Sept. 28, 1937. W. F. HELMOND 2,094,011

TYPEWRITING MACHINE

Original Filed May 9, 1935 3 Sheets-Sheet 1

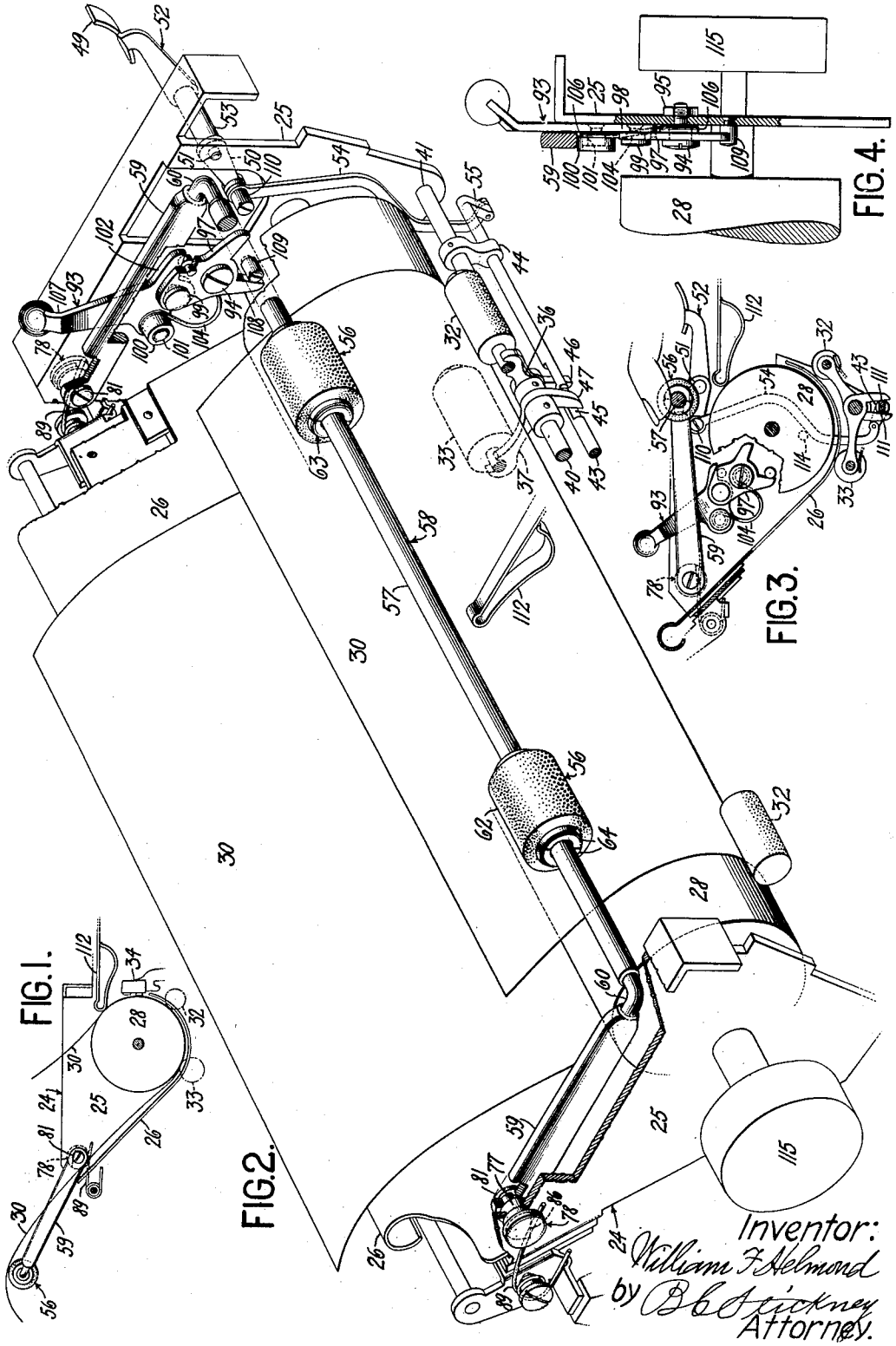


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

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TYPEWRITING MACHINE

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FIG.5.

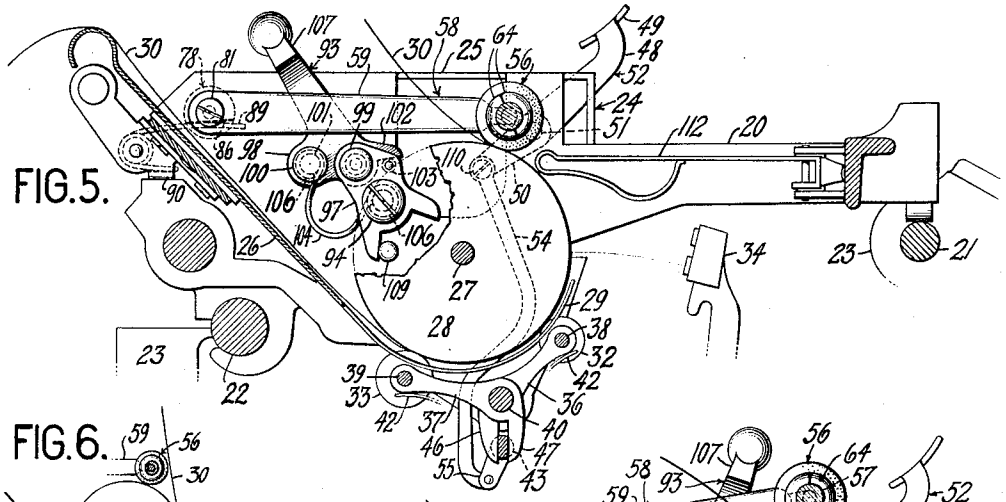


FIG.6.

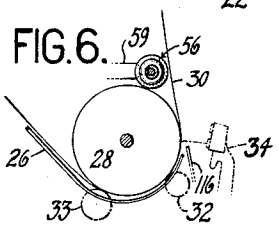


FIG.7.

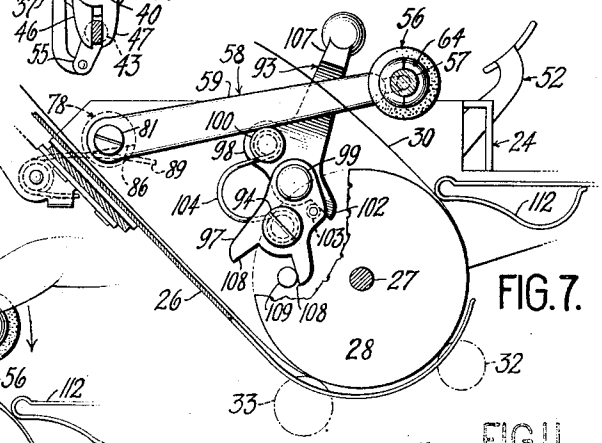


FIG.8.

