

H. A. FOOTHORAP.
 RIBBON MECHANISM FOR TYPE WRITERS.
 APPLICATION FILED FEB. 6, 1911.

1,039,920.

Patented Oct. 1, 1912.

2 SHEETS—SHEET 1.

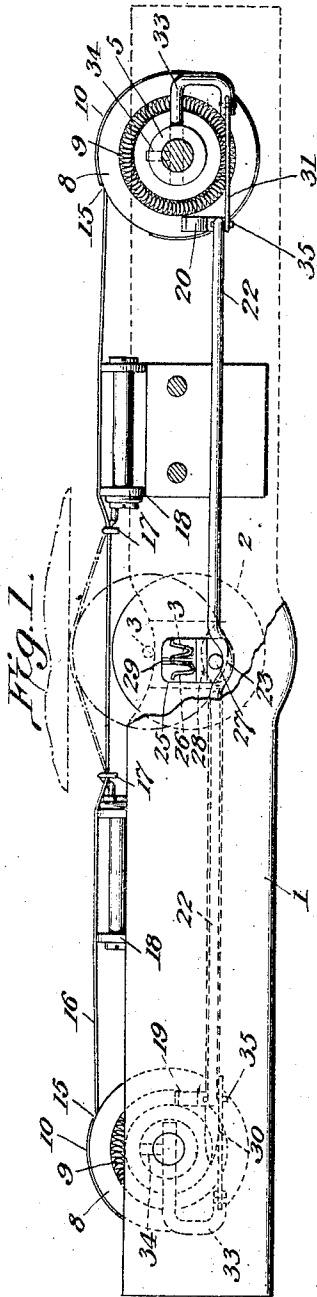


Fig. 2.

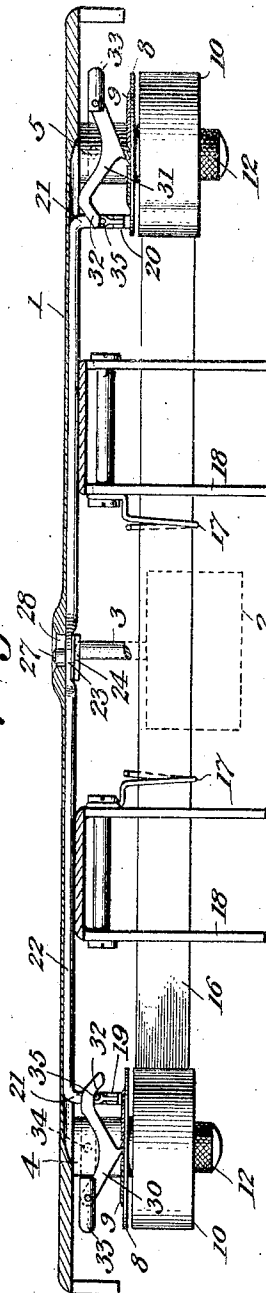
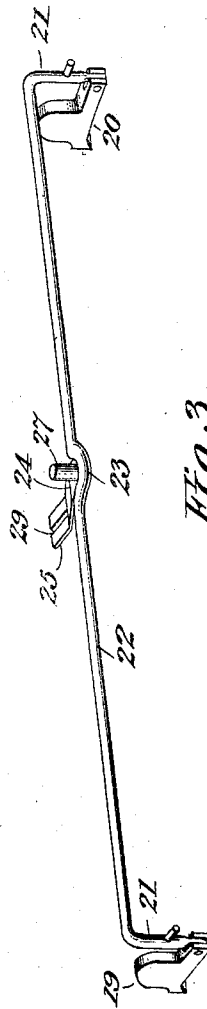


Fig. 3.



WITNESSES

J. H. Culverwell,
D. B. Mammaduke

INVENTOR,

Harry A. Foothorap.

