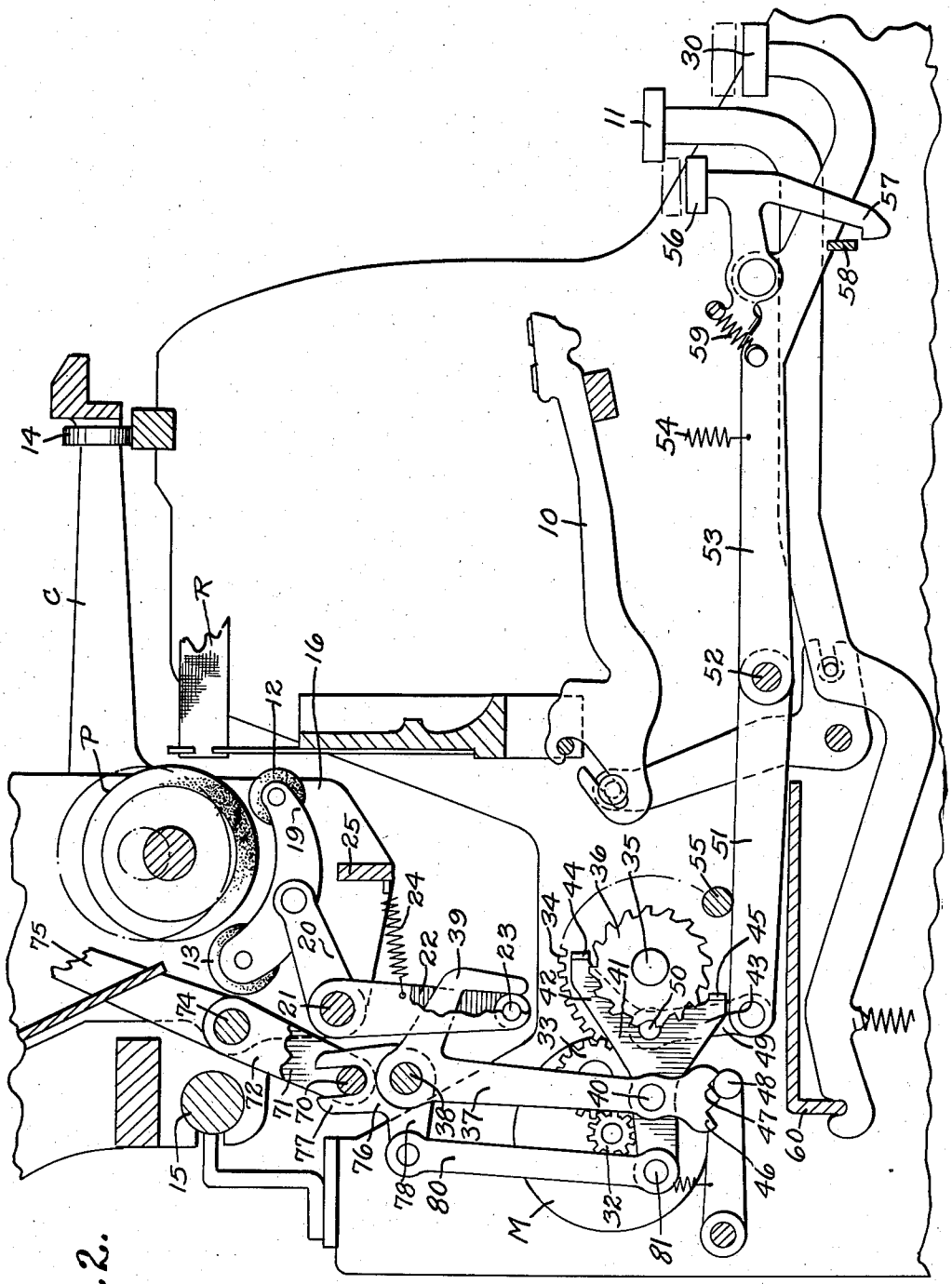


Fig. 2.