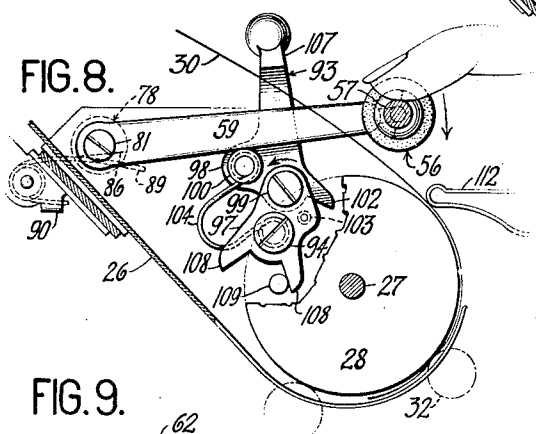


FIG.9.

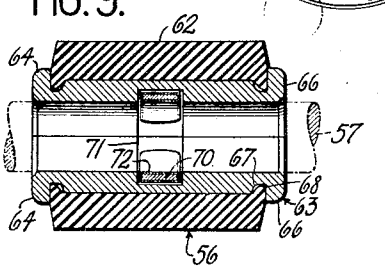


FIG.11.

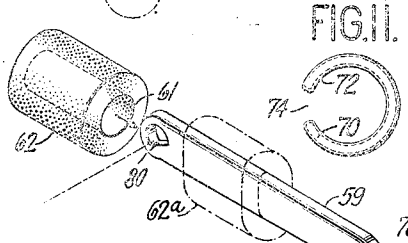
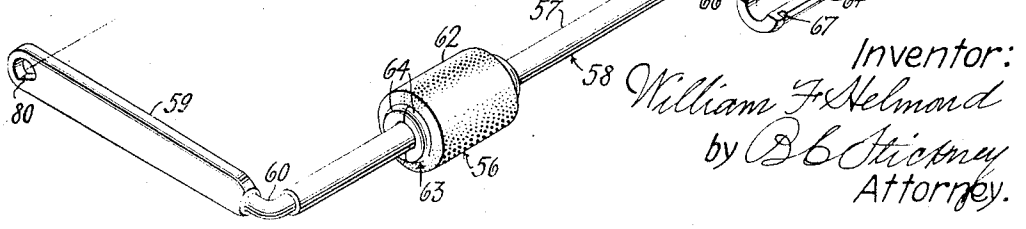


FIG.10.



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TYPEWRITING MACHINE

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FIG. 12.

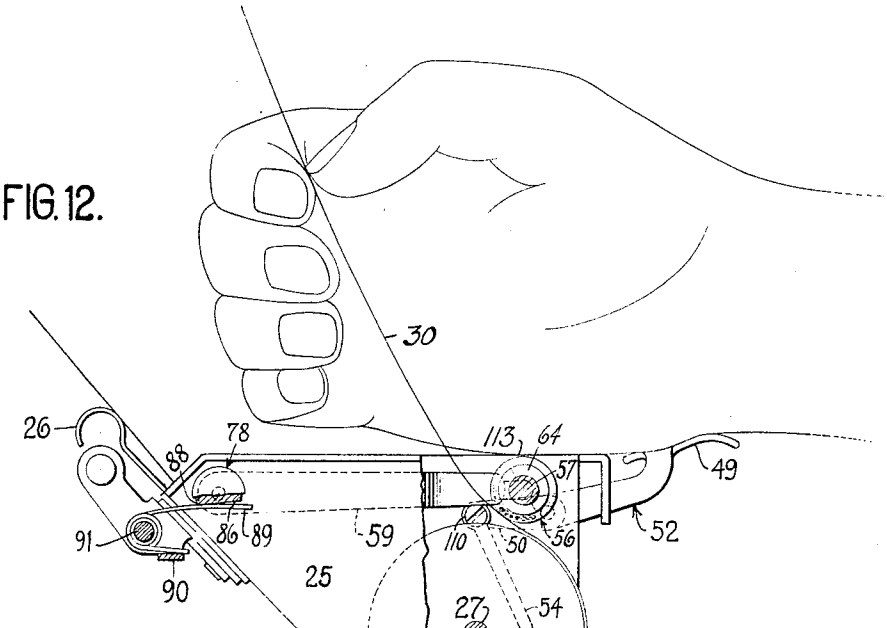


FIG. 13.

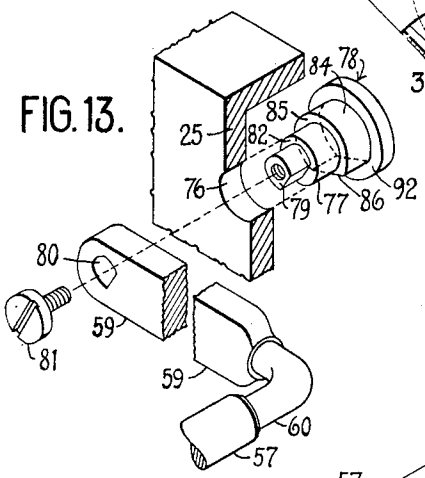


FIG. 14.

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Patented Sept. 28, 1937

2,094,011

UNITED STATES PATENT OFFICE

2,094,011

TYPEWRITING MACHINE

William F. Helmond, West Hartford, Conn., assignor to Underwood Elliott Fisher Company, New York, N. Y., a corporation of Delaware

Application May 9, 1935, Serial No. 20,519
Renewed January 9, 1936

36 Claims. (Cl. 197—138)

This invention relates to the paper-feed-roll mechanism associated with the platen-roll of a typewriter, and affords novel features of improvement designed to simplify the mechanism and facilitate its manufacture, to conduce to convenience and ease of its operation and to other advantages.

An auxiliary or top feed-roll, for holding the paper to the platen above the printing-line, is rotatably mounted on the spindle or cross-rod of a bail; said bail being pivotally supported at its side-arms, so that the top feed-roll may be cast off.

It has been the practice heretofore, in order to thread the feed-roll on the bail-cross rod, which has side-arms formed by bending end-portions of the rod, to make the bend for one of the side-arms after the roll was threaded upon the cross-rod.

This is disadvantageous, inasmuch as it is difficult to polish and plate, or otherwise finish, the bail, after the feed-roll has been placed on the cross-rod, or having first finished the bail, to avoid marring the finish at the arm-bending operation.

One object of the invention is to avoid this and other disadvantages, by providing a feed-roll which may be put upon the bail-cross rod after the latter has had both side-arms bent therefrom.

To this end, the feed-roll may have a longitudinally-split cross-rod-fitting bushing, within a sleeve. Said sleeve, by reason of its bushing-receiving hole, substantially larger than the bail-cross rod, may be threaded over the bend or corner which joints the end of the cross-rod to the side-arm. The sleeve-periphery may constitute the feed-roll periphery.

The longitudinally-split bushing may be made in halves which may be placed upon the bail-cross rod directly and inserted into the space between the sleeve-bore and the cross-rod.

The one-piece sleeve may be of resiliently pliant rubber compound, such as is used for jacketing feed-rolls. The pliability of the rubber sleeve facilitates threading it over the side-arm and onto the cross-rod. It is feasible to use end-flanges upon the split bushing for retaining the latter after its insertion within the rubber sleeve, since the latter may stretch for passing one of said end-flanges, and will snap back into its natural form to hug the split-bushing periphery between the flanges.

The bushing-halves may be produced economically in a mold or die, into which the bushing-material may be placed and accurately formed, so that no further manufacturing operation thereon will be required.

