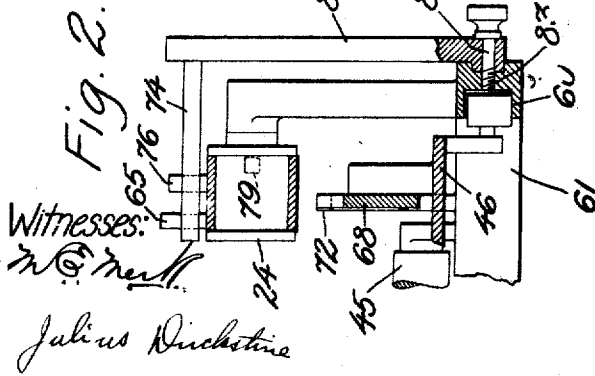
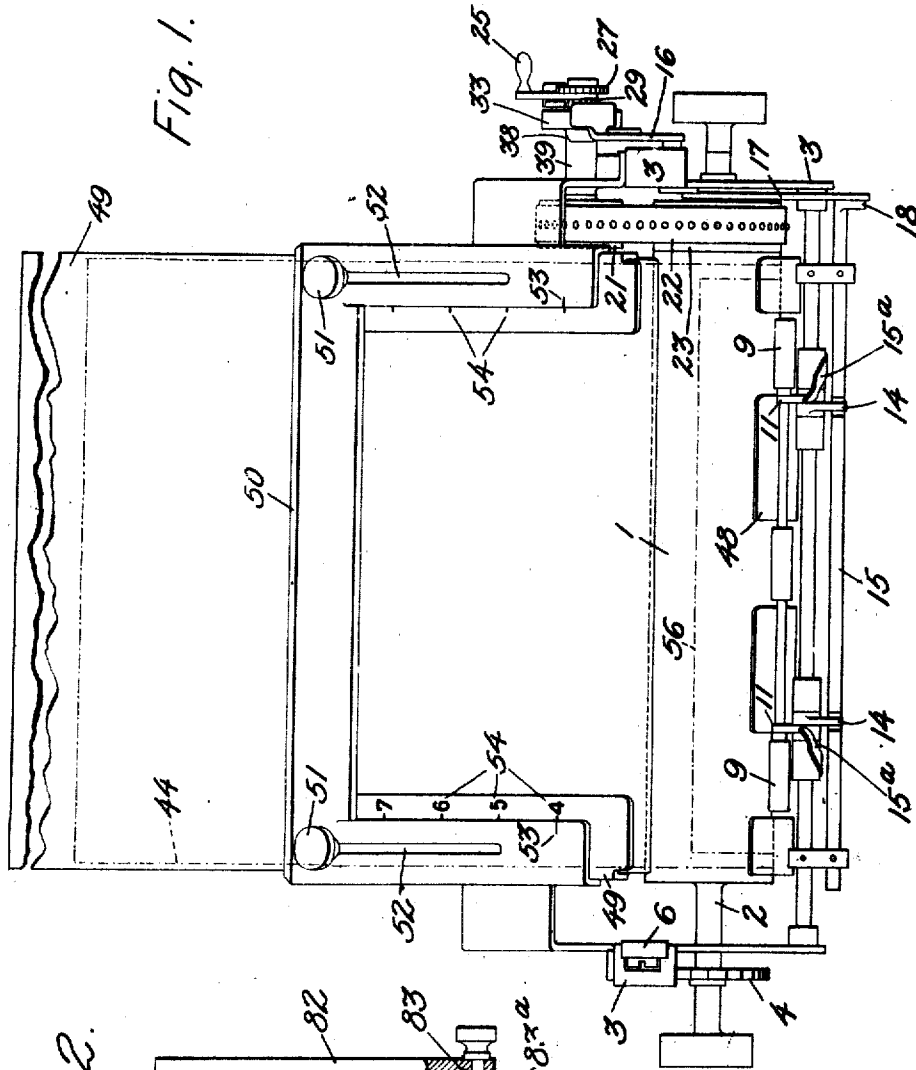


1,356,893.

