

F. A. COOK.
TYPE WRITING MACHINE.
APPLICATION FILED NOV. 25, 1905.

2 SHEETS—SHEET 1.

Fig. 2.

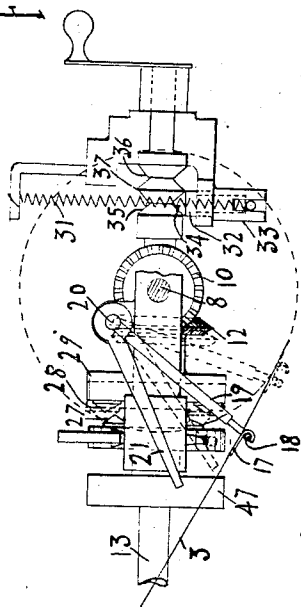


Fig. 1.

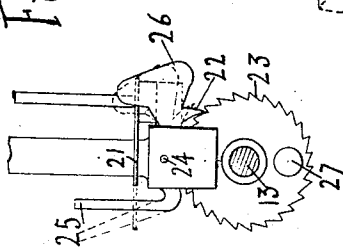
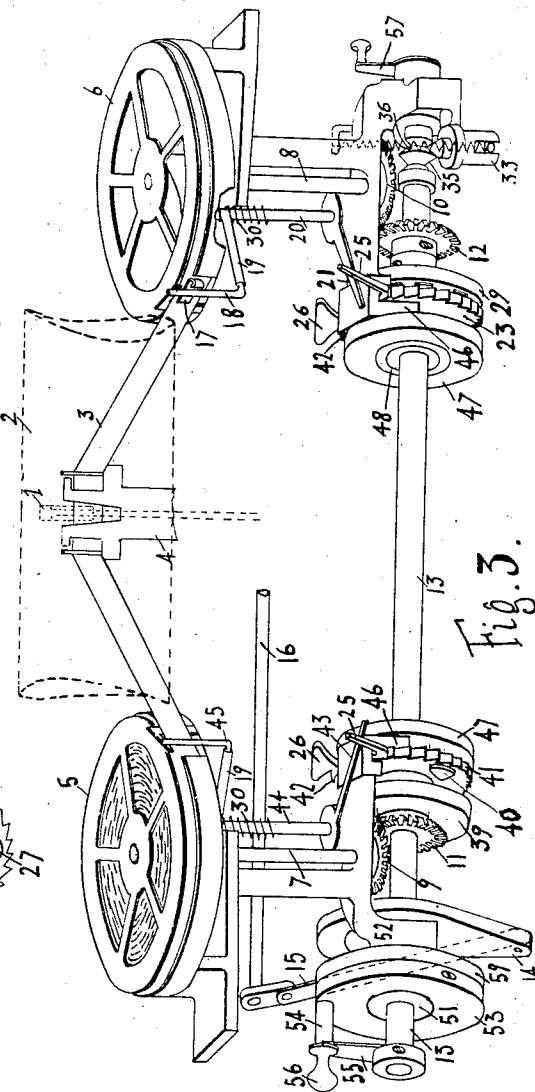


Fig. 3.