It is a further feature of the invention to use for the moldable bushing-material cellulose acetate, "bakelite", or similar material, which will come from the mold in a smoothly surfaced and accurately dimensioned condition. The smooth surface of such molded material conduces to keeping the bail-cross rod from being marred by the rotation of the feed-roll on the cross-rod.

A friction collar or band of spring-metal is retained within the bore of the split bushing, and has a spring fit upon the cross-rod to frictionally detent the feed-roll at any position to which it is set along said cross-rod. In order to make the cross-rod-embracing surface of the metal friction collar smooth, it is a feature of the invention to coat it with cellulose acetate or similar material, and thereby conduce to preventing the collar from marring the finish of the bail-cross rod when the feed-roll is shifted along the latter.

The feed-roll bail is pivoted at an axis behind the platen for swinging upwardly and rearwardly to bring the top feed-roll entirely away from the platen. A bail-spring is effective in the normal bail-position to keep the feed-roll against the platen.

A bail-side-arm-engaging lever is operable manually to effect and gage a lesser swing of the bail to bring the feed-roll to a partly cast-off position just above the platen, as when a worksheet is to be introduced between the platen and feed-roll. Said bail-shifting lever comprises a novel jointed bail-lifting arm and a co-operating spring, which, upon swinging said lever from a normal position to a stop, co-operate to uphold the bail and stably maintain it in the partly cast-off position. But, in response to a finger-pressure upon the bail directly, the jointed arm and spring yield in a manner to permit restoration of the bail to the platen by said direct pressure, and, furthermore, by so yielding, to cause the bail-lifting lever to snap back to its normal position automatically. This novel flexible-arm bail-lever is advantageous, in that it will coact with a simple edge on the bail-side-arm, and in that it may easily be applied to an existing machine, inasmuch as the latter need be provided only with two holes, one for a lever-pivot and another for a lever stop-stud.

Main feed-rolls hold the paper to the platen below the printing-line, and there is employed a train including a finger-piece depressible to set said train to a position in which the feed-rolls are cast off and maintained. Said train is arranged

so that a partial depression of the finger-piece will release the main feed-rolls, but will not keep them in released position; the arrangement being such that upon letting go of the partially depressed finger-piece the latter becomes self-restored, as distinguished from the manual restoration required for the fully depressed finger-piece. There is further employed a connection whereby partial or full depression of said finger-piece will also raise the top feed-roll bail and thereby release the top feed-roll together with the main feed-rolls. The partial depression of the finger-piece and consequent release of the main and auxiliary feed-rolls will permit the paper to be squared or otherwise adjusted around the platen.

It is a further feature of the invention to make provision whereby proper partial depression of said finger-piece, without liability of overthrow, which would prevent self-restoration of the feed-rolls, may be made by the typist's hand, and whereby said hand at the same time remains capable of adjusting the work-sheet.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a side-view diagram showing the top feed-roll bail swung upwardly and rearwardly to a fully cast-off position.

Figure 2 is a perspective view of the platen-frame and feed-roll mechanism.

Figure 3 is a side-view of the platen-frame and feed-roll mechanism, and represents restoration of the main feed-rolls, the top feed-roll-raising lever, and the top feed-roll bail by direct finger-pressure upon the latter.

Figure 4 is a part-sectioned front-view showing the novel bail-lifting lever and the mounting thereof at the end of the platen-frame, the view corresponding to the positions of the parts in Figure 7.

Figure 5 is a cross-section side-view of the typewriter-carriage and feed-roll mechanism, and shows the latter in the normal or work-sheet-holding condition.

Figure 6 is a side-view diagram showing the top feed-roll resting idly upon the platen, while the work-sheet, for typing, passes in front of, instead of under, said auxiliary feed-roll.

Figure 7 is a part-sectioned side-view showing the top feed-roll bail in raised position, following operation of the novel bail-lifting lever.

Figure 8 is a view similar to Figure 7 and represents the yielding of the novel jointed arm and spring of the bail-raising lever to permit restoration of the top feed-roll bail by direct finger-pressure.

Figure 9 is an enlarged longitudinal-section view of the novel feed-roll as assembled upon the bail-cross rod.

Figure 10 is a perspective view representing the novel bail in its finished condition with the side-arms bent therefrom. The view also shows one of the novel feed-rolls in place upon the cross-rod of such bail, and also shows how the novel feed-roll may be assembled upon said cross-rod.

Figure 11 is a side-view of the cross-rod-engaging friction band, and represents said band as having a smooth anti-friction coating.

Figure 12 is a part-sectioned side-view of the platen-frame structure and feed-roll mechanism, and shows the arrangement whereby the typist's hand may partly depress a feed-roll-releasing finger-piece, and, while maintaining said finger-piece in proper partly-depressed position, she may use the same hand for adjusting a work-sheet around the platen.

Figure 13 is a perspective view of details, spread out, of the bail-pivoting means.

Figure 14 is a perspective view of a paper-bail-blank, including end-portions from which the side-arms of the bail may be bent.

The novel feed-roll-mechanism features are herein illustrated as applied to a typewriter-carriage such as the Underwood in which a carriage-frame **20**, Figure 5, runs upon front and rear rails **21**, **22**, supported by standards **23** of the machine-frame.

The carriage also includes a platen-frame **24**, comprising side-plates **25** and a rear paper-table **26**, joined to said side-plates, the latter having journaled therein an axle **27** for a platen **28**.

The rear paper-table **26** has a portion **29** curving around the bottom of the platen to direct a work-sheet **30** between the platen and releasable main feed-rolls **32**, **33**, and up to the printing-line, at which types **34** print. Arms **36**, **37** support spindle-rods **38**, **39** for the main feed-rolls **32**, **33**, said arms extending respectively forwardly and rearwardly from a common fulcrum-rod **40**, supported at its ends by the platen-frame side-plates, as at **41**, Figure 2. Springs **42** pressing upon the arms **36**, **37**, serve to press the main feed-rolls **32**, **33** against the platen.

For rocking the main-feed-roll-carrying arms **36**, **37** jointly about the common fulcrum-rod **40**, to withdraw and thereby release the main-feed-rolls from the platen, the main-feed-roll mechanism includes a cam-shaft **43**, journaled in hangers **44** depending from the fulcrum-rod **40**. Said cam-shaft **43** has camming flats **45** which may coact with arms **46**, **47**, connected respectively to the main-feed-roll-spindle-supporting arms **36**, **37**. It will be understood that a suitable number of pairs of the main-feed-rolls **32**, **33**, controlled by the common cam-shaft **43**, may be provided.

A manually-operable feed-roll-release lever **52**, comprising an arm **48** provided with a finger-piece or handle **49** and another arm **50**, is pivoted upon a fulcrum-stud **51** extending from one of the platen-frame side-plates **25**, said arms having a common hub **53**, and the arm **50** being connected by a link **54** to a crank **55** of the feed-roll-releasing cam-shaft **43**.

Top feed-rolls **56**, for holding the work-sheet **30** to the platen above the printing-line, are rotatably mounted upon a spindle or cross-rod **57** of a bail **58**, having side-arms **59**, pivoted to the platen-frame **24**, as will presently be described, for swinging said top feed-rolls to and from the platen.

