W. H. BROWNING.

INK RIBBON FEED AND SIMILAR REVERSING MECHANISM.

APPLICATION FILED APR. 14, 1917.

**1,303,159.**

Patented May 6, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

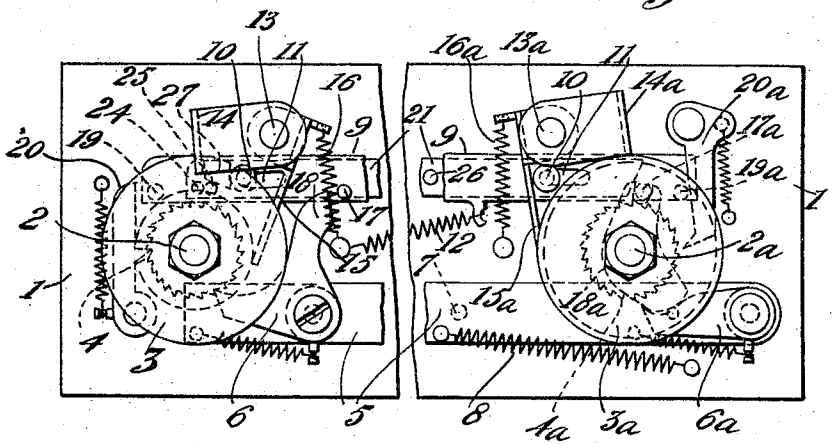
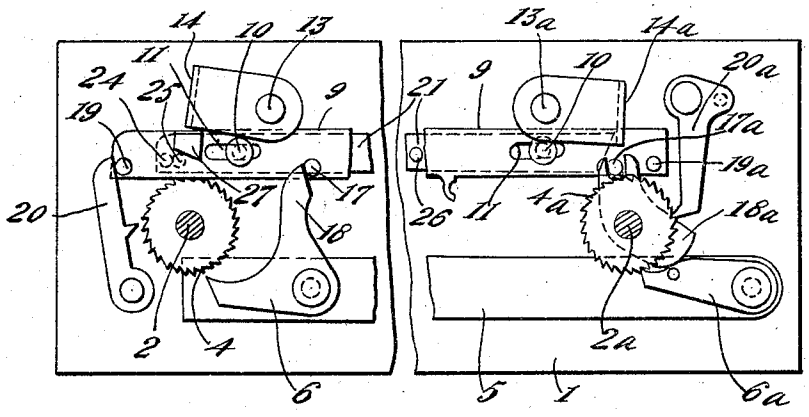



Fig. 2.




Witnesses:

M. E. McDade.

Inventor

Walter H. Browning.

by James L. Norris

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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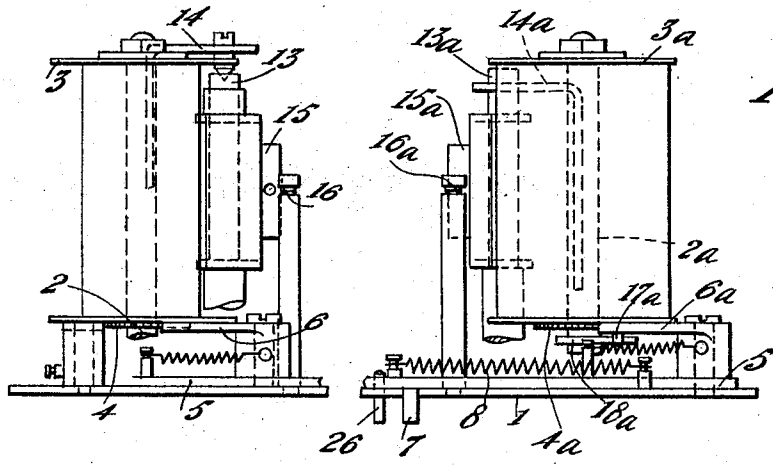



Fig. 3.

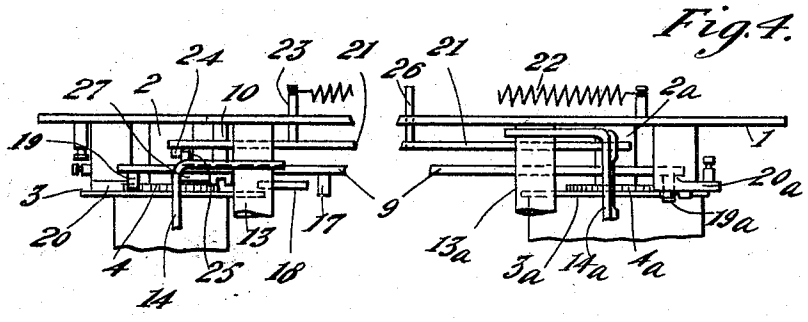



Fig. 4.

