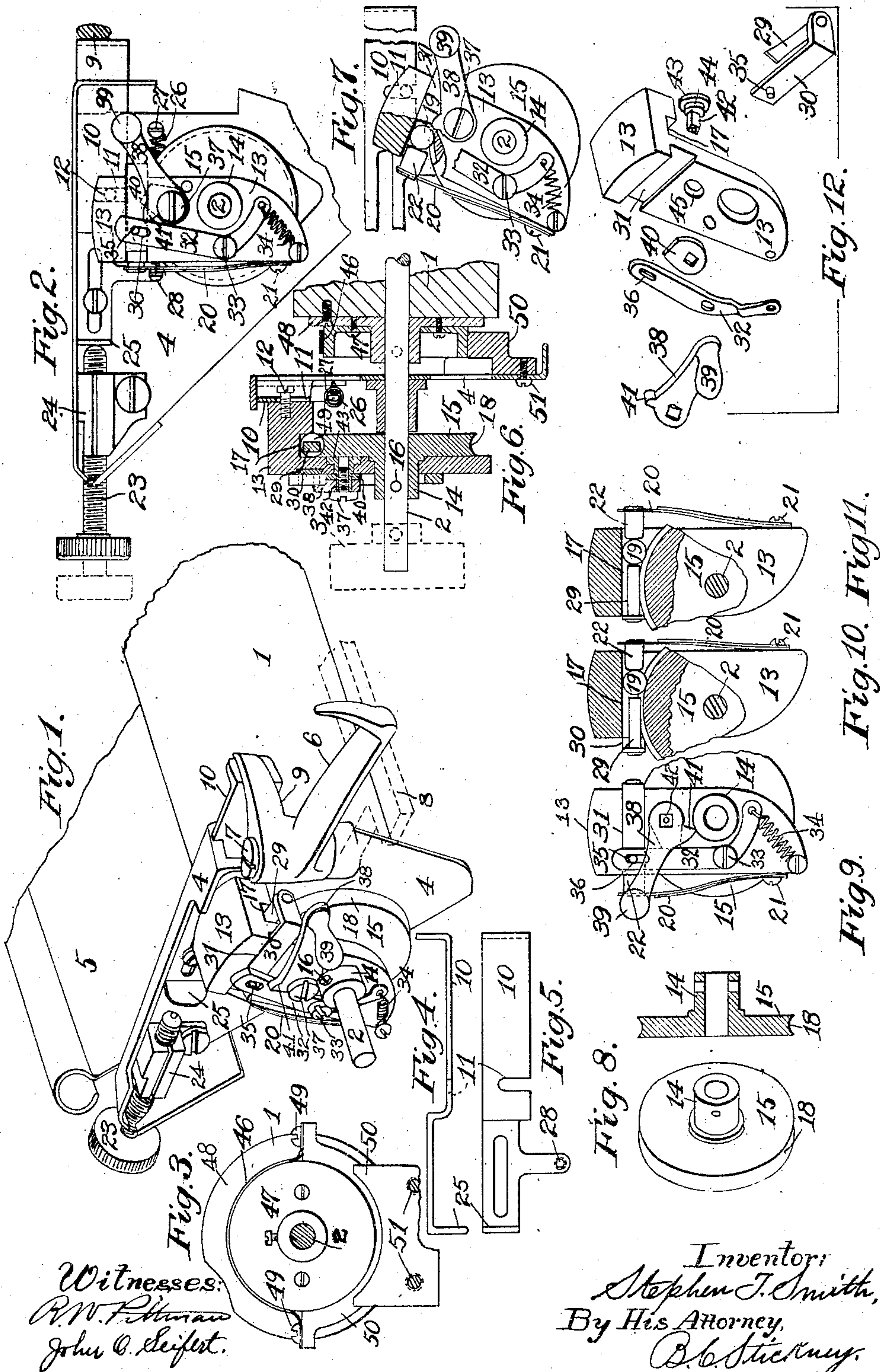


S. T. SMITH.
TYPE WRITING MACHINE.
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UNITED STATES PATENT OFFICE.

STEPHEN T. SMITH, OF STAMFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD TYPE-WRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

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To all whom it may concern:

Be it known that I, STEPHEN T. SMITH, a citizen of the United States, residing in Stamford, in the county of Fairfield 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 the line-spacing mechanism of revoluble and other platens of typewriting machines.