The bail-side-arms **59** are made integral with, and are thereby rigidly joined to, the bail-cross rod **57**, and for this purpose said bail may be made from an originally substantially straight blank, such as is represented in Figure 14.

It is feasible, by reason of novel features of the top feed-rolls, which will presently be described, to make the bail-side-arms **59** of vertically oblong cross-section of substantially greater depth than the diameter of the bail-cross rod and thereby stiffen said side-arms. The shaping of the end or side arm portions **59** of the Figure 14 blank to the desired oblong cross-section may be done by a swedging operation. A swedging operation may also produce in the Figure 14 blank, reduced neck-portions **60** of smaller diameter than the cross-rod. The Figure 14 blank is bent at said reduced neck-portions to form the bail, the side-arms **59**

of which, thus bent from the Figure 14 blank, are indicated by the dotted outline in Figure 14. The reduction in the diameter at the neck-portions 60 facilitates the bending operation. It also neatly demarcates the oblong side-arms 59 from the cross-rod 57 of the bail. Before the swedging operation, the side-arm portions 59 of the Figure 14 blank may be of the same diameter as the cross-rod portions 57, and it is therefore feasible to produce said blank from a suitable length of cold-drawn or cold-rolled round stock.

The bail 58 is completely finished as in Figure 10 before the top feed-rolls 56 are placed thereon. Thus, if the finishing of the bail includes polishing and plating the same, this operation may be completed after the side-arms are bent and before the feed-rolls are assembled upon the bail, and, to make feasible the placing of the feed-rolls 56 upon the bail after the arms have been bent, said feed-rolls have the following novel construction.

A sleeve 62 of suitable resiliently pliable rubber compound forms the jacket of the top feed-roll 56 and has a bore 61 larger than the diameter of the bail-cross rod 57 to receive a bushing 63. Without said bushing, said jacket may be threaded over one of the side-arms 59, around the neck 60 and over the cross-rod 57 of the bail. Inasmuch as the jacket 62 may stretch and bend as indicated in Figure 10 by the dotted outlines 62^a, the threading of said jacket onto the bail is facilitated, the empty bushing-receiving bore 61 of the jacket also conducing to facilitating the threading operation.

In order that the bushing 63 may be placed around the cross-rod of the completed bail 58, and within the jacket 62, said bushing is longitudinally split or divided into separate portions 64, each portion forming one-half of the bushing, as seen at Figure 10, which shows said half-portions separately. The separate half-portions 64 may be brought together, as represented by the dotted lines 65, Figure 10, to encircle the cross-rod 57, preparatory to being in turn encircled and held together by the rubber jacket 62. Each half-portion 64 of the bushing may have end-flanges 66 to abut the ends of the rubber jacket 62, to thereby keep the bushing and the surrounding jacket from becoming relatively displaced endwise after their assembly. In bringing the jacket 62 and bushing 63 together, as by slipping the jacket, first separately threaded onto the bail cross-rod 57, over the cross-rod encircling bushing half-portion 64, one of the flanges 66 passes the bore of the rubber jacket which consequently stretches to accommodate such passage, but thereafter snaps back into its natural form, in which, as seen in Figure 9, the bore of the jacket 62 tightly hugs the periphery of the two associated half-portions 64. Said periphery may have a recess 67 adjacent each flange 66, whereby the bushing-hugging bore 61 of the jacket 62 may bulge inwardly at its ends, as indicated at 68, to thereby conduce to keeping the jacket 62 and bushing half-portions 64 in transverse alignment. The bore 61 of the elastic jacket 62 may be sufficiently undersize relatively to the bushing periphery to conduce to tight embrace of the half-portions 64 by said jacket.

The bushing 63, encircled by the jacket 62, as in Figure 10, rotatably fits the bail-cross rod 57, and is also rotatable relatively to a bail-cross-rod-gripping spring-collar 70, which is located within an annular groove 71 formed in the bore of the bushing. The spring-collar 70 thus co-operates to hold the feed-roll 56 in any position to which the latter may be adjusted along the cross-rod 57, it being understood that the resilient grip of the collar 70 will yield so that the collar will slide along the cross-rod to permit such adjustment. The collar 70 is preferably made of spring-metal, and, to avoid marring the finished surface of the cross-rod as the collar slides therealong at the adjustment of the feed-roll, the spring-metal may be made smooth by a coating of cellulose acetate, represented by 72, Figures 9 and 11. Said coating 72 may be deposited by dipping the collar in the cellulose acetate, or by spraying the latter on the collar. Each half-portion 64 of the bushing may have its part of the annular collar-groove 71, as indicated at Figure 10.

The bushing-half-portion 64, as seen separately in Figure 10, may be economically made in a mold or die. It is advantageous to mold the half-portions from cellulose acetate, "bakelite" compound, or similar material, which will come from the mold or die smoothly surfaced and accurately dimensioned, so that practically no further operation is needed to prepare the molded half-portion for use in the feed-roll. By reason of the smooth surface and low friction coefficient of such molded bushing material, the bushing may rotate freely upon, or slide along, the bail-cross rod 57 and with minimum liability of marring the finished surface of said cross-rod.

The bushing material of cellulose acetate, "bakelite" compound or the like, is light, and so conduces to minimizing the weight of the bail; and such material is, moreover, non-resonant and therefore conduces to reducing rattling noises that might otherwise arise from any play between the bushing and the bail-cross rod.

Preparatory to placing the bushing-halves 64 upon the bail-cross rod, the coated collar 70 is clipped upon said cross-rod, and this is best done by passing the collar over the reduced neck-portion 60 of the bail, as indicated by the arrow 73, Figure 10. A gap 74, Figure 11, in the collar 70 enables the collar to pass the side-arm part of said neck, it being noted that the reduced diameter of the neck-portion 60 makes it feasible to correspondingly minimize said gap, so that the collar may sufficiently embrace the bail-cross rod 57. Figure 2 represents the bail 58 as being provided with two of the novel feed-rolls 56; but it will be understood that said bail may have any other suitable number of said feed-rolls.

For pivotally mounting the top feed-roll bail 58 to swing toward and from the platen, and for spring-pressing the bail to keep the feed-rolls against the platen, the following means and arrangement are shown.

With the top feed-rolls 56 resting upon the platen and the bail-side-arms extending rearwardly, the bail-pivot axis is preferably taken near the front of the rear paper-table 26 and within the platen-frame side-plates 25, as indicated in Figure 5. Each plate 25 has a bail-pivot hole 76, Figure 13, into which is inserted, from the outside of the plate 25, a pivot-journal 77 formed on a journal-member 78. Said member 78 has a reduced end-portion 79 of D-shaped cross-section which fits into a D-shaped hole 80 in the companion bail side-arm 59 to key said member 78 to said side-arm, a headed screw 81 being threaded into the end of the D-shaped portion 79 to draw the side-arm against a shoulder 82 from which said reduced D-shaped portion extends. Each bail-side-arm member 78 also has an enlargement 84 at the outer end of the journal 77 to form a shoulder 85, which may stop

against the outer face of the the side-plate 25, for retaining the bail against lateral displacement. The enlargement 84 has its periphery flattened as at 86 to afford a corner 88, best seen in Figure 12, against which a spring 89 bears to urge the bail toward the platen. Said spring reacts against an abutment 90, and is coiled around and retained by a headed stud 91 on the platen-frame 24. The enlargement 84 of the journal-member 78 may have a flange 92 to keep the tail of the spring 89 in place.