B. C. STICKNEY,
TYPEWRITING MACHINE.
APPLICATION FILED MAY 19, 1917.

Patented Oct. 26, 1920.
4 SHEETS—SHEET 1.



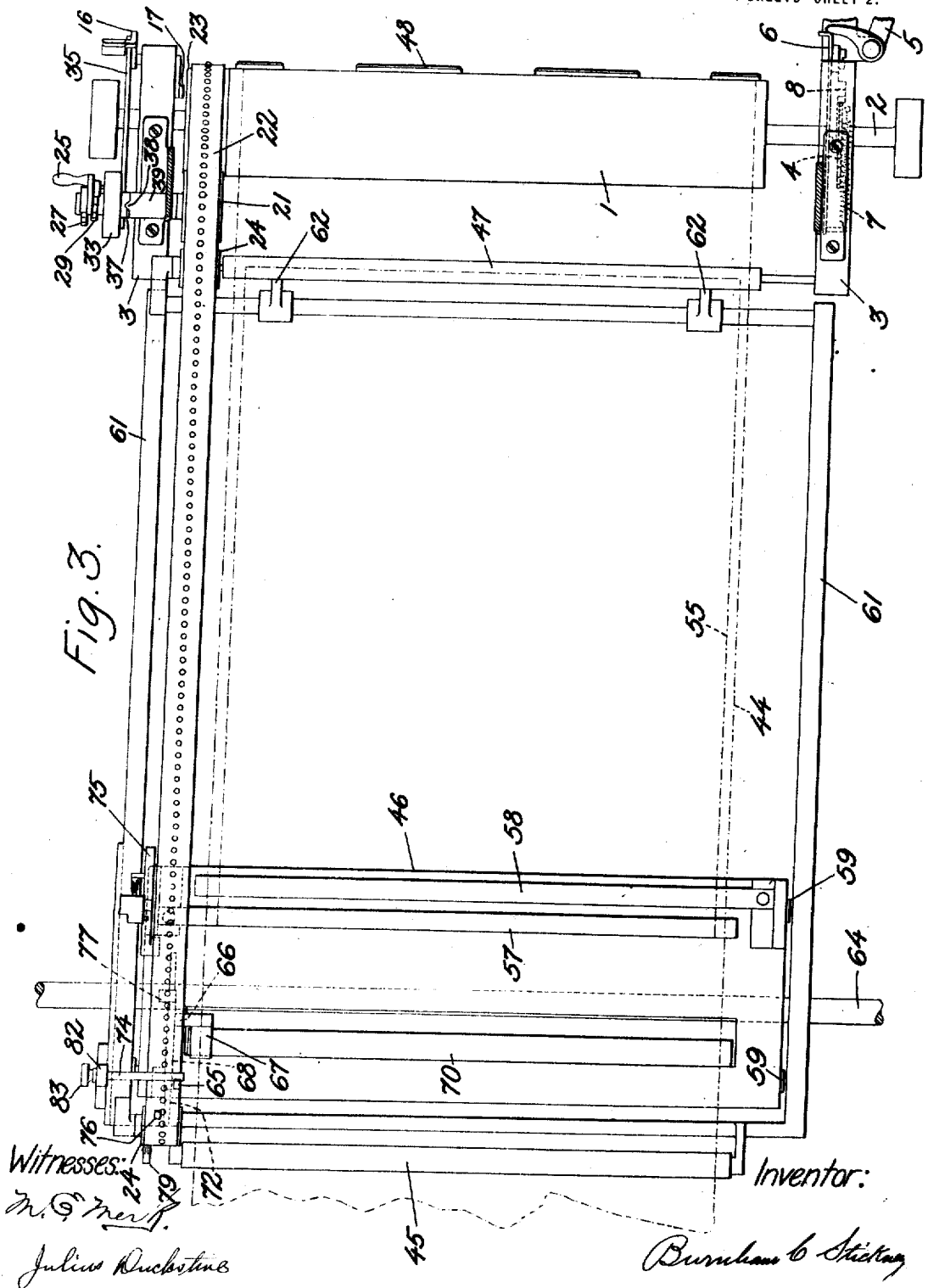
Inventor:
Burnham B. Stickney