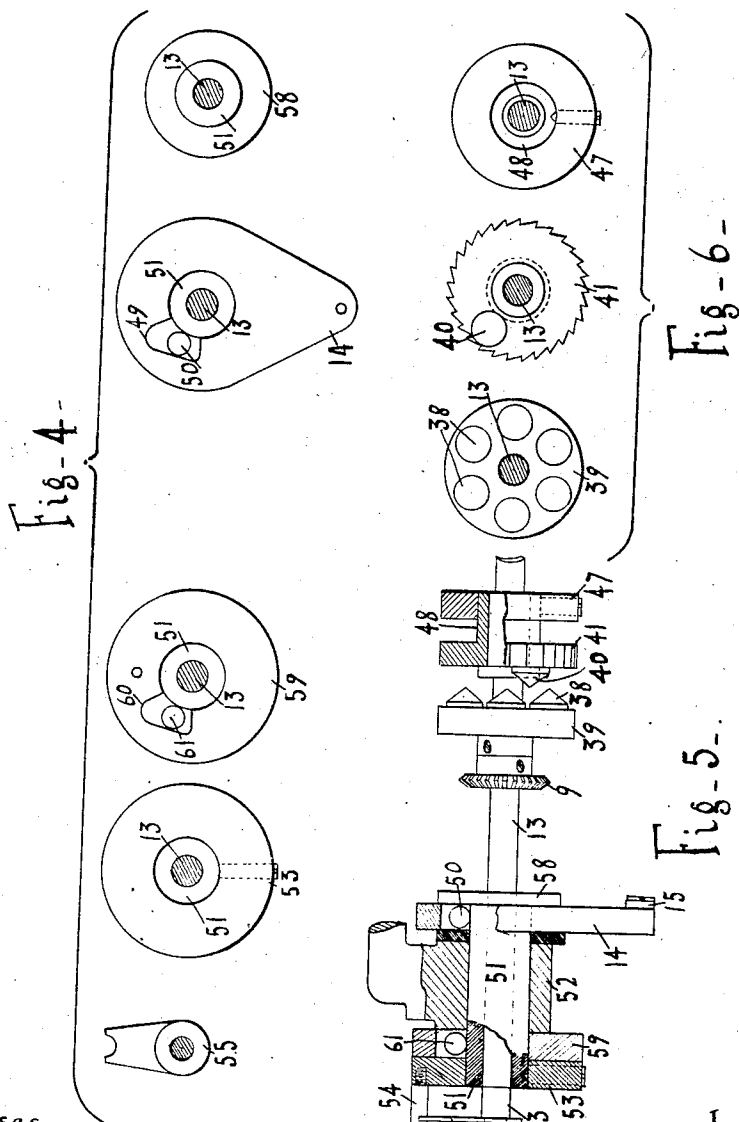
Witnesses
Kittie Frankfort
S. B. Sackett

By his Attorney

Inventor
Frank A. Cook
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2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK A. COOK, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD
TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF
NEW JERSEY.

TYPE-WRITING MACHINE.

No. 831,935.

Specification of Letters Patent.

Patented Sept. 25, 1906.

Application filed November 25, 1905. Serial No. 289,068.

To all whom it may concern:

Be it known that I, FRANK A. COOK, 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 ribbon winding and reversing mechanisms of type-writing and other machines.

The object of the invention is to produce a simple and reliable mechanism for reversing the travel of the ribbon which can be called into operation at the completion of the unwinding of the ribbon from either spool without liability of straining the ribbon and which will act with promptness.

In carrying out my invention I employ, preferably, a horizontal driving-shaft movable endwise to connect with either one of a pair of spool-shafts. Upon said shaft I mount loosely two ratchet-wheels, which are idle during the travel of the ribbon; but when either spool becomes depleted a pawl is caused to engage its associated ratchet-wheel to arrest the same. Upon said ratchet-wheel is provided a cam, and upon the driving-shaft is provided a coacting cam, whereby during further revolution of the shaft the latter is cammed endwise to connect with the empty spool. A similar operation is performed at the other spool when the latter becomes empty.

The invention also includes improved means for imparting intermittent rotation to the driving-shaft.

In the accompanying drawings, Figure 1 is a sectional elevation illustrating a reversing ratchet with cooperating parts, the latter shown in full lines in working positions. Fig. 2 is a plan illustrating the reversing mechanism associated with one of the spools, the parts being shown in full lines at the moment when the reversing operation has been completed. Fig. 3 is a perspective view of the mechanism, the left-hand spool shown full of ribbon and the right-hand reversing mechanism being about to operate. Fig. 4 shows details of the parts which wind the ribbon-driving shaft. Fig. 5 is a sectional front elevation of said winding parts. Fig. 6 shows details of the reversing members.

In the well-known "Underwood" type-

writing machine in connection with which my invention is illustrated types 1 strike rearwardly against the front side of a platen 2. A ribbon 3 is threaded through a vibrator 4 and wound upon spools 5 6. The spools are carried by vertical shafts 7 8, having upon their lower ends bevel-pinions 9 10 to mesh with bevel-pinions 11 12, fixed upon a horizontal driving-shaft 13, which is rotated intermittently by means of a crank 14, a link 15, and rock-shaft 16, the latter being rocked at each type-stroke and the crank 14 having a clutch connection to the shaft 13.