Witnesses:

M. E. McDade

Inventor

Walter H. Browning

by James L. Norris

Attorney

NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

WALTER HENRY BROWNING, OF WEMBLEY, ENGLAND.

## INK-RIBBON FEED AND SIMILAR REVERSING MECHANISM.

1,303,159. Specification of Letters Patent. Patented May 6, 1919.

Application filed April 14, 1917. Serial No. 162,187.

*To all whom it may concern:*

Be it known that I, WALTER HENRY BROWNING, a subject of the King of Great Britain, residing in Wembley, England, have invented certain new and useful Improvements in Ink-Ribbon Feed and Similar Reversing Mechanism, of which the following is a specification.

This invention relates to improvements in ink ribbon feed mechanism for typewriters and the like and in similar mechanism where a sheet or band has to be wound alternately backward and forward from one roller or drum on to another roller or drum.

The invention consists essentially in a ribbon feed or like reversing mechanism of the type described, wherein a sheet, strip or band is wound alternately backward and forward from one reel or drum on to another having reversing means comprising a member, spring or weight-urged in one direction, and a second independent member, preferably operated by a moving part of the apparatus, urged by a stronger spring or heavier weight to engage said first member and urge it in the opposite direction, and means governed by the diameters of said reels or drums for regulating the movements of said movable members.

The invention will be fully described with reference to the accompanying drawings which show the invention as applied to a ribbon feed for typewriters or the like.

Figure 1 is a front view of the apparatus showing the parts in the position for winding the ribbon on one reel.

Fig. 2 is a similar view with the reels removed, showing the parts in position for winding the ribbon on to the other reel.

Fig. 3 is an under-side plan of the same parts in the position shown in Fig. 1.

Fig. 4 is a part top plan with the parts in the same position.

Upon a suitable frame or base plate 1 are mounted the spindles or shafts 2, $2^a$ of the ribbon reels 3, $3^a$, mounted freely thereon, which are each provided at the inner end with ratchet teeth 4 $4^a$, for the purpose of driving them. Also mounted on the base plate 1 and adapted to be reciprocated longitudinally thereon is a slide 5 which carries pawls 6, $6^a$, which may be spring-urged as shown, adapted respectively to engage the ratchets 4, $4^a$ to drive them as the slide 5 is reciprocated, means hereinafter described being provided to prevent both pawls engaging their respective ratchets at the same time. Any suitable means may be employed for reciprocating the driving slide 5. As shown a pin 7 projects through the base plate 1 and is adapted to be engaged periodically by some moving part of the apparatus, a spring 8 being provided to return it to normal position.

Also suitably mounted on the base plate 1 is a bar or the like 9 capable of limited lengthwise movement thereon. As shown the bar 9 is mounted on the studs 10 its lengthwise movement thereon being limited by means of the length of the slots 11 through which the studs 10 pass. A spring 12 tends normally to draw the bar 9 toward the spindle 2 and reel 3.

Upon suitable pivots 13, $13^a$ are freely pivoted riders 14, $14^a$ adapted to ride lightly over the surface of the ribbon on the reel and to be raised or lowered as the ribbon is wound upon or unwound from the corresponding reel. Upon the same pivots may be mounted friction plates 15 $15^a$ adapted to cause the ribbon to be wound tightly upon the reels and to prevent undue rotation of the reels with looseness of the ribbon when it is being unwound therefrom. The friction plates 15, $15^a$ may be urged against the reels by springs 16, $16^a$, and similar springs may be employed with the riders 14, $14^a$ if desired.

The bar 9 carries pins 17, $17^a$ adapted according to the position of the bar to hold one or other of the pawls 6, $6^a$ out of engagement with the corresponding ratchets 4, $4^a$ the pin 17 engaging an arm 18 of the pawl 6, and the pin $17^a$ operating a cam plate $18^a$ on the spindle $2^a$ to hold the pawl $6^a$ away from the ratchet $4^a$. The reversing bar 9 is shown in its two positions in Figs. 1 and 2. Fig. 1 showing the ribbon being wound on reel 3 and Fig. 2 showing it being wound on reel $3^a$.