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UNITED STATES PATENT OFFICE

2,121,853

TYPEWRITER

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Application December 4, 1936, Serial No. 114,153

22 Claims. (Cl. 197—138)

This invention relates to typewriters and it has to do particularly with feed roll mechanism therefore. It is especially useful in power-operated typewriters.

The general object of this invention is to provide an improved typewriter having provision for power operation.

Another object is to provide an improved feed roll mechanism for typewriters.

A further object is to provide a power-operated feed roll mechanism for typewriters, including means by which the feed rolls may be positively moved into and away from operative position relative to a platen by power means.

Additional objects are to provide a power-operated feed roll mechanism including a control key conveniently located with respect to the operator, enabling the operator to easily and quickly render the power means effective to move the feed rolls both toward and away from the platen; to provide power-transmitting mechanism adapted to automatically disconnect the power means from the feed roll mechanism upon movement of the feed rolls to either its operative or released position with respect to the platen; and to provide simple, inexpensive and efficient mechanism for carrying out all of the foregoing features, which mechanism may be readily applied to known typewriter constructions.

Other objects and advantages will become apparent as this description progresses, and by reference to the drawings, wherein,—

Figure 1 is a perspective view of feed roll mechanism embodying this invention, the parts being illustrated in the positions that they assume when the feed rolls are in operative paper-holding position with respect to the platen; and

Fig. 2 is a left-side sectional elevational view of one form of typewriter construction embodying the feed roll mechanism of Fig. 1, the parts of such mechanism being shown in the positions that they assume when the feed rolls are moved to an inactive or released position with respect to the platen.

General construction

In the drawings, only those parts of the typewriter necessary for an understanding of this invention have been illustrated in detail. So far as general structure is concerned, the typewriter may take any suitable form to which this invention is adaptable.

The typewriter shown in Fig. 2 is of a type embodying a traveling paper carriage C, a case-shiftable platen P and type bars 10 adapted to be moved against the platen P to make an impression on the paper through the medium of a ribbon R upon the depression of a type bar key 11. It further embodies front and rear feed rolls 12 and 13 that are urged into engagement with the platen P to hold the paper (not shown) in position thereon, which rolls are movable away from the platen to permit ready adjustment and removal of the paper.

The traveling paper carriage C, which may be operated under the control of suitable escapement mechanism (not shown), is supported by a front roller 14 and a rear slide shaft 15 (Fig. 2). An inner frame 16, which rotatably supports the platen P, is carried by the carriage C, and this frame 16 is shiftable along with the platen by suitable case-shift mechanism (not shown) from a lower case position to an upper case position, and vice versa (Fig. 2). As will become obvious from the following description, the invention may well be used in connection with other case-shifting arrangements, such, for example, as one in which the type bars 10 are moved up and down relative to the platen for a case-shifting operation.

The feed roll mechanism may take any suitable form, including any desired number and arrangement of feed rolls. The arrangement illustrated includes front and rear feed roll shafts 17 and 18 (Fig. 1) supporting the feed rolls 12 and 13, respectively, and having their opposite ends rotatably supported by rocker arms 19. The rocker arms 19 are rotatably supported by arms 20 fixed to a rock shaft 21 having its opposite ends rockably supported by the platen supporting frame 16. The rock shaft 21 is further provided, adjacent its opposite ends, with depending fixed arms 22, the lower ends of which support a cross-shaft 23. Any suitable means may be employed for urging the feed rolls toward and into engagement with the platen. The structure shown includes springs 24 (Fig. 2) between the arms 22 and a crossbar 25 carried by the platen frame 16. These springs 24 tend to constantly urge the feed rolls 12, 13, through the shafts 21 and 23, in a counterclockwise direction (as viewed in the drawings) toward and into engagement with the platen P. It will be seen, however, that by rocking the shaft 21 and associated parts in a clockwise direction, the feed rolls 12, 13 are moved away from the platen P in opposition to the urge of the springs 24.

This invention provides power means for rocking the shaft 21, to, in turn, move the feed rolls 12 and 13 both away from and into engagement with the platen P, thereby facilitating manipu-

lation of the machine by the operator. This invention has particular utility in machines employing wide carriages, and where a considerable resistance is offered by the feed roll mechanism to movement of the same away from the platen. One form of mechanism for carrying out this feature of my invention will now be described.