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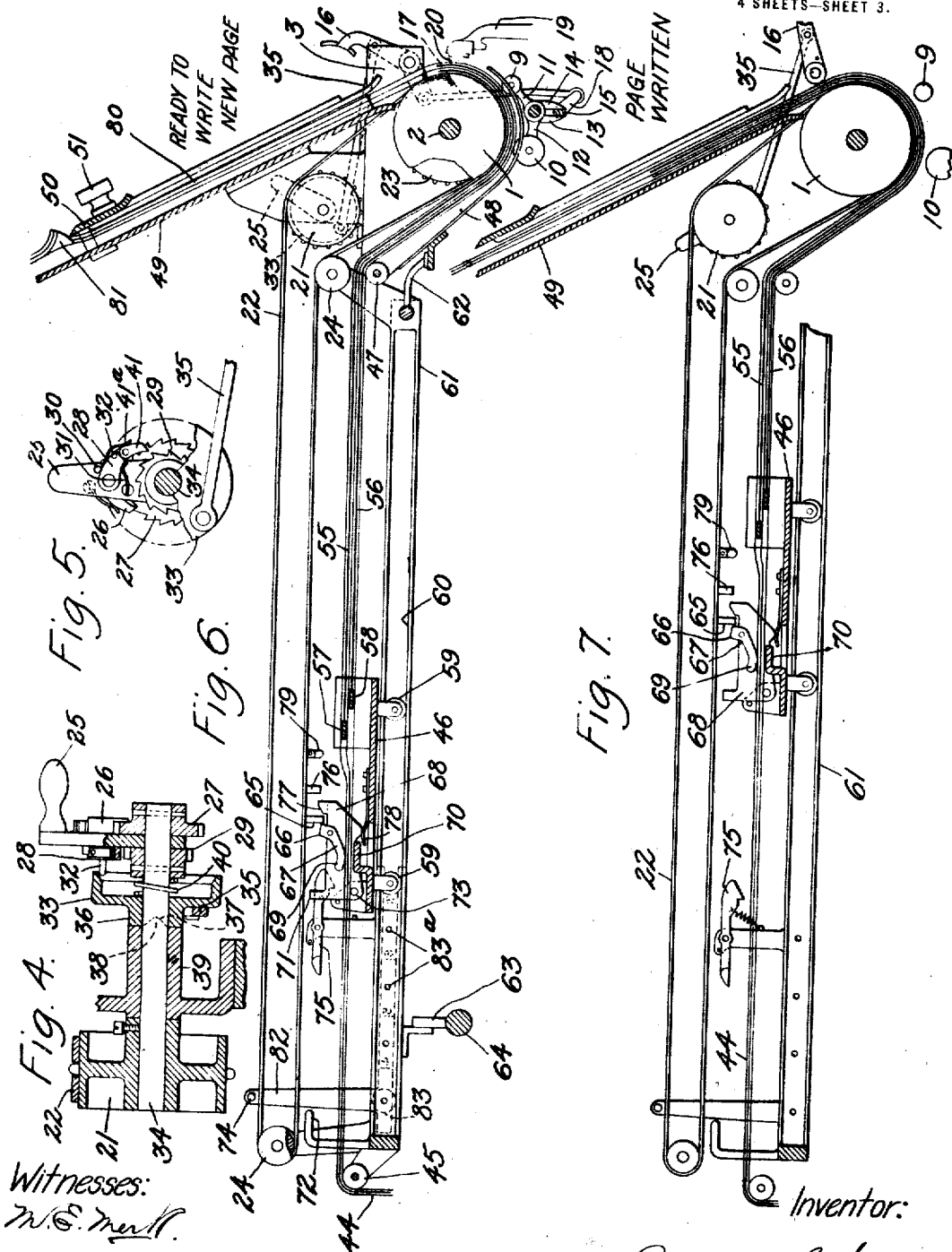
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TYPEWRITING MACHINE.
APPLICATION FILED MAY 19, 1917.