It is customary to provide the platens with line-space wheels having teeth at regular intervals to control the extent of the line-spacing movement of the platen, so that the intervals between the lines of writing correspond to the pitch of the teeth in said wheel.

It is often desired to space the lines uniformly but at intervals not corresponding with the teeth of a line-space; and it is the object of my invention to provide a simple and effective line-spacing mechanism for this purpose, and especially one that can be operated by the usual line-spacing lever, so that by the use of said lever the lines may be spaced at any desired intervals; such intervals to be regulated by suitable means from time to time to effect fine variations in the line-spacing intervals.

I have illustrated the invention in connection with the Underwood front strike writing machine, in which the line-spacing lever is used for returning the carriage to begin the writing of a new line; and I have interposed a clutch mechanism between said line-spacing lever and the revoluble platen, that permits fine variations to be effected in the line-spacing movements of the platen effected by said lever. Means are also provided for releasing the platen from the control of the clutch mechanism to permit the platen to be rotated by its hand wheel in the usual manner, independently of the line-space mechanism. There is also provided a brake, which is constantly effective to prevent accidental rotation of the platen when released from the control of the clutch, and also to prevent overthrow of the platen at the completion of each line-spacing movement.

The releasing of the platen from the control of the clutch is preferably effected by a separate lever, which has means to lock the clutch in the released condition, so that

the platen may be freely manipulated independently of the clutch for an indefinite time.

The preferred form of clutch comprises a ball or other roll running in a groove in a wheel, which is fixed to the platen or platen axle; a lever being mounted on the platen axle and having a cam surface inclined to the periphery of said wheel, and a spring pressing the ball into the bite of the cam and wheel. Said cam lever is connected to the above-mentioned carriage-returning lever, so that the carriage is returned and the cam operated by a simple stroke of the hand of the operator. The cam lever is arrested by means of an adjustable screw stop, which may be turned to effect fine variations in the extent of the movement imparted to the platen by the cam lever, so that the operator is enabled to write his lines as closely together or as far apart as he desires, always with uniform spacing.

In the accompanying drawings, Figure 1 is a perspective view of one end of the platen frame of an Underwood front strike writing machine, parts being broken away or omitted to disclose the invention more clearly; and there being also shown the usual carriage-returning lever and a part of the carriage upon which said lever is usually mounted; the parts being shown in normal positions. Fig. 2 is an end elevation of the platen frame and connected parts, shown at the completion of the line-spacing operation, that is, at the termination of the platen stroke; the parts being arrested by the adjustable screw stop. Fig. 3 is an elevation of the end of the platen, showing the brake device thereon; the platen axle shown in section. Fig. 4 is a plan, and Fig. 5 an elevation of a slide corresponding to that usually employed in the Underwood, and here used to transmit movement from the carriage-returning lever to the clutch-lever. Fig. 6 is a sectional front elevation showing the platen, the brake and the line-spacing devices in the Fig. 2 position. Fig. 7 is a diagram to illustrate the position of the ball or roll in the bite of the cam and clutch-wheel; the parts being shown in the normal Fig. 1 positions. Fig. 8 is a perspective view of the clutch wheel. Fig. 9 is a side elevation