Power control means

Power may be supplied by any suitable motor means and, preferably, by an electric motor M. The motor M is momentarily connected to the feed roll rock shaft **21** by depressing a key **30** located at the front of the machine conveniently to the operator. This connection is effected through a series of drive connections of such character that continued drive movement of the motor M breaks the driving connection between it and the shaft **21** when such shaft has been moved the desired extent to fully engage the feed rolls with the platen or to fully release them therefrom. The arrangement further includes means by which the drive connections, once they have been moved to either feed roll position, are held in that position until released by the operator.

More particularly, the motor M, which is preferably (but not necessarily) of a continuous rotating type, is provided with a shaft **31** (Fig. 1) connected by suitable reducing gears **32**, **33** and **34** to a shaft **35** which supports a ratchet wheel **36**. The ratchet wheel **36** is operatively connected to the feed roll support mechanism, upon depression of the feed roll key **30**, by the following mechanism:

An upright lever **37**, having its upper end pivotally carried by a suitable support **38**, is mounted approximately midway of the sides of the machine to accommodate, as will be seen from the following description, movement of the carriage C to its full extent in both directions. The lever **37** is provided with an arm **39** extending forwardly and downwardly from its pivotal support **38** behind the cross-shaft **23**. The relation of the arm **39** with respect to the shaft **23** is such that, upon clockwise movement of the lever **37**, the arm **39** operatively engages and moves the shaft **23** in a similar direction. The depending part of the arm **39** is also of sufficient length to accommodate movement of the platen (and shaft **23**) between upper and lower-case positions without affecting the position of the feed rolls. That is to say, with this arrangement, the position of the feed rolls is not affected by case-shift operations and the feed rolls may be disengaged from and engaged with the platen while the platen is in either its upper or lower-case position.

The lower end portion of the lever **37** pivotally supports, at **40**, a pawl member **41** having a bifurcate forward portion providing pawl arms **42** and **43** having laterally turned end portions providing lugs **44** and **45** between which the ratchet wheel **36** is received. The lower end of the lever **37**, below the pawl pivot **40**, is provided with downwardly opening notches **46** and **47** which are adapted to receive a feed roll positioning detent **48**, by which the feed roll mechanism is held in either position with respect to the platen when the motor M is disconnected therefrom.

The pawl arms **42** and **43** are so spaced apart that, when the pawl **41** is in neutral position, the lugs **44** and **45** are normally out of engagement with the teeth of the ratchet wheel **36**, but either of these lugs may be moved into engagement with such teeth for motor drive connection by reciprocating the pawl **41** in appropriate direction about its pivotal support **40**. The pawl is maintained normally in a neutral position by a link **49** having its upper end pivotally connected at **50** to the forward end of the pawl **41** and pivotally connected at its lower end to an arm **51** rigidly secured to a rock shaft **52**, the purpose of which will be described more fully hereinafter.

Assuming that the feed rolls **12** and **13** are engaged with the platen, they may be moved away from the platen by depressing the feed roll key **30**, thereby effecting power drive engagement between the ratchet wheel **36** and the pawl **41**. Specifically, the key **30** is carried by an arm **53** fixed to the rock shaft **52** which is suitably journaled in the typewriter frame. The arm **53** is constantly urged upwardly by a spring **54** connected to its upper edge and to a convenient part of the machine. The key **30** is located adjacent one side of the keyboard of the machine, and it is to be understood that a similar key and supporting arm may be located on the opposite side of the machine so that the rock shaft **52** may be actuated similarly from either side of the machine. The rock shaft **52** is connected to the pawl **41** by the arm **51** and link **49** as above described.