For lifting the top paper-bail 58 and maintaining it in a partly cast-off position wherein the top feed-rolls are sufficiently above the platen 28 to clear the work-sheet 30, as in Figure 7, the following novel means are shown.

A bail-lifting lever 93 is pivoted to the inner face of one of the side-plates 25 by a headed fulcrum-stud 94 secured to said side-plate as by a nut 95, Figure 4. The bail-engaging arm of said lever 93 is made flexible and to this end is jointed in that it comprises a lower member 97, which bears upon said fulcrum-stud 94, and an upper member 98 which is pivotally joined to the lower member 97 by a headed pivot-stud 99. Said upper member 98 presents a roller 100, pivoted upon a stud 101, under the bail-side-arm 59. Relative rotation of the upper and lower members 97 and 98 about their pivotal joint or stud 99 is stopped in one direction by abutment of stops 102, 103 on the respective members, and the latter are normally maintained in such abutment by a U-shaped spring 104. At such abutment of said members 97 and 98, as in Figure 5, the center of their pivotal joint or stud 99 is offset from a straight line connecting the centers of the roller 100 and the lever-fulcrum-stud 94.

For applying the U-shaped spring 104 so that its force maintains said lever-members 97, 98 in abutment at the stops 102, 103, as in Figure 5, the two legs of said spring may react respectively against the roller-stud 101, on the upper member 98, and against the lever-fulcrum-stud 94, it being understood that the spring is contracted between said studs, so that it exerts a force tending to spring its two legs apart. Each leg may have a stud-encircling loop 106 to keep said spring 104 in place. Figure 4 represents one spring-leg as having its loop 106 between the lower lever-member 97 and the platen-frame side-plate 25, to react against the fulcrum-stud 94; the other spring-leg having its loop 106 between the roller 100 and the upper member 98, to react against the roller-stud 101.

For manually swinging it between the normal, Figure 5 position and the bail-lifting, Figure 7 position, the lever 93 includes a finger-arm 107 which may be part of the upper lever-member 98, to extend upwardly between the platen-frame side-plate 25 and the bail-side-arm 59. The swing of the lever 93 between the Figures 5 and 7 positions is limited by means of spaced stops 108 provided on the lower lever-member 97 and abutting respectively, as represented in said Figures 5 and 7, a stop 109, on the platen-frame side-plate 25.

By moving its finger-arm 107 forwardly, from the Figure 5 to the Figure 7 position, the bail-lifting lever 93 swings as a unit about the fulcrum-stud 94; and the accompanying upward and forward swing of the roller 100 causes the latter, by engaging the lower edge of the bail-side-arm 59 to lift the bail to the Figure 7 position. The lever 93 will maintain itself and the bail in the Figure 7 position, inasmuch as a straight line which connects the centers of the bail-upholding roller 100 and the lever-fulcrum-stud 94 may be at or slightly beyond a perpendicular to the lower bail-arm edge engaged by said roller, and the weight of the bail and the force of the bail-restoring springs 89 have therefore, in the Figure 7 position, no moment effective about the lever-fulcrum-stud 94 for reversing the lever 93; it being noted also that the spring 104 is strong enough so as not to yield under said bail-weight and bail-spring force.

Return of the bail to the platen will result from manually moving the finger-arm 107 back to the Figure 5 position.

For permitting restoration of the bail by direct finger-pressure thereon indicated in Figure 8, and incidentally effecting automatic restoration of the lever 93, said lever 93 operates as follows.

Under said direct finger-pressure the U-shaped lever-spring 104 will yield and there will be a swing, leftward of Figure 8, of the upper lever-member 98 about the pivotal joint 99, inasmuch as, during the initial part of the bail-depression, the lower member 97, together with said pivotal joint or stud 99, tends to remain stationary, as is indicated in said Figure 8, by the separation of the stops 102, 103 on said members 97, 98.

The yielding of the lever-spring 104 and leftward swing of the upper lever-member 98 about the pivot-joint 99 continues until depression of the bail 58 and consequent movement of the roller 100 to the left of the lever-fulcrum 94 have proceeded far enough to cause the lever to snap back to its normal Figure 5 position. The snapping back of the lever is induced by the lever-turning moment which the finger-pressure can exert through the bail and roller 100 by reason of said roller 100 becoming moved by the leftward swing of the upper member 98 sufficiently to the left of the lever-fulcrum-stud 94. The snapping back of the lever is also induced by the reaction of the lever-spring 104. In other words, as the upper lever-member 98 swings about the knuckle or joint 99 and the roller 100 moves to the left of the lever-fulcrum 94, while the lower lever-member 97 remains substantially stationary as in Figure 8, a straight line joining the center of the latter and said roller 100 becomes inclined at an increasingly obtuse angle to the lower edge of the bail-arm 59 engaged by said roller, and the latter, at some point in the depression of the bail 58, will accordingly be caused to roll leftward along said edge as the force in the spring 104 tends to bring the lever-members 97, 98 back to their abutting positions, and incidentally induces restoration of the lever 93 with a snap.

Figure 8 represents the paper-bail 58 at the point of its manual depression by the indicated finger where the lever 93 is about to snap back, as described, to its Figure 5 position as the restoration of said bail to the platen is completed.

Figure 1 represents the paper-bail 58 swung upwardly and rearwardly until stopped, as indicated, by the rear paper-table 26. In the Figure 1 position, said paper-bail is therefore completely removed from proximity to the platen, and in said position it may also co-operate to support the trailing side of the work-sheet, as indicated.

Figure 6 represents the paper-bail 58 in its normal position on the platen, and shows how the work-sheet 30 may pass in front of said bail, instead of under the bail and its top feed-rolls 56.

It will be seen now that the novel bail-raising lever 93 is easily applicable to existing machines,

inasmuch as all that is required for its installation is the provision of two holes respectively for the lever-fulcrum-stud **94** and the stop **109**. It will further be seen that said novel lever **93** may coact with the ordinary side-arm edge afforded by said bail **58**, and that the novel lever **93** contains within itself substantially all the elements necessary to provide for its automatic restoration, as described.

The top paper-bail **58** may also be lifted to raise the top feed-rolls **56** off the platen conjointly with casting off the main feed-rolls **32—33**. The arm **50** of the main feed-roll-release lever **52** is provided therefore with a stud **110** extending under the side-arm **59** of the top feed-roll bail **58**. Said stud **110** is operative, as shown in Figure 3, to raise the top bail **58** at operation of said main feed-roll-release lever **52**. Figure 3 further shows said feed-roll-release lever **52** as being fully operated by full depression of its finger-piece **49**, so that the cam-shaft **43**, fully rotated, has its dwells **111** opposing self-restoration, by means of the springs **42**, of the main feed-rolls **32—33** and release train, and thereby also preventing restoration of the top bail **58**. In such case restoration of the feed-rolls depends upon reversely tripping the fully operated main feed-roll-release lever **52**.