4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPEWRITING-MACHINE.

1,356,893.

Specification of Letters Patent.

Patented Oct. 26, 1920.

Application filed May 19, 1917. Serial No. 169,648.

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Typewriting-Machines, of which the following is a specification.

This invention relates to an improvement in typewriting machines, and more especially to an attachment known as the fan-fold, for assisting in making a number of copies of a piece of typewritten work at the same time.

In this type of machine, where the work is of a continuous character requiring a number of copies of the same letter or bill and a large number of letters or bills of similar character, the fan-folded work-sheets are fed from a roll or rolls in a pack, with means for interleaving the work-sheets with carbon sheets. The carbon sheets are mounted on a traveling table, over which the paper of the work-sheets passes in continuous longitudinal folds or strips, the carbon sheets interleaving the work-sheets.

The pack comprising the work-sheets is fed around the platen by a driving mechanism for the platen, until the first line of writing comes to the printing point, then the platen is rotated line by line by the usual line-space mechanism. When the piece of work is completely written, the usual feed rolls may be released from the platen, which enables the operation of a reversible driving connection between a hand crank and the special driving mechanism for the platen and the traveling table, whereby the platen may be reversely rotated and the traveling table may be returned, carrying with it both the carbon sheets and the work-sheets, as the latter are clamped to the table for this movement.

The pack of sheets is thus withdrawn clear of the platen and the bend taken out so that it is straight; thus the work-sheets may be drawn around the platen alone by rotating the platen to space them relatively to the carbon sheets the distance of the aggregate number of lines of writing plus any heading space left at the top of each sheet or the length of the bill. This is effected by the special driving mechanism which advancingly rotates the platen after the feed rolls have been moved into their position,

clamping the work-sheets to the platen. The table is locked against movement during this action.

A continued driving movement releases the traveling table at a time when the previously finished piece of work has been completely advanced from overlapping the carbon sheets so as to bring a fresh portion of each work-sheet strip in parallel with the carbon sheets. Then the pack comprising the fresh strips of work-sheets and the carbon sheets passes around the platen to a position to be written on. The completed work-sheets may be torn off as they project beyond a knife edge. This knife edge is adjustable so as to vary the length of the work-sheets.

In this way, the series of continuous strips may be written on simultaneously to form a number of copies of the same work, and then as each piece of work is completed, the group of copies is cut off. Then the next piece of work is written so as to form a continuous operation, the same sheets of carbon being automatically placed for each new piece of work.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a front view, in elevation of the typewriter platen, showing the knife gage for determining the length of the work-sheet adjusted for the smallest work-sheet.

Fig. 2 is a detail view, partly in elevation and partly in vertical section, showing the stopping mechanism for limiting the reverse movement of the driving mechanism.

Fig. 3 is a top plan view, showing the special driving mechanism for the platen and traveling table.

Fig. 4 is a vertical section from right to left, showing the means for connecting and disconnecting a normally silent pawl, so as to enable the platen and the traveling table to be reversibly driven, thus withdrawing all sheets from the platen.

Fig. 5 is a detail view of the pawl-and-ratchet drive, showing the reverse drive pawl as silent, corresponding to the position of the parts in Fig. 4.

Fig. 6 is an end view in elevation, with parts broken away to show the underlying structure, and showing the pack comprising the work-sheets and carbon sheets as ad-

vanced to a position for the initial line of writing, the feed rolls being in their clamping position.

Fig. 7 is a view of the parts shown in Fig. 6, except that the typewriting action has taken place and a single piece of work or bill has been completed, so that the carbon sheets and work-sheets have been advanced the length of the piece of work past the printing point of the typewriter.