In the use of the foregoing structure, assuming that the feed rolls **12**, **13** are engaged with the platen (Fig. 1), depression of the feed roll key **30** rotates the cross-shaft **52** and arm **51** in a clockwise direction, thereby moving the pawl **41**, through the link **49**, upwardly or counterclockwise to engage the lower pawl lug **45** with the ratchet wheel **36**. Movement of the pawl **41** vertically beyond its initially-engaged ratchet connection is limited by the arm **51** striking a fixed stop member **55**. Wherefore, as the pawl **41** and ratchet **36** are engaged, with the ratchet rotating in a clockwise direction, the pawl **41** is shifted rearwardly and the lever **37** and its arm **39** are rotated in clockwise direction. In this movement, the arm **39** engages and moves the cross-shafts **23** and **21** in a clockwise direction, thereby moving the feed rolls **12**, **13** away from the platen.

As the pawl **41** is moved rearwardly, shifting the lower end of the lever **37** clockwise, the detent **48** is moved from its rear notch **46** (Fig. 1) into its forward notch **47** (Fig. 2) and, in that position, the feed rolls are in their fully-released condition. The detent **48** holds the feed rolls in this released position so long as the key **30** remains depressed, the pawl **41** and ratchet wheel **36** having been disconnected in the meantime. More particularly, the pawl lug **45** is so positioned with respect to the teeth of the ratchet **36** by the arm **51** engaging the stop **55** that, upon engagement of the pawl with the ratchet, the pawl can move only in a rearward direction, and this movement is continued until the pawl **41** is fully disengaged from the ratchet **36** and the continued rotation of such wheel does not affect the position of the parts. As the pawl **41** is moved rearwardly, and just as it passes out of engagement with the teeth of the ratchet **36**, which is approximately at the time the detent **48** is passing from the notch **46** into the notch **47**, the detent passes fully into the notch **47**, thereby insuring movement of the pawl **41** to a fully disengaged position, which is retained as long as the key **30** remains depressed.

The feed roll key **30** may be held depressed by the finger of the operator or, if desired, a latch

key 56 (Fig. 2) pivotally carried by the arm 53 may be employed for this purpose. This latch key 56 is of a form having a hook-like portion 57 adapted, upon depression of the key, to engage a stop member 58 which retains the parts in depressed condition until the latch key 56 is again depressed, at which time it will be returned to its normal position by a spring 59. As the latch key 56 is released, the spring 54 will return the arm 53 to its raised or normal position of Fig. 1.

In returning the feed rolls 12, 13 to their platen-engaged position, upon release of the platen key 30, the shaft 52 and arm 51 are rotated under the influence of spring 54 in a counterclockwise direction, thereby moving the pawl 41 downwardly to engage its upper lug 44 with the ratchet 36. Downward or counterclockwise movement of arm 51 is limited to the desired pawl-and-ratchet engaging extent by a suitably mounted stop plate 60 (Fig. 2), which serves the same purpose as the stop 55. As the pawl 41 and ratchet are engaged, the pawl 41 is shifted forwardly and the lever 37 is rotated in counterclockwise direction, permitting the shafts 23 and 21 to rotate in counterclockwise direction under the influence of the feed roll springs 24 to move the feed rolls into engagement with the platen. The drive engagement between the pawl 41 and ratchet wheel 36 is of momentary duration, as explained in connection with the movement of the feed rolls away from the platen. That is to say, at the beginning of this operation, the detent 48 is in its forward notch 47 (Fig. 2) and, at about the time the ratchet wheel 41 is moving out of engagement with the pawl lug 44, the forward movement of the pawl 41 shifts the detent 48 into its notch 46. As the detent moves fully into its notch 46 (Fig. 1), the pawl and ratchet wheel are held in disengaged relation and the connections are held in position to permit the full and desired engagement of the feed rolls with the platen. The parts are held in this position until the key 30 is again depressed.

It may be desirable, in certain instances, to provide means adjacent the platen for controlling the operation of the feed rolls to enable the operator to more readily apply, remove or adjust the paper relative to the platen. One form of structure for accomplishing this feature of my invention is shown in the drawings. Such structure includes a cross-shaft 70 (Fig. 1) having its opposite ends supported by arms 71 and 72 rotatably supported at 73 and 74, respectively, by the carriage C. The arm 71 is provided with an upward extension 75 having a finger-piece 75a which may be readily grasped by the operator for moving the arm 71 back and forth.