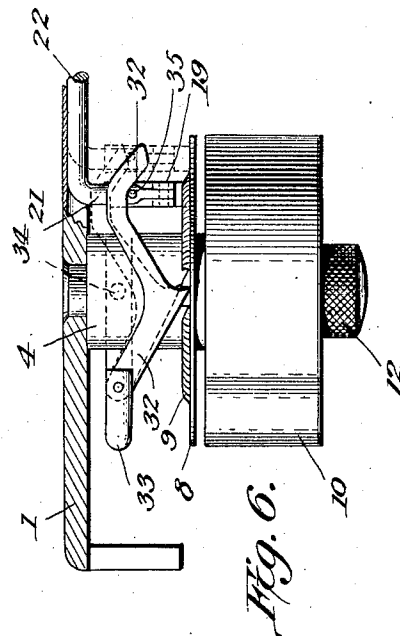
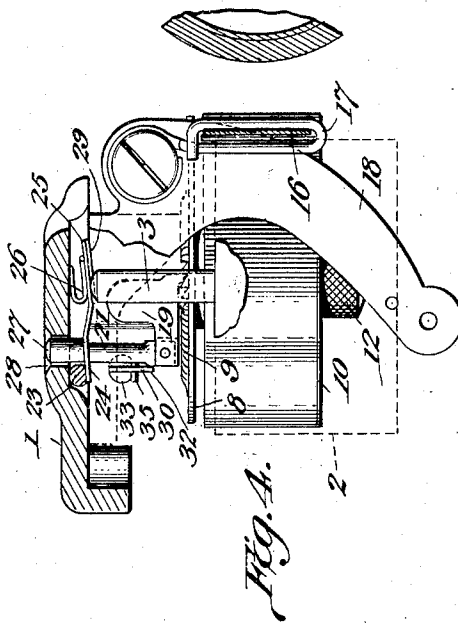
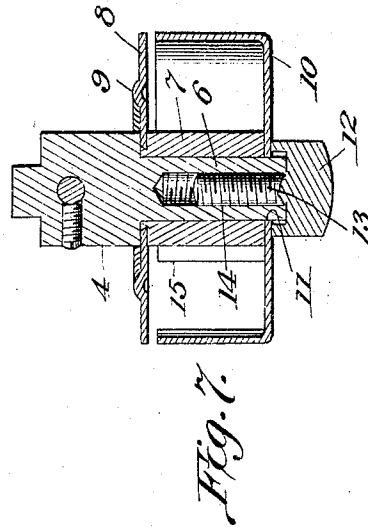
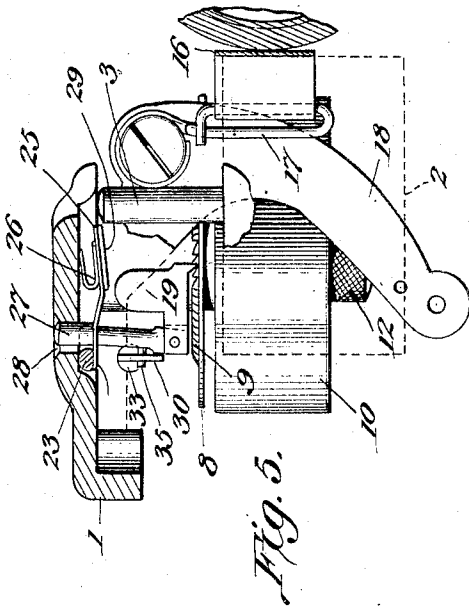
by *L. G. Juhn*
 Attorney.

H. A. FOOTHORAP.
 RIBBON MECHANISM FOR TYPE WRITERS.
 APPLICATION FILED FEB. 6, 1911.

1,039,920.

Patented Oct. 1, 1912.

2 SHEETS—SHEET 2.



WITNESSES
J. H. Silverwell.
W. M. Marmaduke.

INVENTOR,
Harry A. Foothorap.
 by *L. E. Julian*
 Attorney.

BEST AVAILABLE COPY

UNITED STATES PATENT OFFICE.

HARRY A. FOOTHORAP, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR TO ELLIOTT-FISHER COMPANY, OF HARRISBURG, PENNSYLVANIA, A CORPORATION OF DELAWARE.

RIBBON MECHANISM FOR TYPE-WRITERS.

1,039,920.

Specification of Letters Patent.

Patented Oct. 1, 1912.

Application filed February 6, 1911. Serial No. 606,929.

To all whom it may concern:

Be it known that I, HARRY A. FOOTHORAP, a citizen of the United States of America, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Ribbon Mechanism for Type-Writers, of which the following is a specification.