Fig. 8 is a detail view, similar to the views of Figs. 6 and 7 of the traveling table, showing the same being driven to withdraw reversibly the carbon sheets and work-sheets from the platen just before the traveling table is to be disconnected from the drive belt.

Fig. 9 is a view of the parts shown in Fig. 8, just subsequent to the time when the traveling table has come against its stop, so as to disconnect it from the traveling belt, permitting the latter to continue its movement. A latch is shown as having come into engagement with the traveling table to prevent its subsequent return movement for a certain part of the return movement.

Fig. 10 is a detail view, similar to Figs. 6 and 7, showing the finish of the reverse drive of the belt subsequent to the position of the parts in Fig. 9, and in which the belt has reached the limit of its reverse drive movement.

Fig. 11 is a view of the parts shown in Fig. 10, the belt, however, having been operated in an advancing or forward feeding direction, so that it has come to a position in which it releases the traveling table, so that the carbon sheets carried thereby can travel with the work-sheets, inasmuch as the latter have been spaced relatively to the carbon sheets by the counter drive of the platen, so as to bring a fresh portion of each work-sheet to register with the carbon sheets.

The platen 1 is mounted on an axle 2, which, in turn, is rotatably mounted on the typewriter carriage 3. The platen 1 is provided with the usual Underwood line-space mechanism, including a line-space wheel 4 secured to the platen axle 2. To drive the line-space wheel 4, so as to advance the platen a line-space at a time, a line-space lever 5 thrusts a slide 6 rearwardly against the tension of a spring 7. The slide 6 has a pawl 8 to engage the line-space wheel 4 at the proper time, so as to rotate the platen 1 a line-space whose magnitude may be varied as desired.

The usual pressure feed rolls 9 and 10 for clamping the work-sheets with the interleaved carbon sheets to the platen are used. These feed rolls 9 and 10 are mounted on swinging frames 11 and 12 having arms 13 and 14, supported by a rock shaft 15. At the points where the arms 13 and 14 engage the rock shaft 15, the rock shaft is squared

so that when it turns, it will spread the arms against the tension of springs 15^a Fig. 1, and thus withdraw the feed rolls 9 and 10 from engagement with the work-sheets on the platen, permitting the same to be adjusted relatively to the platen. The rock shaft 15 is oscillated by a finger-piece or hand lever 16, which is in the form of a bell crank connected by a link 17 to a crank arm 18 provided on the rock shaft 15.

The typewriter carriage has the usual step-by-step movement at the striking of type-bars 19 at a printing point 20.

The usual line-space movement of the platen is augmented by a special drive, so that it may be rotated forwardly or backwardly a number of line-spaces at a time for the purpose of properly positioning and removing the work-sheet with respect to the platen. The special drive includes a sprocket wheel 21, engaging a perforated belt 22, which passes over and around a sprocket wheel 23 secured for rotation with the platen 1. This belt 22 passes over guide rollers or pulleys 24, for a purpose to be mentioned hereafter.

The driving of the sprocket 21 is done by a hand crank 25, Figs. 4 and 5. For rotating the sprocket wheel 21 in a direction so as to advance the platen in a line-feeding direction, there is provided a spring-pressed pawl 26, which engages a ratchet wheel 27, secured to the sprocket wheel 21. When the hand crank 25 is rotated in the opposite direction, this pawl 26 will slip idly over the teeth of the ratchet wheel 27.

For rotating the sprocket wheel 21 and thus the platen 1 in the reverse direction, so as to back-feed the work-sheets in a counter line-spacing direction, there is provided a second pawl 28 pivotally mounted on the hand crank 25 and arranged to cooperate with a ratchet wheel 29, secured for rotation with the sprocket wheel 21, but facing in the opposite direction to the ratchet wheel 27. The pawl 28 is normally held out of engagement with the ratchet wheel 29 against a pin 30 by means of a spring 31.