The cross-shaft 70 is operatively connected with the pawl 41 through a crank member 76 pivotally carried by the pivotal support 38 for the upper end of arm 37. The crank member 76 is provided with a forked arm 77 slidably embracing the shaft 70 and another arm 78 pivotally connected, at 79, to the upper end of a link 80. The lower end of link 80 is pivotally connected, at 81, to a rear end portion of the pawl 41 rearwardly of the pivotal connection between the lever 37 and pawl 41.

In use, as the upper end of the arm 71 is moved forwardly and the shaft 70 is swung in a clockwise direction, the crank member 76 is moved in a counterclockwise direction, thereby actuating the pawl 41 through the link 80 to engage the lower pawl lug 45 with the ratchet 36 and move the feed rolls 12, 13 away from the platen in the same manner as when the key 30 is depressed. The feed rolls will remain in this released position so long as the finger-piece 75a is held in its forward or clockwise position by the operator's hand or by actuating the latch key 56 to hold the key 30 depressed. As soon as the finger-piece 75a is released, the power means will again be connected to return the feed rolls to their platen-engaged position. The finger-piece 75a and shaft 70 are directly connected with the feed roll key 30 through the pawl 41 so that, when the finger-piece 75a is actuated to release the feed rolls, the key 30 is depressed, and it remains in that condition so long as the finger-piece is held in its forward position. However, when such finger-piece is released, the spring 54 acting on the feed roll key arm 53 will move the arm 53, shaft 52, arm 51 and pawl 41, as hereinabove explained, to engage the upper pawl lug 44 with the ratchet 36, whereupon the several parts are moved to their platen-engaged positions in the same manner as when the key 30 is released. In the particular form shown, due to the direct connections between the key 30 and arm 71, the latter is actuated each time the key 30 is depressed and released, and vice versa. It will be seen, however, that either the key 30 or the finger-piece 75a and associated parts may be dispensed with, and the remaining control elements may be relied upon to effect the operation described.

It will be understood that, while only one form of structure embodying the invention has been shown and described, other changes in details and arrangements of parts may be resorted to without departing from the spirit and scope of the invention as defined by the claims that follow.

I claim:

1. In a typewriter, a platen, feed rolls movable toward and from the platen, power means, mechanism operatively engaged with said feed rolls for moving the latter toward and from said platen, and means operable at will for connecting said power means to said mechanism for actuating the latter to move said feed rolls away from and toward said platen.

2. In a typewriter, a platen, feed rolls movable toward and from the platen, power means, mechanism operatively engaged with said feed rolls for moving the latter toward and from said platen, and means for operatively connecting said power means to said mechanism for a time sufficient to move said feed rolls away from said platen to a feed roll release position, said means serving also to connect said power means to said mechanism for a sufficient time to restore said feed rolls to a platen-engaged position.

3. In a typewriter, a platen, feed rolls movable toward and from the platen, power means, mechanism operatively engaged with said feed rolls for moving the latter toward and from said platen, means for operatively connecting said power means to said mechanism for actuating the latter to move said feed rolls away from and toward said platen, said mechanism including means for disengaging it from said power means upon movement of said feed rolls to a predetermined position either away from or toward said platen.

4. In a typewriter, a platen, feed rolls movable toward and from the platen, power means, mechanism operatively engaged with said feed rolls for moving the latter toward and from said platen, means for operatively connecting said power means to said mechanism for actuating the latter

to move said feed rolls away from said platen and also toward said platen, and means included in said mechanism and actuated by said power means for disconnecting said power means upon movement by said feed rolls to a predetermined extent away from said platen, said means also serving to disconnect said power means upon movement of said feed rolls to a predetermined extent toward said platen.

5. In a typewriter, a platen, feed rolls normally engaged with said platen, means for moving said feed rolls away from said platen to a feed-roll-released position, and for returning said feed rolls to a platen-engaged position, power means, means for connecting said power means to said feed roll moving means to actuate the latter when it is desired to move said feed rolls to their feed-roll-released position and also to their platen-engaged position, and means for automatically disconnecting said power means from said moving means upon movement of said feed rolls to either of their positions.