10 This invention relates to ribbon mechanism for typewriters, and more particularly to a manually reversible ribbon mechanism for typewriters of the printing wheel type.

The object of the invention is to equip a well known form of printing wheel typewriter with an extremely simple and inexpensive ribbon mechanism operative to effect the ribbon feed by the movement of the spindle of the printing wheel in its excursions relative to the platen, and capable of reversal to change the direction of the ribbon feed by a manually operated reversing device disposed for convenient manipulation.

Another object is to greatly simplify and cheapen the construction of the ribbon spools and the mountings therefor.

In the accompanying drawings—Figure 1 is a top plan view of the top plate of a printing wheel typewriter of well known construction with all of the various elements of my printing mechanism assembled thereon. Fig. 2 is a front elevation, partly in section, of the subject-matter shown in Fig. 1. Fig. 3 is a perspective view of the combined pawl carrier and reversing bar with its operating cam and reversing key attached. Fig. 4 is a transverse section on a somewhat enlarged scale, showing the printing wheel retracted from the platen and with the elements of the ribbon mechanism in the positions they assume normally. Fig. 5 is a similar view with the printing wheel advanced to the platen and the elements of the ribbon mechanism in corresponding position. Fig. 6 is a side elevation of one of the ribbon spools, the driving pawl and check dog associated with said spool being shown in full lines in their operative positions and showing in dotted lines the positions assumed by the parts when the reversing key is operated to cause the ribbon to be fed by the positive

driving of another spool, and Fig. 7 is a detail sectional view of one of the ribbon spool posts, the ribbon spool, spool casing, and retaining screw.

1 indicates the top plate of the typewriter, 2 the type wheel and 3 the type wheel spindle, all constructed, mounted and related in the usual manner to permit a type on the wheel 2 to be positioned at the printing point by the rotary movement of the wheel 2 through the manipulation of keys, not shown, and to be moved bodily toward the platen to print the selected character. The spindle thus moves laterally from the normal position shown in Fig. 4 to the printing position shown in Fig. 5 and as will be more fully explained, this usual relative movement of the spindle 3 with respect to the stationary plate 1 is utilized for the operation of the ribbon feeding mechanism.

Depending from the plate 1 adjacent to the opposite ends thereof are two spool posts 4 and 5 each having a reduced lower end 6 upon which is rotatably mounted a spool 7 having secured to the upper end thereof an annular flange 8 provided with a face ratchet 9, the teeth of the ratchet 9 being preferably formed in the upper surface of an annular corrugation or bead pressed or otherwise formed in the flange 8. Inclosing the ribbon below the flange 8 is a cup-shaped ribbon casing 10 having an axial opening 11 for the lower end of the reduced portion 6 of the post and retained in place by the head 12 of a retaining screw 13 screwed into a threaded opening or socket 14 extending upwardly from the bottom of the post. The wall of each spool casing 10 is provided with a slot or opening 15 to accommodate the ribbon 16.

Intermediate of the spools the ribbon is guided in suitable ribbon guides 17 which may be carried for instance by the usual key lever supporting frames 18 which are secured to the under side of and depend from the plate 1 at opposite sides of the type wheel. Coacting with the face ratchets 9 of the ribbon spools are two feed pawls 19 and 20 pivotally mounted to the terminal arms 21 of a combined pawl carrying and reversing bar 22 afforded bearings between

the under side of the plate 1 and the adjacent surfaces of the frames 18, see Figs. 2 and 4. The middle portion of the rod 22 is forwardly deflected, as indicated at 23, and to this deflected portion or crank is attached the front end of a rearwardly disposed cam plate 24 having its rear end inclined to form a feed cam 25 and urged downwardly by a spring 26 interposed between the cam 25 and the plate 1. In the normal position of the type wheel spindle 3 the upper end of the latter engages the lowest portion of the cam 25 and thus holds said cam elevated in opposition to the spring 26. When the spindle moves rearwardly to carry the type wheel 2 to the printing position, see Fig. 5, the spindle 3 rides out from under the cam 25 and allows the latter to drop. This dropping of the feed cam effects an oscillation of the rod or shaft 22 which draws back the feed pawls 19 and 20, the distance between said pawls being such that one pawl only can be in engagement with its face ratchet at any given time.