of the clutch-lever and its appurtenances; the lever being shown for convenience in the Fig. 2 position; but the releasing lever being shown in effective position to release the
 5 platen from the control of the clutch. Fig. 10 is a sectional elevation of the clutch-lever and clutch-wheel with the intervening roll, taken however from the opposite side from Fig. 2. Fig. 11 is a view similar to Fig. 10,
 10 the clutch-lever being shown for convenience in an upright position, but the clutch ball being shown as released to permit independent rotation of the platen. Fig. 12 shows in perspective the clutching-lever and clutch-releasing parts carried thereby.
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The usual cylindrical platen 1 is fixed to an axle 2 having the usual hand wheel 3 journaled in ends 4 of a platen frame which also comprises a paper shelf 5. The platen
 20 is rotated line by line by means of the usual lever 6 fulcrumed at 7 upon the carriage 8 in which said platen frame is mounted, and employed to return the carriage to begin a new line of writing. This lever has an arm
 25 9 which drives a slide 10 guided upon the platen frame end 4 for backward and forward movement. The slide 10 has a slot 11 to engage a wrist 12 projecting from the inner face of a lever 13, which is pivoted to
 30 turn freely about the axle 2; said lever fitted loosely upon the hub 14 of a wheel, collar or head 15, which is fixed to the platen axle by a pin or screw 16. The lever has a part overhanging the wheel, and is formed with
 35 a cam-surface 17 in such overhanging part, this cam-surface directly opposed to the grooved periphery 18 of said wheel and extending tangentially or convergently toward said periphery; and a ball 19 is inserted be-
 40 tween said cam-surface and the working surface or periphery of the wheel, and is pressed into the bite of the cam and wheel by means of a spring-finger 20 fixed at 21 to the lower end of the lever and carrying at its
 45 upper end a projection 22 to engage the ball or roll. The spring 20 is normally effective to cause the ball to be firmly held between the cam-lever and the wheel; so that when the cam-lever is turned backwardly by
 50 means of the lever 6 and slide 10, the wheel 15 is forced to turn with the cam-lever 13, accompanied by the axle 2 and the platen 1, whereby the line-spacing movement of the latter is effected.

55 The line-spacing movement of the parts is limited by a stop in the form of a thumb screw 23 threaded through a block 24 fixed upon the platen frame end, with the forward end of the screw in the path of a lug
 60 25 formed upon the inner end of the slide 10. The screw may be turned in either direction to lengthen or shorten the line-spacing interval as much as may be required, so that evenly spaced ruled lines may be written
 65 upon without the necessity of rotating the

platen by hand at the beginning of every line, to cause the line of writing to fall accurately upon the line of ruling.

The device is also useful for many other purposes where uniform line-spacing is re-
 70 quired at intervals disagreeing with the ordinary standards.

Upon relieving the carriage-returning lever 6 from pressure the slide 10 is returned to normal position by a spring 26
 75 caught at one end upon a screw 27 provided in the platen frame end 4, and at the other end upon a screw 28 provided upon the slide 10. The levers 6 and 13 are also returned to normal position by the spring. Thus
 80 after setting the screw 23, it is only necessary to operate the lever 6 in the usual manner at the end of every line of writing, in order to cause the writing to fall on the paper at the required line-spacing intervals
 85 without further attention from the operator.

The platen may be advanced by either of the usual hand wheels 3, at any time, independently of the described line-spacing mechanism; but since the clutch is prefer-
 90 ably always in effective position, the platen cannot be turned backwardly against the opposition of the clutch.

To permit the platen to be turned backwardly independently of the clutch, there
 95 is provided a clutch-releasing device, comprising a finger 29 adapted to engage the ball 19 on the opposite side from the spring 20, to press said ball out of the bite of the cam 17 and wheel 15, as illustrated dia-
 100 grammatically at Fig. 7, so that the wheel 15 may be turned backwardly or forwardly independently of the cam-lever 13. This finger 29 may be carried upon a small slide 30 working in a groove 31 in the lever 13;
 105 and the slide may be operated by a sub-lever 32 pivoted at 33 upon the main lever 13, and having a spring 34 whereby it is caused to return to normal ineffective position together with the slide 30, the latter
 110 having a pin 35 to engage a slot 36 in said lever 32.