6. In a typewriter, a platen, feed rolls normally engaged with said platen, means for moving said feed rolls away from said platen to a feed-roll-released position and for returning said feed rolls to a platen-engaged position, power means, means for connecting said power means to said feed roll moving means to actuate the latter when it is desired to move said feed rolls to their feed-roll-released position and also to their platen-engaged position, means for automatically disconnecting said power means from said moving means upon movement of said feed rolls to either of their positions, and means for holding said moving means at rest and disengaged from said power means after the disconnection of said power means.

7. In a typewriter, a platen, feed rolls normally engaged with said platen and movable to a feed-roll-released position, mechanism adapted to be actuated for movement of said feed rolls to their feed-roll-released position and back to their platen-engaged position, including a member shiftable to effect said movements, power means including a driven member, and means for connecting said shiftable member to said driven member to effect said feed roll movements.

8. In a typewriter, a platen, feed rolls normally engaged with said platen and movable to a feed-roll-released position, mechanism adapted to be actuated for movement of said feed rolls to their feed-roll-released position and back to their platen-engaged position, including a member shiftable to effect said movements, power means including a driven member, means for connecting said shiftable member to said driven member for a predetermined time for effecting said feed roll movements after which said members are disconnected, and means for holding said shiftable member disengaged from said driven member and said mechanism at rest after said feed roll movements have been effected.

9. In a typewriter, a platen, feed rolls, power means, connections between said power means and feed rolls normally disengaged, means for engaging said power means with said connections to move said feed rolls toward and from said platen, means for disengaging said power means and connections upon a predetermined movement in either direction, and means for holding said connections at rest when said power means is disconnected.

10. In a typewriter, a platen, feed rolls, power means, means for connecting said power means to said feed rolls for moving the latter both away from and toward said platen, including a member shiftable to engage said power means and shiftable by said power means to move said feed rolls in both directions, and means for shifting said member to engage said power means.

11. In a typewriter, a platen, feed rolls, power means, means for connecting said power means to said feed rolls for moving the latter both away from and toward said platen, including a member shiftable to engage said power means and shiftable by said power means to move said feed rolls in both directions, means for shifting said member to engage said power means, the arrangement being such that said member is disconnected from said power means upon a predetermined feed roll shift movement thereof, and means for holding said member in a neutral position after its disengagement from said power means and until said member is again shifted to engage said power means.

12. In a typewriter, a platen, feed rolls, a support for said feed rolls rockable for movement of the latter away from and toward said platen, power means including a drive member, connections between said drive member and said support including a lever rotatable to rock said support, a drive connector between said lever and said drive member, and means for engaging said connector with said drive member for rocking said lever to rock said support.

13. In a typewriter, a platen, feed rolls, means constantly urging said feed rolls toward said platen, a rock shaft supporting said feed rolls for movement toward and from said platen, power means including a rotatable drive member, mechanism for rocking said shaft including a rotatable lever and a shift member pivotally supported by said lever and engageable with said drive member, and manually operated means for shifting said shift member in one direction to engage said drive member for rotating said lever in a direction for moving said feed rolls away from said platen, said latter means also being adapted to shift said shift member in an opposite direction to engage said drive member for permitting movement of said feed rolls toward said platen under the influence of said urging means.

14. In a typewriter, a platen, feed rolls, means constantly urging said feed rolls toward said platen, a rock shaft supporting said feed rolls for movement toward and from said platen, power means including a rotatable drive member, mechanism for rocking said shaft including a rotatable lever and a shift member pivotally supported by said lever and engageable with said drive member, manually operated means for shifting said shift member in one direction to engage said drive member for rotating said lever in a direction for moving said feed rolls away from said platen, said latter means also being adapted to shift said shift member in an opposite direction to engage said drive member for permitting movement of said feed rolls toward said platen under the influence of said urging means, said shift member being shiftable by said drive member to disengage said shift member from said drive member, and means for holding said lever, shift member and associated parts in a neutral position upon disengagement thereof by and with said drive member.