At Fig. 3 the pinions 9 11 are seen in mesh, so that the ribbon is winding on the full spool 5, the other spool 6 being empty. An obstruction 17 at the end of the ribbon engages a finger 18, which extends up from an arm 19, the latter fixed upon a vertical rock-shaft 20, so that the obstruction 17 will cause the shaft 20 to turn. Upon the lower end of the latter is provided an arm 21, which at such turning movement releases a pawl 22 and permits it to drop into engagement with a ratchet-wheel 23, which is loose upon the shaft 13. The pawl is pivoted at 24 upon a fixture, so that it may prevent rotation of the ratchet-wheel. The arm 21 normally engages a finger 25, formed upon the pawl, so as to hold it out of use; but when said arm is rocked by the ribbon it releases the pawl, and a weight 26, formed upon the pawl, causes the latter to drop into the ratchet. To the side or face of the ratchet is fixed a cone 27, which projects into the path of similar cones 28, which project from the side of a disk 29, the latter being fixed to the shaft 13, so as to rotate therewith. The cone 27 being stationary, the nearest cone 28 rides thereon during the further rotation of the shaft 13 and cams the latter endwise or toward the right at Fig. 3 until the pinion 12 is brought into mesh with the pinion 10 and the ribbon begins to wind upon the empty spool 6. A spring 30 returns the rock-shaft 20 to normal position and causes the arm 21 to lift the pawl 22 from the ratchet 23. The last part of the endwise movement of the shaft 13 is effected by a spring 31, Fig. 2, which is connected to a plunger 32, sliding in a box 33 and having a cone-head 34 to fit in either of a pair of V-grooves 35 36, formed in a collar which is mounted upon the shaft 13. After the point of the detent 34 rides over the ridge 37 be-

tween said V-grooves the spring 31 has sufficient force to cam the shaft endwise by the engagement of the detent 34 with the inclined wall of the adjoining groove. During such endwise movement of the shaft another set of cams 38 upon another disk 39 is moved into position to engage a cam 40; provided upon the other ratchet 41; but said ratchet may revolve idly, since its pawl 42 is held up by an arm 43, corresponding to arm 21 and fixed upon a shaft 44, having a ribbon-engaging finger 45, corresponding to finger 18. Movement of the ratchets in axial direction is prevented by fixed projections 46, inserted between the ratchet-wheels, and collars 47, secured upon hubs 48 of the ratchet-wheels.

The crank 14 is provided with a recess 49, Fig. 4, in which is placed a ball 50, which runs upon a bushing 51, which turns with the shaft 13. Said bushing turns in a bearing formed in a fixed bracket 52 and has fixed upon its outer end a collar 53, from which projects a stud 54, loosely engaged by a crank 55, fixed upon the end of the shaft 13. The shaft and bushing 51 are hence caused to turn together, while the shaft may move endwise independently of the bushing, the stud 54 being long enough to permit such play. A handle 56 may be formed upon the end of the stud 54 for winding the ribbon, and the other end of the shaft may be also provided with a crank 57. The ball 50 works between the periphery of the bushing 51 and an inclined wall of the recess 49, so as to grip said bushing when the crank 14 turns in one direction, but to run idly when the crank runs in the other direction, so that the shaft 13 is rotated step by step at the operation of the types. It will be seen that the bushing 51 is provided with a head 58 to confine the crank 14 and that a fixed disk 59 is interposed between the collar 53 and the bracket 52, whereby endwise movement of the bushing and other parts is prevented. The fixed disk 59 is provided with a recess 60 and ball 61, engaging the bushing 51 and preventing backward rotation of the shaft 13.

Variations may be resorted to within the scope of my invention and portions of my improvements may be used without others.

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, two pairs of cooperating cams upon said driving-shaft, one cam in each pair connected to the shaft to rotate therewith and the other cam in each pair loose upon the shaft, and means controllable by the ribbon for locking the loose cams against rotation so that they cooperate with the rotating cams to shift the shaft endwise.

2. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool

shafts having gears, of a driving-shaft having gears to mesh with said gears in alternation, two pairs of shaft-shifting cams upon said driving-shaft, one cam in each pair connected to the shaft to rotate therewith, and the other cam in each pair loose upon the shaft, means for locking said loose cams alternately against rotation, and means releasable through the ribbon movements for holding said locking means in idle position.

3. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spool shafts, of a driving-shaft, two pairs of shaft-shifting devices, each pair consisting of a cam and a wheel having a circular series of cams, one device in each pair connected to the driving-shaft to rotate therewith, and the other device in each pair being normally idle, and ribbon-controlled means for locking one member of each pair so that it may cooperate with its companion to shift said driving-shaft.

4. In a ribbon-reversing mechanism, the combination of a pair of ribbon-spool shafts, a driving-shaft, two pairs of normally ineffective cam devices upon said driving-shaft, and means controllable by the ribbon movements for causing the devices in one pair alternately with the devices in the other pair to cooperate to reciprocate said driving-shaft.