When it is necessary to reversibly rotate the platen 1, the pawl 28 is forced into mesh with the ratchet wheel 29. As it is desirable that this action take place when the pressure feed rolls 9 and 10 are withdrawn from their clamping position, the operation of the pawl 28 is controlled from the finger-piece 16. For this purpose, there is provided on the pawl 28 a pin 32 which underlies an annular shifter 33 loosely mounted on a shaft 34. The annular shifter 33 is connected by a link 35 to the finger-piece 16, so that when the latter is shifted to its shifted position, it will also rotate the shifter 33. The shifter 33 is provided with a hub 36 having a notch 37, normally registering with a cam 38 on a fixed hub 39, concentric

tric with the shaft 34. The rotation of the shifter 33, however, will cause the shifter to be cammed to the right, Fig. 4, against the tension of a spring 40. This action cams the pin 32 centripetally so as to force the pawl 28 into engagement with the ratchet wheel 29. The pawl 28 is formed in two parts, the outer engaging nose 41 being pivoted on the body portion, so that if the pawl should happen to strike the apex of one of the teeth of the ratchet wheel 29, it would yield enough against the tension of a spring 41^a to prevent breakage of the parts and properly set itself subsequently. The ratchet wheels 27 and 29 are secured to the shaft 34, to which the sprocket wheel 21 is also secured, so that whatever ratchet wheel is driven, the sprocket wheel will be rotated in a corresponding direction.

The belt 22 drives other mechanism besides the platen 1, but before this mechanism is described, it will be necessary to explain the arrangement of the work-sheets and carbon sheets. The work-sheets 44, of which there may be several, three being shown, may come from a roll or rolls (not shown), and extend over a guide-roll 45. The work-sheets 44 may be each of a separate strip, coming from a distinct roll, or the layers of a single wide strip, folded over on itself sidewise. The work-sheets 44 extend from the guide-roll 45 over a traveling table 46 to a second guide-roll 47, and from thence around the platen 1 between the feed-rolls 9 and 10, a paper-apron 48 and the platen.

From the front side of the platen, the work-sheets may extend up through a take-off guide frame 49, beneath a cutting-off knife 50. The knife 50 may be adjusted to any one of a plurality of positions, as best shown in Fig. 1. That is to say, the knife-blade 50 is adjustably mounted on the guide frame 49 by means of thumb-screws 51, which extend into slots 52 provided in the frame of the knife-blade. By shifting the knife-blade up or down, the length of the work-sheet cut off can be determined. In other words, this knife-blade forms a gage, and the scale of the gage includes a reference line 53, which may be brought into register with any one of a plurality of reference lines 54, indicated by the numbers "4," "5," "6" and "7," which may be the numbers of different forms varying in length. The frame 49 extends up beyond the knife-blade 50 a considerable distance, so as to support the work-sheets, projecting beyond the knife-blade 50, before they are severed from the continuous strips.

The table 46, above-mentioned, forms a traveling support for carbon sheets 55 and 56, which are located so as to extend between the continuous sheets 44, enabling the type-bars 19 to copy on the under strips of

work-sheets the matter written on the uppermost sheet. For supporting the carbon sheets 55 and 56, there are provided ribs 57 and 58, vertically displaced relatively to each other and extending transversely of the traveling table 46. The table 46 is provided with wheels 59, riding in channels 60 (Fig. 2), in a frame 61 extending rearwardly from the carriage 3 of the type-writing machine. The frame 61 is secured to the carriage 3 by brackets 62, so as to travel in a letter-spacing direction with the carriage. To support the frame 61 at its rear end, it is provided with wheels 63, arranged to travel on a stationary rail 64.

As the pack of work-sheets and carbon sheets are fed line by line around the platen, the table 46 advances toward the platen to permit of the concomitant movement of the carbon-sheet strips and the platen. To reversely run the traveling table, and thus withdraw the work-sheets and carbon sheets from the platen as a unit, the finger-piece 16 is operated to concomitantly release the rolls 9 and 10, and at the same time connect up the pawl 28 with the ratchet 29. Then the hand-crank 25 is reversely rotated so as to rotate the platen 1 backwardly, and at the same time drive the table 46 backwardly by means of the belt 22.