15. In a typewriter, a platen, feed rolls, a member rockable to move said rolls away from and toward said platen, power means including a rotatable drive member, connections between said drive member and said rock member including a

lever rotatable for rocking said rock member and a drive engaging member rotatably carried by said lever for shift movement relative to said drive member, and means for shifting said drive engaging member to engage said drive member for shift movement of the former to rotate said lever and move said rolls away from said platen, said means including a depressible key which upon being released after depression engages said drive engaging and drive members for movement of lever to return said rolls toward said platen.

16. In a typewriter, a platen, feed rolls, a member rockable to move said rolls away from and toward said platen, power means including a rotatable drive member, connections between said drive member and said rock member including a lever rotatable for rocking said rock member and a drive engaging member rotatably carried by said lever for shift movement relative to said drive member, means for shifting said drive engaging member to engage said drive member for shift movement of the former to rotate said lever and move said rolls away from said platen, said means including a depressible key which upon being released after depression engages said drive engaging and drive members for movement of lever to return said rolls toward said platen, means controlling the power shift movement of said drive engaging member in such a way that the latter is disconnected from said drive member upon a predetermined movement of said rolls, and means engaging and releasably holding said lever and drive engaging member in a neutral position upon said disconnection of said members.

17. In a typewriter, a platen, feed rolls, a rock shaft supporting said rolls for movement away from and toward said platen, power means including a rotatable drive member, connections between said drive member and rock shaft including a rotatable lever, means by which rotation of said lever rocks said rock shaft, a double-armed pawl pivotally carried by said lever, and means for connecting said pawl to said drive member including a manually operated key member and connections between the latter and said pawl whereby movement of said key member in one direction engages one of the arms of said pawl with said drive member to shift said pawl member and lever to move said rolls away from said platen, and vice versa, when said key member is moved in the opposite direction and engages the other arm of said pawl.

18. In a typewriter, a platen, feed rolls, a rock shaft supporting said rolls for movement away from and toward said platen, power means including a rotatable drive member, connections between said drive member and rock shaft including a rotatable lever, means by which rotation of said lever rocks said rock shaft, a double-armed pawl pivotally carried by said lever, means for connecting said pawl to said drive member including a manually operated key member and connections between the latter and said pawl whereby movement of said key member in one direction engages one arm of said pawl with said drive member to shift said pawl member and lever to move said rolls away from said platen, and vice versa, when said key member is moved in the opposite direction and engages the other arm of said pawl, and means for automatically disengaging said drive member and pawl member upon movement of said rolls a predetermined extent in either direction.

19. In a typewriter, a platen, feed rolls, means for supporting said rolls for movement away from and toward said platen, power means including a drive member, connections between said power means and roll support including a member shiftable to engage said drive member to move said roll support and rolls, a manually operable key connected with said member for shifting it to engage said drive member when such key is either depressed or released after depression for power movement of said rolls away from and toward said platen, and another manually operated member connected with said shiftable member for said power shift movements of said rolls independently of manual depression of said key member.

20. In a typewriter, a platen, feed rolls, means for supporting said rolls for movement away from and toward said platen, power means including a drive member, connections between said power means and roll support including a member shiftable to engage said drive member to move said roll support and rolls, a manually operable key connected with said member for shifting it to engage said drive member when such key is either depressed or released after depression for power movement of said rolls away from and toward said platen, another manually operated member connected with said shiftable member for said power shift movements of said rolls independently of manual depression of said key member, and means for automatically disconnecting said shiftable and drive members after actuation of either of said manually operated members and upon movement of said rolls to a predetermined extent away from or toward said platen.

21. In a typewriter, a case-shiftable platen mounted for rotational, longitudinal and case-shift movements only, feed rolls movable toward and from the platen, power means, mechanism operatively engaged with said feed rolls for moving the latter toward and from said platen in any of the positions to which it may be moved, and means operable at will for connecting said power means to said mechanism for actuating the latter to move said feed rolls away from said platen.

22. In a typewriter, a platen, feed rolls movable toward and from the platen, power means, mechanism operatively engaged with said feed rolls for moving the latter toward and from said platen, said mechanism including connections adapted to be engaged with said power means for moving said feed rolls toward said platen.

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