To move the lever 32 with its connected finger 29 to the effective Fig. 11 position, there is pivoted at 37 upon the lever 13 a
 115 third lever 38 having a finger-piece 39. Connected to the lever 38 to turn therewith is a lug or projection 40 to bear against the lever 32 and press the same to the Fig. 9 position; the end of the lug radiating from
 120 the pivot and engaging the lever 32 in a manner to hold the latter locked in the Fig. 9 position. The lever 38 may have a lug 41 to engage the hub 14 to arrest the lever 38 in the Fig. 9 position. The screw 37 is
 125 threaded into the square shank 42 of a headed nut 43, which has a cylindrical body 44 to turn in a bearing 45 in the lever 13; said shank 42 fitting in square holes in the parts 40 and 38, so that said parts are
 130

caused to turn together. When the lever 38 is swung over from the Fig. 9 to the Fig. 1 position, the spring 34 returns the lever 32 and slide 30 to permit the ball 19 to be pressed again by the spring 20 into the bite of the cam and wheel.

To hold the platen steady during its released condition, and at other times, there is provided a brake-band 46 running over a cylindrical collar or head 47, fixed to the head 48 of the platen 1. The ends of the brake-band 46 are secured by screws 49 upon a bracket 50 secured to the platen frame end by screws 51. This brake is effective to prevent overthrow of the platen at the usual line-spacing operation effected by the lever 6.

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

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with a platen, of an irregular line-spacing mechanism therefor, comprising a driver having a handle, a roll clutch between the driver and the platen, and a stop to arrest the driver; said roll clutch comprising a wheel, a member having a surface inclined to said wheel, and a roll fitting between said surface and said wheel.

2. In a typewriting machine, the combination with a revoluble platen, of a wheel or collar connected thereto and cooperating with a roll and a cam lever to form a clutching mechanism for rotating the platen, a handle for operating said cam lever, a stop, and returning means for the cam lever and handle.

3. In a typewriting machine, the combination with a revoluble platen, of a wheel or collar connected thereto and cooperating with a roll and a cam lever to form a clutching mechanism for rotating the platen, a handle for operating said cam lever, a stop, said cam lever mounted to turn about the axis of said wheel, and the roll being supported between the working periphery or surface of the wheel and the cam on said lever, and a spring to press the roll into the bite of the cam and wheel.

4. In a typewriting machine, the combination with a revoluble platen and a platen axle, of a wheel or collar fixed upon the platen axle, a lever loosely mounted on the platen axle and having a cam, a roll between the cam and the periphery or surface of said wheel, and a lever to operate said cam lever.

5. In a typewriting machine, the combination with a revoluble platen and a platen axle, of a wheel or collar fixed upon the platen axle, a lever loosely mounted on the platen axle and having a cam, a roll between the cam and the periphery or surface

of said wheel, a lever to operate said cam lever, and adjustable means to effect fine variations in the length of stroke imparted to the platen by said cam lever.

6. In a typewriting machine, the combination with a revoluble platen, of a wheel connected thereto, a lever, a slide operated by said lever, a clutch lever pivoted concentrically with the wheel and connected to said slide to enable the latter to turn the wheel and platen, and a stop adjustable for effecting fine variations in the length of the stroke of the platen effected by said clutch lever; said clutch lever having a cam surface, and a roll being yieldingly held between said cam surface and the periphery or working surface of said wheel.

7. In a typewriting machine, the combination with a revoluble platen, of a wheel connected thereto, a lever, a slide operated by said lever, a clutch lever pivoted concentrically with the wheel and connected to said slide to enable the latter to turn the wheel and platen, and an adjustable screw stop in the path of said slide to arrest it at the conclusion of the platen-driving stroke thereof.

8. In a typewriting machine, the combination with a platen and a wheel or collar connected thereto, of a cam lever mounted to turn about the axis of the wheel, a roll, a spring to press the roll into the bite of the cam and the working periphery or surface of the wheel, operating means connected to said cam lever, and adjustable means for effecting fine variations in the stroke imparted by said cam lever to the platen.