For this latter purpose, there is provided on the belt 22 a lug 65, which engages one arm 66 of a clamp 67, pivotally mounted on a swinging member 68, Fig. 7. The other arm 69 of the clamp 67, when the clamp is rocked by the belt 22, grips the bunch of work-sheets 44 between its surface and a stationary jaw 70. In this way, the work-sheets are drawn with the traveling table and the carbon sheets as the table is driven rearwardly by the belt 22.

When the table reaches the limit of its rearward travel, as in Fig. 9, the toe 71 on the swinging member 68 comes into engagement with a trip 72, so that the member 68 is rocked about its pivot 73, withdrawing the arm 66 of the clamp 67 from engagement with the lug 65 on the drive-belt 22. This permits the drive-belt to be driven still farther idly, until the lug 65 passes around the pulley 24 and comes into engagement with an abrupt stop-pin 74. This warns the operative that the limit of drive has been reached, and that the work-sheet strips and carbon sheets have been entirely withdrawn, clear of the platen, to a position shown in Fig. 10.

The table 46 is locked in its rearmost position by a spring-pressed latch 75, so that it cannot return forwardly until the latch is released. This is to prevent the carbon sheets from traveling forward with the work-sheets while the latter are being advanced to bring a fresh blank portion thereof into register with the carbon sheets.

For a return drive of the platen, the release-finger-piece 16 is returned to normal position, bringing the rolls 9 and 10 in clamping relation with the platen 1. This withdraws the pawl 28 from driving engagement with the ratchet wheel 29. The hand-crank 25 may then be rotated to advance the platen in a line-spacing direction. Under these circumstances, the pawl 26 and the ratchet wheel 27 operate.

As the belt 22 turns in the direction of the arrow, of Fig. 11, a lug 76 on the belt 22, just in advance of the pick-up lug 65, engages a cam surface 77 on the swinging member 68 and depresses it against the tension of its spring 78, so as to permit the pick-up lug 65 to escape past the arm 66 of the clamp 67.

Under these conditions, the traveling table 46 is ready to start forward with the carbon and work-sheets together. At this time the belt 22, by means of a releasing lug 79, disengages the latch 75 from the traveling table 46, leaving it free to move in an advancing direction. Incidentally, the releasing lug 79 is one-way acting and pivotally mounted on the belt 22, so as to release, when the belt is driven in the direction of the arrow (Fig. 11), and pass idly by the latch 75 when the belt is driven as in Fig. 9. The latch 75 has requisite camming and abrupt surfaces, with which the lug is shown in engagement, respectively in Figs. 11 and 9.

The stop 74 is adjustable to correspond with the adjustment of the knife-blade 50. It is in the form of a pin mounted on a T-shaped arm 82, Figs. 2 and 6. The arm 82 is mounted in a groove in the frame 61. A clamp pin 83 is screw-threaded so as to enable it to be inserted in and tightened up in any one of a number of holes 83^a to hold the arm 82 and thus the stop pin 74 in any adjusted position.

When taken with the above description, the operation will be readily understood. We may assume that a set of the work-sheets 44 are properly positioned relatively to the carbon sheets 55 and 56, as in Fig. 6; at the printing point 20 of the typewriter, ready to start the initial line of writing of a bill or other piece of typewriting work. Under these conditions, the feed-rolls 9 and 10 will grip the pack of work members closely to the platen 1. The typewriting is done line by line, in the usual manner, and the platen advanced line by line by means of the line-space lever 5.

When the sheet is completely written, it will occupy somewhat the position of Fig. 7, with the written sheet projected in the guide frame 49 above the level of the printing point 20. We will assume that considerable of the work-sheet 44 has either been written on or projected a sufficient distance beyond the ends of the carbon sheet, as in Fig. 7, to

permit a considerable backward movement of the platen 1 and the work-sheets without the work-sheets entirely leaving the platen.