The reversing bar 9 may also carry pins 19, $19^a$ adapted to engage spring urged locking pawls 20, $20^a$ to hold one or other out of engagement with the ratchets 4, $4^a$ when the corresponding reel is being unwound.

Behind or adjacent to the reversing bar 9 is a second longitudinally movable bar 21 which may also be mounted on the studs 10. This bar is normally maintained drawn toward the reel $3^a$ by a spring 22 which may for convenience, as shown, be arranged behind the base plate 1, a pin 23 secured to the

bar 21 passing through a slot in the base plate for the purpose. Upon the front of the bar 21 is arranged a pin or lug 24 and behind the reversing bar 9 is a corresponding pin 25 adapted to be normally engaged thereby. The spring 22 being made of greater strength than the spring 12, the tension of the spring 22 on the bar 21 normally overcomes that of the spring 12 on the reversing bar 9 and draws it from its position toward the reel 3 into its position toward the reel $3^a$. This causes it to throw the pawl $6^a$ out of engagement with the ratchet $4^a$ on the reel $3^a$ and to throw the pawl 6 into engagement with ratchet 4 on reel 3 and so cause the ribbon to be wound from reel $3^a$ on to reel 3.

Means are provided for normally reciprocating the bar 21 and this may be done by actuating the pin 26 at the back of the base plate 1 by the same means as are employed to actuate the pawl bar or driving slide 5, the spring 22 causing the bar to return to normal position after each actuation in the other direction. The reversing bar 9 under the action of its spring 12 is also normally caused to reciprocate with the bar 21.

The bars 9 and 21 are preferably arranged so that their outer edges approximately coincide with and are tangential to the maximum peripheries of the reels 3 and $3^a$ so that as the reels unwind the edges of their riders are free unless otherwise prevented, to drop below the level of the edges of the bars 9 and 21 and as they are wound up the edges of the riders are gradually raised above the edges of said bars. If therefore the rider 14 is extended lengthwise so as to embrace the bar 9 and the rider $14^a$ is extended to embrace the bar 21, being formed so as to arch over the bar 9 in all positions, it is obvious that if suitably positioned slits or stops are formed on said bars or they are made of suitable length the riders may be caused as they are lowered to enter such slits, engage such stops, or pass over the ends of the bars and prevent their reciprocating movement. As shown the rider $14^a$ is arranged to pass over the end of the bar 21 and the rider 14 to engage a stop 27 on the bar 9.

Now supposing the position of the parts to be as shown in Fig. 1, and the ribbon to be just finished winding on to reel $3^a$ from reel 3, the rider $14^a$ will be at its highest position and the rider 14 will drop to its lowest position (for the purpose for which the riders are employed they need not follow the ribbon to the smallest diameter) for when the bars 21 and 9 are, under the tension of the spring 22, together moved toward the reel $3^a$ the rider 14 will drop past the stop 27 on the bar 9 and in this position it holds the bar 9 from moving back toward the reel 3. The bar 9 being held in this position in the manner above described maintains the pawl $6^a$ out of engagement with ratchet $4^a$ of reel $3^a$ leaving the latter free to rotate under any tension on the ribbon, and liberates pawl 6 permitting it to engage ratchet 4 of reel 3 and so to positively drive it.

It will be obvious that though bar 9 is now locked there is nothing to prevent the continued reciprocation of bar 21. As, however, the ribbon is unwound from reel $3^a$ the rider $14^a$ gradually drops until its edge falls below the level of the edge of bar 21 when, on a movement of said bar toward reel 3 it will drop over the end of the bar and lock it in the position toward reel 3. Both bars are then in the locked position and so remain for the time being. As the reel 3, however, becomes full the rider 14 is gradually raised by the ribbon till, when the reel is quite full, it is lifted out of engagement with stop 27 on the bar 9 which, seeing that the bar 21 is held toward reel 3, is itself free to move in the same direction under the impulse of spring 12. This movement of the reversing bar 9 reverses the pawls as above described and the ribbon is again rewound on to reel $3^a$, both bars 9 and 21 meanwhile remaining stationary. When reel $3^a$ is again full rider $14^a$ is lifted from the end of bar 21, which is then, together with bar 9, under the impulse of the strong spring 22 moved toward reel $3^a$, and, rider 14 being allowed to drop, bar 9 is again locked in this position and again reverses the feed. And so the action continues, the reverse taking place each time one of the ribbons becomes full.