Direct finger-pressure upon bail **58**, indicated in Figure 3, will restore said bail to the platen and at the same time will reversely trip the main feed-roll-release lever **52** and its train by means of the stud **110** and thereby cause restoration of the main feed-rolls **32—33** to the normal Figure 5 platen-engaging condition. A paper-finger **112** is pivoted to the carriage-frame **20** to swing into or out of position of use in which said finger cooperates to direct the work-sheet under the top feed-rolls **56**.

Operation of the main feed-roll-release lever **52** by partial depression of its finger-piece **49** will release the top and bottom feed-rolls sufficiently to permit adjustment of the work-sheet **30**, and upon merely letting go of said partially depressed finger-piece **49** said feed-rolls will be restored to grip the adjusted work-sheet since the cam-shaft **43**, having been only partly rotated, cannot sustain said rolls in their partly cast-off position.

In order that said cam-shaft **43** will not be rotated too far by excess depression of the finger-piece **49** which would prevent the desired self-restoration of the feed-rolls; and in order therefore that the typist's hand may effect and gage proper partial depression of said finger-piece and at the same time be free to adjust the work-sheet, the following novel arrangement is provided.

A hand-rest **113** and the finger-piece **49** are relatively disposed so that the heel or side of the typist's hand applied to partially depress said finger-piece **49** encounters or bears against said rest **113** and thereby, as illustrated in Figure 12, is enabled to gage and maintain with steadiness the proper partial depression of the finger-piece **49** while the fingers of the hand are left free to adjust the work-sheet as is also indicated in Figure 12.

Having adjusted the work-sheet, as in Figure 12, the typist's hand may release the finger-piece **49**, which, having been only partly depressed to the proper extent, will become self-restored, thereby causing the top and main feed-rolls to grip the adjusted work-sheet.

Figure 12 shows the top horizontal flange of the platen-frame side-plate **25** serving as the hand-rest or finger-piece depressing gage **113**, and shows the finger-piece **49** arranged relatively to said gage **113**, so that depression of said finger-piece **49**, gaged by abutment with the typist's hand, which, in turn, is gaged by resting upon said flange or rest **113**, as in Figure 12, will be to the proper extent for quick adjustment of the work-sheet and self-restoration of the feed-rolls. It will be understood that said gage **113** also serves for partly releasing the main feed-rolls **32, 33** alone, as when the top paper-bail **58** is in the cast-off position of Figure 1.

It will also be seen that full operation of the feed-roll-release lever **52** is feasible to keep the feed-rolls released as in Figure 3, inasmuch as such full operation is not obstructed by the partial-operation gage **113** itself. Full operation of said feed-roll-release lever **52** may be limited to the proper point by a stop **114**, Figure 3, engaged by the release-lever link **54**, said stop being presented by the platen-frame side-plate **25**.

The platen-axle **27** is provided with the usual platen-knobs **115**, and there may also be provision of the usual line-space detent-devices (not shown) for the platen. The usual paper-scale **116** at the front of the platen is seen at Figures 6 and 12.

Variations may be restorted 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 typing machine having a platen; a bail having a cross-rod and side-arms joined thereto, and a platen-engaging feed-roll journaled on said cross-rod, said feed-roll being constructed of separable elements, whereby said feed-roll may be put upon or removed from said cross-rod without obstruction by said side-arms.

2. In a typing machine having a platen; a bail having a cross-rod and side-arms joined thereto, and a platen-engaging feed-roll journaled on said cross-rod, said feed-roll being constructed of separable elements, whereby said feed-roll may be put upon or removed from said cross-rod without obstruction by said side-arms, said feed-roll elements comprising a jacket which may be separately threaded over one of said side-arms and onto the cross-rod and a sectional bushing placeable upon said cross-rod without obstruction by said side-arms to support said jacket concentrically with said cross-rod.

3. As a new article of manufacture for use with a typing-machine platen, a one-piece paper-bail comprising a cylindrical cross-rod and side-arms of vertically oblong cross-section designed to stiffen said side-arms, said oblong-sectioned side-arms being integral with said cross-rod, as distinguished from separately made and attached side-arms.

4. In a typing machine having a platen, a one-piece paper-bail comprising a cylindrical cross-rod and side-arms of vertically oblong cross-section designed to stiffen said side-arms, said side-arms being integral with said cross-rod, as distinguished from separately made and attached side-arms, and a feed-roll journaled upon said cross-rod, said feed-roll being made in sections for placement upon said cross-rod without obstruction from said side-arms.

5. In a typing machine having a platen, a feed-roll co-operative with the platen and comprising a jacket and a bushing for the jacket longitudinally split into sections, whereby said feed-roll is placeable upon a spindle or journal, having

ends over which the jacket alone may be threaded.

6. In a typing machine having a platen, a feed-roll co-operative with the platen and comprising a jacket and a bushing for the jacket longitudinally split into sections, whereby said feed-roll is placeable upon a spindle or journal, having ends over which the jacket alone may be threaded, the bore of said bushing having an annular recess for retaining a certain adjunct of said feed-roll, and the bushing-sections affording complementary parts of said recess.

7. In a typing machine, a paper-guiding roll comprising an elastic jacket and a bushing therefor longitudinally split into separable sections to facilitate assembly of said roll upon a spindle, said bushing having end-flanges, said jacket by reason of its elasticity being stretchable to pass one of said flanges and then snap over and hug the periphery of the bushing, the sections of the latter having been first put together upon said spindle.

8. In a typing machine having a platen and a co-operative feed-roll, feed-roll-releasing means including a member displaceable manually to a fully operated position to release said feed-roll and maintain it released from the platen, said member being subsequently restored manually for restoring said feed-roll, said member being also partly displaceable manually to thereby partly release said feed-roll sufficiently for adjusting a work-sheet, the partly displaced member and the partly released feed-roll being self-restoring, and a gage against which the typist's hand in partly displacing said member rests, whereby proper extent of said partial displacement is gaged, and whereby said typist's hand is at the same time enabled to adjust said work-sheet.

9. A paper-guiding roll appurtenant to a typing-machine platen, said roll comprising a jacket and a bushing longitudinally split into homologous separable sections to facilitate assembly of said roll upon a spindle.

10. A spindle-engaging bushing for the jacket of a paper-guiding roll appurtenant to a typing-machine platen, said bushing being longitudinally split into separable sections to facilitate assembly of said roll upon the spindle.

11. A spindle-engaging bushing for the jacket of a paper-guiding roll appurtenant to a typing-machine platen, said bushing being longitudinally split into separable sections to facilitate assembly of said roll upon the spindle, said sections being made of a certain class of material, of the order of "bakelite" compound or cellulose acetate, adapted to the purpose of economically molding the section to accurate dimensions and durable smooth hard surfaces and for conducing to non-resonance and lightness in weight of the bushing.

12. A spindle-engaging bushing for the jacket of a paper-guiding roll appurtenant to a typing-machine platen, said bushing being longitudinally split into separable sections to facilitate assembly of said roll upon the spindle, said bushing having jacket-retaining end-flanges afforded by complementary parts of said sections.