5. In a ribbon-reversing mechanism, the combination with a pair of ribbon-spools, and a common driver, of two pairs of normally ineffective rotatable cam devices, and means controllable by the longitudinal movements of the ribbon for rendering said pairs of cam devices alternately effective to cause shifting movements between said spools and said driver.

6. In a ribbon-reversing mechanism, the combination with a pair of spool-shafts and a driving-shaft, of two wheels fixed upon said driving-shaft and each carrying a circular series of cams, a loose toothed wheel associated with each of said cam-wheels, said toothed wheels having cams to cooperate with said cam-wheels, pawls for holding said toothed wheels stationary, and means releasable by the ribbon for holding said pawls in effective position.

7. In a ribbon-reversing mechanism, the combination with a pair of spool-shafts and a driving-shaft, of two wheels fixed upon said driving-shaft and each carrying a circular series of cams, a loose toothed wheel, associated with each of said cam-wheels, said toothed wheel having cams to cooperate with said cam-wheels, pawls for holding said toothed wheels stationary, springs which hold said pawls out of effective position, and parts extending into the path of the ribbon so as to be moved thereby, for releasing said pawls.

8. In a ribbon-reversing mechanism, the combination with a pair of spool-shafts and a driving-shaft, of two wheels fixed upon said driving-shaft and each carrying a circular se-

ries of cams, a loose toothed wheel associated with each of said cam-wheels, said toothed wheel having cams to cooperate with said cam-wheels, pawls for holding said toothed wheels stationary, rock-shafts having arms extending into the path of the ribbon so as to be moved thereby, springs holding said rock-shafts in normal position, and arms upon said rock-shafts holding said pawls away from said toothed wheels.

9. In a ribbon-reversing mechanism, the combination with a pair of spool-shafts and a driving-shaft shiftable endwise to connect with said spool-shafts, of toothed wheels loose upon said driving-shaft, means preventing said toothed wheels from shifting axially with said driving-shaft, cams upon said toothed wheels, cam-wheels fixed upon said driving-shaft to cooperate with the cams upon said toothed wheels, pawls for holding said toothed wheels stationary, springs holding said pawls out of effective position, and ribbon-controlled means for releasing said pawls in alternation.

10. In a ribbon-reversing mechanism, the combination with a pair of spool-shafts, of a driving-shaft shiftable endwise to connect with said spool-shafts, toothed wheels loose upon said driving-shaft, cams projecting laterally from said toothed wheels, means preventing said toothed wheels from shifting axially with said shaft, wheels fixed upon said driving-shaft and each provided with a series of cams projecting laterally toward said toothed wheels, normally ineffective means for holding said toothed wheels against rotation, and ribbon-controlled devices for causing said holding means to engage said toothed wheels.

11. In a ribbon-reversing mechanism, the combination with a ribbon-spool having a gear, of a driving-shaft having a gear, means being provided for unwinding the ribbon from said spool while said gears are out of mesh, cooperating cams upon said driving-shaft, one cam connected to the shaft to rotate therewith and the other cam loose upon the shaft, and means controllable by the ribbon for locking the loose cam against rotation so that it may cooperate with the rotating cam to shift said shaft to move the gear thereon into mesh with said spool-gear.

12. In a ribbon-reversing mechanism, the combination with a ribbon-spool, of a revoluble driver for said spool, a shifter revoluble with said driver, a revoluble loose member in position to cooperate with said shifter, said loose member having a series of teeth, a pawl, a spring-controlled member for holding said pawl normally out of engagement with said teeth, and means for enabling the movement of the ribbon to release said pawl so that it may engage said teeth to lock said loose member against rotation, so that the latter may cooperate with said shifter to effect shifting movement between said spool and said driver.

13. The combination with a pair of spool-shafts and a driving-shaft movable endwise to connect with either spool-shaft, of a bushing or collar upon said driving-shaft, a stud projecting from said bushing, a crank loosely engaging said stud and fixed upon said shaft, means for preventing said bushing from moving in axial direction, and a crank mounted loosely upon said bushing and having a ball or roller-clutch connection therewith.

14. The combination with a pair of spool-shafts and a driving-shaft movable endwise to connect with either spool-shaft, of a bushing or collar upon said driving-shaft, a stud projecting from said bushing, a crank loosely engaging said stud and fixed upon said shaft, means for preventing said bushing from moving in axial direction, and a crank mounted loosely upon said bushing and having a ball or roller-clutch connection therewith, and a fixed member also having a ball or roller-clutch connection with said bushing for preventing backward rotation of the driving-shaft.

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Witnesses:

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EDW. P. STORY.