It is of course obvious that the bars 9 and 21 may be placed anywhere with relation to the reels or drums and their movements governed from the riders 14 and $14^a$ by suitable lever or link connections.

According to the present invention as set out above, the reversing of the reels or drums is operated by a single set of opposing springs. We are aware, however, that it has been proposed to reverse the movement of the ink ribbon of a typewriter by means of two pairs of opposing springs, one pair operating with each ribbon reel. Such an arrangement is entirely distinct from that herein described and necessitates complementary mechanism of an entirely different type for its application.

Having thus described the said invention and the best means I know of carrying the same into practical effect, I claim:—

1. In apparatus having ink ribbon and like feed mechanism of the type herein referred to, the combination of a frame, a pair of ribbon reels rotatably mounted on the frame, a ratchet device carried by each reel, a reciprocating driving slide, a pair of pawls pivotally mounted on the slide and adapted respectively to engage the ratchets

to turn the reels alternately as the slide reciprocates, reversing mechanism for moving the pawls alternately into and out of engagement with the ratchets, said reversing mechanism consisting of a movable member slidably mounted on the frame, a spring device tending to move the member in one direction, a second movable member slidably mounted on the frame and engaging the first movable member, a second spring device having an inherent power stronger than that of the first spring device and tending to urge the second movable member and the first movable member together in the direction reverse to the first said direction and means governed by the diameters of the said reels for regulating the movements of the said movable members.

2. In apparatus having ink ribbon and like feed mechanism of the type herein referred to, the combination of a frame, a pair of ribbon reels rotatably mounted on the frame, a ratchet device carried by each reel, a reciprocating driving slide, a pair of pawls pivotally mounted on the slide and adapted respectively to engage the ratchets to turn the reels alternately as the slide reciprocates, reversing mechanism for moving the pawls alternately into and out of engagement with the ratchets, said reversing mechanism comprising a reciprocating member, a reacting controlling device tending to move the member in one direction, a second reciprocating member which normally operatively engages the first member, a second reacting controlling device having inherent power stronger than that of the first said reacting controlling device and tending to move the two reciprocating members together in a direction opposite to the said first direction against the action of the first said reacting controlling device and means for positively moving the said second member periodically in the first-named direction against the action of its own reacting controlling device and means governed by the diameters of the ribbon reels for regulating the movements of the reciprocating members.

3. In apparatus having ink ribbon and like feed mechanism of the type herein referred to, the combination of a frame, a pair of ribbon reels rotatably mounted on the frame, a ratchet device carried by each reel, a reciprocating driving slide, a pair of pawls pivotally mounted on the slide and adapted respectively to engage the ratchets to turn the reels alternately as the slide reciprocates, reversing mechanism for moving the pawls alternately into and out of engagement with the ratchets including means adapted to prevent both pawls from engaging the ratchets at the same time, said means comprising a reversing bar slidably mounted on the frame, means for moving the bar longitudinally in one direction to a terminal position, a reacting controlling device for moving the bar in the reverse direction to another terminal position, means carried by the bar, adapted, according to the position of the bar, to hold one or other of the said pawls out of engagement with the corresponding ratchet, and devices governed by the diameters of the ribbon reels for regulating the actions of said reversing mechanism.

4. In apparatus having ink ribbon and like feed mechanism of the type herein referred to, the combination of a frame, a pair of ribbon reels rotatably mounted on the frame, a ratchet device carried by each reel, a reciprocating driving slide, a pair of pawls pivotally mounted on the slide and adapted respectively to engage the ratchets to turn the reels alternately as the slide reciprocates, reversing mechanism for moving the pawls alternately into and out of engagement with the ratchets, including means adapted to prevent both pawls from engaging the ratchets at the same time, said means comprising a reversing bar slidably mounted on the frame, means for moving the bar longitudinally in one direction to a terminal position, a reacting controlling device for moving the bar in the reverse direction to another terminal position, means carried by the bar, adapted according to the position of the bar to hold one or other of the said pawls out of engagement with the corresponding ratchet, riders resting upon the reels adapted to rise and fall as the diameters of the reels increase or decrease, said riders adapted to hold the reversing bar alternately and each respectively in one of its terminal positions till one of the reels is filled with ink ribbon or the like, and devices governed by the diameters of the ribbon reels for regulating the actions of said reversing mechanism.

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

WALTER HENRY BROWNING.

Witnesses:

C. S. HOPKINS,

B. H. DERHAM.

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