When the spindle 3 is retracted by the usual retracting means to withdraw the type wheel from the platen, the upper end of the spindle rides under the feed cam 25, raises the latter, and effects an opposite oscillatory movement of the pawl carrier 22 to advance the feed pawls 19 and 20 and thus cause the engaged pawl to advance or effect a partial rotation of its spool to feed the ribbon. It will be seen, therefore, that the feed pawls are mounted on an oscillatory pawl carrier which is rocked in a direction to cause the feed by the coaction between the cam 25 and the spindle 3 during the retraction of the latter and is rocked in the opposite direction to retract the pawls by the spring 26 when the spindle is withdrawn from the feed cam during the printing operation. It will of course be understood that the teeth in the respective face ratchets 9 are oppositely disposed and that the feed dogs being arranged to engage the adjacent sides of the two ratchets will rotate the ribbon spools in opposite directions, notwithstanding the fact that both feed dogs move in the same direction to effect the feed.

Obviously the reversal of the feed may be effected by shifting one feed dog out of engagement with its ratchet and the other feed dog into engagement with the ratchet adjacent thereto. This result can be readily attained by shifting the pawl carrier 22 endwise in the proper direction and it is contemplated to effect this end manually by the manipulation of a ribbon feed reversing key 27 projecting upwardly from the plate 24 and through a longitudinal slot 28 in the plate 1.

To prevent accidental shifting of the dog

carrier the cam 25 is provided with a longitudinal rib 29 extending along its center and preferably formed by pressing the cam plate to produce a longitudinal corrugation. This rib or downward projection 29 lies at one side or the other of the spindle 3 and by coaction therewith prevents the pawl carrier from being shifted unless sufficient force is exerted to compel the spring 26 to yield sufficiently to allow the projection 29 to ride over the spindle. In addition to the feed pawls, it is desirable to provide each spool with a check dog 30 or 31. Each of these dogs is disposed to engage one of the face ratchets and is provided with a pivotal mounting at one end and with a cam 32 at its opposite end. The pivotal mounting of the dog is preferably effected in one end of a dog carrier 33 of substantially U-shaped form, as shown in Fig. 1, having one leg or branch extended transversely through the adjacent post 4 or 5 and adjustably retained by an abutment screw 34. The dog carriers 33 are adjustable in order to properly position the cams 32 of the respective dogs in proper relation to a pair of dog releasing pins 35 one of which is extended forwardly from each of the depending ends or arms 20 of the dog carrier 22. By reference to Figs. 2 and 6, it will be seen that when one of the feed pawls is in engagement with the adjacent ratchet the contiguous pin 35 will be so related to the adjacent cam 32 that the check dog will be permitted to engage the ratchet in order to prevent reverse rotation thereof while the adjacent spool is being positively operated to effect the ribbon feed. The pin 35 at the opposite end of the pawl carrier however, will bear such relation to the cam of the adjacent dog that the latter will be held in disengaged position. Upon the shifting of the pawl carrier, however, the engaged feed pawl will not only be removed from the ratchet, but the pin 35 associated with said pawl will coact with the adjacent cam 32 to lift the dog out of engagement with the ratchet so that the spool from which the ribbon is now to be drawn may rotate freely in the direction necessary to permit the unwinding of the ribbon therefrom. This movement of the pawl carrier which simultaneously effects the disengagement of the pawl and dog from one spool will likewise bring the other pawl into engagement with the other spool and permit the associated check dog to drop into action.

The foregoing description will suffice for a complete disclosure of the invention, but the right to modify the illustrated structure within the scope of the protection prayed is expressly reserved.

What I claim is:—

1. The combination with a platen and

printing mechanism, of ribbon spools, a shaft arranged to be positively rocked by the printing mechanism during the retraction of the latter, arms extended from the shaft, pawls carried by the arms, and ratchets secured to the spools and arranged to be engaged by the pawls.

2. The combination with a platen and printing mechanism, of ribbon spools, and spool operating mechanism including a rock shaft rocked by the printing mechanism to operate a spool during the retraction of the printing mechanism and shiftable endwise to determine the spool to be operated.

3. The combination with a platen and printing mechanism, of two ribbon spools, two pawl and ratchet devices each arranged to rotate one of the spools, a rock shaft movable endwise to render either pawl and ratchet device operative, and means operated by the printing mechanism during the retraction thereof to rock the shaft and actuate the operative pawl and ratchet mechanism.