13. A spindle-engaging bushing for the jacket of a paper-guiding roll appurtenant to a typing-machine platen, said bushing being longitudinally split into separable sections to facilitate assembly of said roll upon the spindle, said bushing having jacket-retaining end-flanges, and the bore of the bushing having an annular recess for retaining a spindle-gripping element, said bushing-sections affording complementary parts of said flanges and recess.

14. A paper-guiding roll mountable upon a spindle and adjustable to different stations therealong for co-operation with a typing-machine platen, said roll having spindle-gripping means of spring-metal for frictionally holding the roll at any station, said metal means having a coat of cellulose acetate for engaging the spindle, said coat conducing to preventing said means from marring the spindle-surface.

15. In a paper-guiding roll mounted upon a spindle and adjustable therealong to different stations for co-operation with a typing-machine platen, a spindle-gripping ring of spring-metal having a coat of cellulose acetate for engaging the spindle to frictionally hold the roll at any station, said coat conducing to preventing said ring from marring the spindle-surface.

16. In a typing machine comprising a platen, end-supports in which the platen is journaled, and a paper-holding bail appurtenant to the platen; means pivoting said bail to swing to and from the platen and to press the bail toward the platen, said means including a journal-member separable from each bail-side-arm, the latter being disposed adjacent the inner side of a companion one of said platen-journaling supports, a pivot-journal afforded by said member being insertable into a pivot-hole, provided in said support, from the outer side of the latter and being rigidly attachable to the bail-side-arm, said journal-member having an enlargement forming a shoulder to abut said outer side of the support for retaining said bail laterally, and a spring bearing against a companion part of said journal-member outside of said support to press said bail toward the platen, said part and spring being relatively arranged so that said part may traverse said spring as the bail is swung to and from the platen.

17. A paper-holding bail, appurtenant to a typing-machine platen, said bail having a cross-rod and side-arms joined thereto, and a roll journaled on said cross-rod, said roll including a jacket having a bore of larger diameter than said cross-rod, said jacket being thereby separately threadable onto the cross-rod, by way of one of said side-arms, and a bushing comprising separable sections which may be put together around said cross-rod, and which may thereupon be surrounded by said jacket.

18. A paper-holding bail, appurtenant to a typing-machine platen, said bail having a cross-rod and side-arms joined thereto, and a roll journaled on said cross-rod, said roll including a jacket having a bore of larger diameter than said cross-rod, said jacket being thereby separately threadable onto the cross-rod, by way of one of said side-arms, and a bushing comprising separable sections which may be put together around said cross-rod, and which may thereupon be surrounded by said jacket, the jacket being elastic, and its bore being undersize relatively to the sectional bushing, so that the surrounding jacket firmly embraces and keeps the bushing-sections together.

19. A paper-holding roll, appurtenant to a typing-machine platen, comprising a bushing longitudinally split into separate sections which may be put together around a spindle for the roll, and jacketing means arranged to surround the bushing and keep its sections in place, said jacketing means also presenting the paper-engaging periphery of the roll.

20. In a front-strike typewriting machine, the combination of a revoluble platen, a feed-roll near the bottom of the platen, a paper-holding bail pivoted behind the platen to swing upwardly and rearwardly from an effective position at the top of the platen to an idle position remote from the platen, a spring-device acting to maintain said bail in its effective position, and means conditionable manually to cast off said bottom feed-roll, and simultaneously cast off said bail to a position intermediate its said idle and effective positions, said means being effective, when conditioned, to hold said bottom feed-roll in cast-off position and to hold said bail in said intermediate position, said casting-off and holding means including provision enabling manual pressure upon said bail to restore the bail to the platen from said intermediate position and to simultaneously restore the bottom feed-roll, said manual pressure upon said bail being also effective to restore said casting-off and holding means.

21. In a front-strike typewriting machine, the combination of a revoluble platen, a feed-roll near the bottom of the platen, a paper-holding bail pivoted behind the platen to swing upwardly and rearwardly from an effective position at the top of the platen to an idle position remote from the platen, a spring-device acting to maintain said bail in its effective position, an omnibus casting-off device shiftable manually to operative position to cast off said bottom feed-roll, and to simultaneously cast off said bail to a position intermediate its said idle and effective positions, said omnibus casting-off device being effective, when set, to hold said bottom feed-roll in cast-off position and to hold said bail in said intermediate position, and a bail casting-off device shiftable manually to operative position, independently of said omnibus casting-off device, to cast off said bail and hold it in its intermediate position independently of the lower feed-roll, said casting-off and holding devices including provision enabling manual pressure upon said bail to restore the bail and to restore the bottom feed-roll if the latter has also been cast off, and to restore said casting-off devices, said bail casting-off device including provision whereby it yields and in so yielding snaps back to its restored position at said manual pressure upon the bail.

22. In a front-strike typewriting machine, the combination of a revoluble platen, a feed-roll near the bottom of the platen, a paper-holding bail mounted for engaging the top of the platen, a key-operated device conditionable manually by operation of its key to jointly cast off and hold said bottom feed-roll and said paper-holding bail, and another key-operated device conditionable manually by operation of its key to cast off and hold said paper-holding bail alone, said manually-conditionable casting-off and holding devices including provision enabling manual pressure upon the cast-off bail to restore the latter, and to restore the bottom feed-roll if the latter has also been cast off, and to restore said key-operated devices, said other key-operated device including provision whereby it yields and, in so yielding, snaps back to its restored position at said manual pressure upon the bail.

23. In a typewriting machine, the combination of a revoluble platen, a support, a paper-holding bail pivoted to said support for engaging the platen, and a manually-operable unitary bail casting-off lever pivoted to said support for engaging said bail, said lever being effective when rocked from an idle to an operative position to cast off said bail and being also effective in said operative position to sustain said bail in cast-off position, said unitary lever including a substantially flexible bail engaging and sustaining arm whereby said arm is capable of yielding resiliently and thereby causing said lever to become restored to its idle position when manual pressure is exerted directly upon said bail to restore the latter to the platen.

24. In a typewriting machine having a platen, the combination of a paper-holding bail fulcrumed for engaging the platen, a bail-controlling lever, and a fulcrum for said lever, said lever including a base-part pivoted to said lever-fulcrum, said lever also including a bail-engaging extension having a hinge-connection to said base-part and stopping against the latter to establish normal relative positions, of said base-part and extension, wherein said hinge-connection is offset from a straight line from said lever-fulcrum to the bail engaging point of said extension, and a spring acting to yieldably maintain said part and extension in said normal relative positions, whereby said bail, after having been cast off and held cast off by rocking said lever from an idle position preparatory to introducing a work-sheet between said bail and platen, may be restored by direct manual pressure thereon, said rocked lever yielding by means of said hinge-connection under said direct pressure on the bail, and said spring becoming effective at the yielding of said lever to automatically restore the latter to its idle position.

25. A paper-guiding roll appurtenant to a typing-machine platen, said roll comprising a jacket having a paper-feeding surface and a bushing longitudinally split into separable sections to facilitate assembly of said roll upon a spindle.

26. In a typing machine having a cylindrical, rotatable platen, a feed-roll co-operative with the platen and comprising a jacket and a bushing for the jacket longitudinally split into sections, whereby said feed-roll is placeable upon a spindle or journal having parts over which the jacket alone may be threaded.