9. In a typewriting machine, the combination with a platen having a wheel or collar, of a lever mounted to turn about the axis of the wheel and having a cam surface tangentially disposed, a roll confined between the cam and the periphery of the wheel, a spring upon the lever to press the roll into the bite of the cam and wheel, and means to operate the lever.

10. In a typewriting machine, the combination with a revoluble platen and a lever, of a universal clutch mechanism between the lever and the platen, said clutch mechanism normally in condition to transmit movement from the lever to the platen, means for effecting fine variations in the stroke imparted by the lever through the clutch mechanism to the platen, said clutch mechanism constructed to permit independent advance rotation of the platen, and means to release the platen from the control of said clutch mechanism and to maintain mechanically the released condition of the platen.

11. In a typewriting machine, the combination with a platen, of a driver having a handle, a roll clutch between the driver and the platen, a stop to arrest the driver, said roll clutch being normally in condition to

transmit movement from the driver to the platen, said roll clutch comprising a wheel, a member having a surface inclined to said wheel, a roll fitting between said surface and said wheel, and means to release the platen from the control of said clutch.

12. In a typewriting machine, the combination with a platen, of a driver having a handle, a roll clutch between the driver and the platen, a stop to arrest the driver, said roll clutch being normally in condition to transmit movement from the driver to the platen, and means to release the platen from the control of said clutch; means being provided for mechanically maintaining the releasing means in effective position.

13. In a typewriting machine, the combination with a platen having a wheel or collar, of a lever mounted to turn about the axis of the wheel and having a cam surface inclined toward the periphery of the wheel, a roll confined between the cam and the periphery of the wheel, a spring to press the roll into the bite of the cam and wheel, means to operate the lever, and a roll-releasing lever mounted upon said cam lever.

14. In a typewriting machine, the combination with a platen having a wheel or collar, of a lever mounted to turn about the axis of the wheel and having a cam surface inclined toward the periphery of the wheel, a roll confined between the cam and the periphery of the wheel, a spring to press the roll into the bite of the cam and wheel, means to operate the lever, a roll-releasing lever mounted upon said cam lever, and a third lever, also mounted on said cam lever, to operate the roll-releasing lever.

15. In a typewriting machine, the combination with a platen having a wheel or collar, of a lever mounted to turn about the axis of the wheel and having a cam surface inclined toward the periphery of the wheel, a roll confined between the cam and the periphery of the wheel, a spring to press the roll into the bite of the cam and wheel, means to operate the lever, a roll-releasing lever mounted upon said cam lever, and a

third lever, also mounted on said cam lever, to operate the roll-releasing lever, and having means to lock the latter in roll-releasing position.

16. In a typewriting machine, the combination with a platen having a wheel or collar, of a lever mounted to turn about the axis of the wheel and having a cam surface inclined toward the periphery of the wheel, a roll confined between the cam and the periphery of the wheel, a spring to press the roll into the bite of the cam and wheel, means to operate the lever, and a roll-releasing lever mounted upon said cam lever; said roll-releasing lever being connected to a finger to press the roll out of the bite of the wheel and cam in opposition to the tension of said spring.

17. In a typewriting machine, the combination with a platen having a wheel or collar, of a lever mounted to turn about the axis of the wheel and having a cam surface inclined toward the periphery of the wheel, a roll confined between the cam and the periphery of the wheel, a spring to press the roll into the bite of the cam and wheel, means to operate the lever, a roll-releasing lever mounted upon said cam lever, said roll-releasing lever being connected to a finger to press the roll out of the bite of the wheel and cam in opposition to the tension of said spring, and a spring to return said roll-releasing lever to normal position.

18. In a typewriting machine, the combination with a revoluble platen and a wheel or collar connected thereto, of a lever having a cam and mounted to turn about the axis of the wheel, a roll, a spring pressing the roll into the bite of the cam and wheel, means for operating said lever to turn the platen by means of said wheel, roll and cam, and means both to return the lever to normal position and to release the platen from the control of the lever.

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