4. The combination with a platen and printing mechanism, of a pair of ribbon spools, and spool operating mechanism including pawl and ratchet devices, a shaft shiftable endwise to determine which of said devices is to operate, a handle extended from the shaft to facilitate the shifting thereof, and an arm extended from the shaft and co-operating with the printing mechanism to rock the shaft and thereby operate the selected ratchet device.

5. The combination with a supporting plate, and a platen and printing mechanism, of ribbon mechanism carried exclusively by the plate and including a shaft, rocked by the printing mechanism to cause a feed of the ribbon and shiftable endwise to reverse the direction of the feed.

6. The combination with a plate, and a platen and printing mechanism, of ribbon mechanism carried exclusively by the plate and including a shaft, rocked by the printing mechanism to cause a feed of the ribbon and shiftable endwise to reverse the direction of the feed, and a reversing handle extended through the plate from the shaft.

7. The combination with a plate, and a platen and printing mechanism, of ribbon spools suspended from the plate and having ratchets connected thereto, a shaft mounted to rock and to shift endwise on the plate and having terminal arms, an intermediate arm coöperatively related to the printing mechanism and a reversing handle extended through the plate, and pawls carried by the terminal arms of the shaft and shiftable into and out of engagement with the ratchet wheels by the endwise movement of the shaft.

8. In a typewriter, the combination with

a platen, a movable wheel spindle and a printing wheel mounted on said spindle, of ribbon mechanism including a shaft mounted to rock to feed the ribbon, and means operated by the spindle to rock said shaft.

9. In a typewriter, the combination with a platen, a reciprocating wheel carrier, a spindle movable therewith, and a printing wheel mounted on the spindle, of ribbon spools, and spool operating means including a rock shaft and an arm extended into the path of the wheel spindle from said shaft.

10. In a typewriter, the combination with a platen, a reciprocating wheel carrier, a spindle movable therewith, and a printing wheel on the spindle, of ribbon spools, pawl and ratchet spool operating mechanism, a rock shaft for operating said pawl and ratchet mechanism, and a cam plate disposed in the path of the spindle during the retraction of the printing wheel and coacting with said spindle to rock the shaft.

11. In a typewriter, the combination with a platen, a reciprocating wheel carrier, a spindle movable therewith, and a printing wheel on the spindle, of a pair of ribbon spools, two pawl and ratchet spool operating devices, a shaft movable endwise to determine which of said devices shall operate, and rocked to operate the selected device, a handle for moving the shaft endwise, and a cam plate extended from the shaft and coacting with the wheel spindle to rock the shaft and operate the selected pawl and ratchet device.

12. In a typewriter, the combination with a plate, a platen and a wheel carrier, a spindle movable with the carrier, and a printing wheel on the spindle, of ribbon spools supported from the plate, ratchet wheels connected to the spools, an endwise shiftable rock shaft mounted on the plate and having terminal arms, an intermediate cam plate coacting with the wheel spindle and a reversing handle extended through the top plate, and pawls carried by the terminal arms and movable into and out of engagement with the ratchet wheels by the endwise movement of the shaft.

13. The combination with a pair of ribbon spools having ratchets, of a pawl carrier, feed pawls carried by the carrier and shiftable alternately into engaging relation with the ratchets, check dogs adapted to engage the ratchets and provided with cams, and projections extended from the pawl carrier and coacting with said cams.

14. The combination with a spool post having a reduced end provided with a screw socket, of a ribbon spool rotatable on the reduced portion of the post and having a ratchet flange at one end, a cup-shaped ribbon casing mounted on the reduced portion of the post at the opposite end of the spool,

and a headed screw received within the screw socket of the post and retaining the ribbon casing and spool.

15. The combination with a pair of ribbon spools having ratchets, of ribbon spool supports, check dogs carried by the supports, an endwise movable, rocking pawl-carrier, feed pawls adapted to engage the ratchets and operated by the carrier, and

means whereby the endwise movement of the pawl-carrier will control the engagement of the check dogs with the ratchets.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY A. FOOTHORAP.

Witnesses:

J. F. CULVERWELL,

R. M. PARKER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."