27. A spindle-engaging bushing for the jacket of a paper-guiding roll appurtenant to a typing-machine platen, said bushing being longitudinally split into separable sections to facilitate assembly of said roll upon the spindle, and the bore of the bushing having an annular recess for retaining a spindle-gripping element, said bushing-sections affording complementary parts of said recess.

28. A paper-guiding roll mountable upon a spindle and adjustable to different stations therealong for co-operation with a typing-machine platen, said roll having a spindle-contacting core formed of non-scratching and non-sonorous material, such as bakelite, said roll having spindle-gripping means of elastic non-scratching and non-sonorous material for frictionally holding the roll at any station on the spindle.

29. A paper-guiding roll mountable upon a spindle and adjustable to different stations therealong for co-operation with a typing-machine platen, said roll having a spindle-contacting core formed of non-scratching and non-sonorous material, and non-scratching and non-sonorous means for frictionally holding the roll at any station on the spindle.

30. As a new article of manufacture for use with a typing-machine platen, a one-piece paper-bail comprising a spindle having cylindrical bearing surfaces and side arms vertically elongated in

cross-section in order to stiffen said side arms against yielding in a vertical plane, said side arms being integral with said spindle whereby said paper-bail as a unit is free from any joints between said spindle and said side arms.

31. In a typing-machine, the combination of a platen, a reciprocatory carriage in which it is rotatable, a support, a feed-roll, means comprising a pivotal connection for holding said feed-roll in engagement with the platen, and a roll-casting-off lever pivoted to said support and manually shiftable from a normal position to a casting-off position, said lever comprising two parts pivotally connected so as to permit the two parts to oscillate with reference to each other, and a spring connection between the two parts, whereby the roll may be moved out of operative position away from the platen and so held under spring tension, but the roll may be returned to engagement with the platen by direct manual pressure thereon, and the lever restored to its normal position.

32. In a typewriting or other machine, in combination, a support, a part mounted on said support and movable in a predetermined direction from one position to another position, and a unitary lever mounted on the support and movable transversely with reference to said part, said lever being effective when rocked from one position to another position to move said part, and being also effective to hold said movable part in the position to which it is moved, said unitary lever including a resiliently flexible arm to move and hold said part, whereby sufficient pressure on the movable part, in opposition to the direction in which it has been moved, causes said arm to flex and thereby release said securing lever and restore said lever to the original position.

33. In a front-strike typewriting machine, the combination with a revoluble platen, of an upper feed-roll mounted to run on the top of the platen and to swing up and off therefrom to a position of disuse, rolls mounted to run upon the bottom of the platen; all of said rolls normally bearing against the platen, and means for moving said upper roll to a mechanically determined intermediate-release position near the platen, including an intermediate-position finder for said roll, said releasing means and intermediate-position finder including a key depressible by the operator's hand, a fixed gage mounted in position to be encountered by and co-operate with the hand when it is depressing said key, to arrest the hand and key at mid stroke, to determine mechanically the intermediate-release position of said upper feed-roll, said gage serving as a means to support the hand while the fingers are left free to adjust the released work-sheet on the platen; a connection extending from said key for moving the feed-roll away from the platen either to the mechanically determined intermediate position, or to a full release position, releasing connections also extending from said key to said bottom rolls; and key-returning means, including a spring, acting when the hand is withdrawn from said key, to return the rolls to normal work-sheet-gripping positions.

34. In a front-strike typewriting machine, the combination with a revoluble platen, of an upper feed-roll mounted to run on the top of the platen and to swing up and off therefrom to a position of disuse, rolls mounted to run upon the bottom of the platen; all of said rolls normally bearing against the platen, and means for moving said upper roll to a mechanically determined intermediate-release position near the platen, including an intermediate-position finder for said roll, said releasing means and intermediate-position finder including a key depressible by the operator's hand, a fixed gage mounted in position to be encountered by and co-operate with the hand when it is depressing said key, to arrest the hand and key at mid stroke, to determine mechanically the intermediate-release position of said upper feed-roll, said gage serving as a means to support the hand while the fingers are left free to adjust the released work-sheet on the platen; a connection extending from said key for moving the feed-roll away from the platen either to the mechanically determined intermediate position, or to a full release position, releasing connections also extending from said key to said bottom rolls; and key-returning means, including a spring, acting when the hand is withdrawn from said key, to return the rolls to normal work-sheet-gripping positions; said key being depressible past said gage to cast off the top and bottom feed-rolls, detent-means being provided and becoming effective when the key is depressed past said gage to maintain said top and bottom feed-rolls mechanically in cast-off position, said detent-means also being then effective to keep said key down, said key co-operating with said connections and spring at manual return of the fully depressed key to restore said feed-rolls from fully cast-off positions.

35. In a front-strike typewriting machine, the combination with a revoluble platen, of a feed-roll, a bail mounting said feed-roll to run on top of the platen and to swing up and off therefrom to a position of disuse, rolls mounted to run upon the bottom of the platen; all of said rolls normally bearing against the platen, and means for moving said bail and its roll to a mechanically determined intermediate-release position near the platen, including an intermediate-position finder for said bail, said releasing means and intermediate-position finder including a key depressible by the operator's hand, a fixed gage mounted in position to be encountered by and co-operate with the hand when it is depressing said key, to arrest the hand and key at mid stroke, to determine mechanically the intermediate-releasing position of said bail, said gage serving as a means to support the hand while the fingers are left free to adjust the released work-sheet on the platen; a connection extending from said key to said bail for moving the bail away from the platen either to the mechanically determined intermediate position or to a full release position, said connection being arranged for permitting said bail to be swung individually to said position of disuse, releasing connections also extending from said key to said bottom rolls, and key-returning means, including a spring, acting when the hand is withdrawn from said key, to return the rolls to work-sheet-gripping positions.

36. In a front-strike typewriting machine, the combination with a revoluble platen, of a feed-roll, a bail mounting said feed-roll to run on top of the platen and to swing up and off therefrom to a position of disuse, rolls mounted to run upon the bottom of the platen; all of said rolls normally bearing against the platen, and means for moving said bail and its roll to a mechanically determined intermediate-release position near the platen, including an intermediate-position finder for said bail, said releasing means and intermediate-position finder including a key depressible by the operator's hand, a fixed gage

mounted in position to be encountered by and co-operate with the hand when it is depressing said key, to arrest the hand and key at mid stroke, to determine mechanically the intermediate-releasing position of said bail, said gage serving as a means to support the hand while the fingers are left free to adjust the released work-sheet on the platen; a connection extending from said key to said bail for moving the bail away from the platen either to the mechanically determined intermediate position or to a full release position, said connection being arranged for permitting said bail to be swung individually to said position of disuse, releasing connections also extending from said key to said bottom rolls, and key-returning means, including a spring, acting when the hand is withdrawn from said key, to return the rolls to work-sheet-gripping positions, said key being depressible past said gage to cast off the top and bottom feed-rolls including said bail, detent-means being provided and becoming effective when the key is depressed past said gage to maintain said top and bottom feed-rolls including said bail mechanically in cast-off position, said detent-means being then effective to keep said key down, said key co-operating with said connections and spring at manual return of the fully depressed key to restore said feed-rolls and bail from fully cast-off positions.

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