The platen rolls 9 and 10 are now released by an actuation of the finger-piece 16, so that the work-sheets and carbon sheets can be drawn rearwardly from the platen as a unit. This action, as explained above, forces the normally disconnected pawl 28 into mesh with the ratchet wheel 29. The hand-crank 25 can now be rotated reversely, that is, in a direction to rotate the platen 1 backwardly.

The backward movement of the belt 22 brings the lug 65 snugly against the arm 66, Fig. 7, so as to force the clamp 67 to grip the work-sheet strips 44, forcing the table 46 to carry them rearwardly. The clamp 67, it will be noted, forms one element of a clutch which connects the table 46 in trailing relation with the belt 22. Inasmuch as the carbon sheets 55 and 56 are fixed on the table 46, they will travel with the table and with the work-sheet strips. The movement is continued, until the carbon sheets and the written portion of the work-sheet in juxtaposition to the carbon sheet are entirely withdrawn from the platen 1, and preferably to such a distance as to get beyond the kink or bend in the pack of sheets, as in Fig. 10, so as to avoid friction between the carbon sheets and the work-sheets in subsequent relative feeding movements.

At this time, the toe 71 on the swinging member 68 is rocked to disconnect the traveling table 46 from the belt 22. This permits the clamp 67 to release the work-sheet strips 44. At the same time the latch 75 comes into play, as in Figs. 9 and 10, thus locking the traveling table 46 and the carbon sheets carried thereby from an advancing movement. The belt 22 drives on until brought to a halt by the stop 74.

The pressure rolls 9 and 10 may now be brought into intimate contact with the work-sheet strips 44, so as to bind them on the platen. This action withdraws the pawl 28 to an idle position, thus disconnecting the reverse drive. The pawl 26, however, is in mesh with the ratchet wheel 27, so that the crank 25 may now be rotated in an advancing direction to rotate the platen in a line-spacing direction.

The first part of this advancing movement is idle with respect to the traveling table 46 and the carbon sheets 55 and 56, as the pick-up lug 65 travels from the stop 74 (Fig. 10) to the position of Fig. 11. During this portion of the movement, however, the platen has been drawing on the work-sheets 44, which are bound to it, so that the work-sheet strips 44 have been advanced relatively to the carbon sheets 55 and 56, a distance sufficient to clear the just previously typewritten matter from paralleling the

carbon sheets and bringing fresh portions of the work-sheet strips into opposition to the carbon sheets, so as to collate them for new typewriting. The table 46 is held stationary by the latch 75 up to this time.

When the relative shift of the sheets has been accomplished, a continued movement of the hand-crank 25 causes the lug 76 to cam the swinging member 68 to such a position as to permit the connecting lug 65 to come in front of the clamp 67. At the same time the releasing lug 79 unlocks the traveling table 46 from the latch 75. Now the carbon sheets and the traveling table advance with the work-sheets until they come around to a position, somewhat like that of Fig. 6, with the tops of the carbon sheets just beyond the initial line to be written on, and this line of the work-sheets will be at the printing point 20 of the typewriter.

This will be the finishing point of the movement of the hand-crank 25. The bill or piece of work just previously written will project from a point beyond the printing point 20 to the edge of the knife-blade 50, as indicated at 80. The second removed bill or piece of work to be written will have been advanced beyond the knife-blade 50, as at 81, and may be cut off at this time. It will be seen that it is necessary to leave the previously written bill or piece of work in the machine to allow for the next withdrawing and advancing movement, to give a relative displacement between the carbon sheets and the work-sheet strips.

Under these circumstances, the parts are in a position to typewrite the next piece of work or bill. The only pawl connecting the sprocket wheel 21 is pawl 26, and, inasmuch as the sprocket wheel 21 is rotated in an advancing direction, the crank 25 may move idly with the ratchet wheel or may click over the ratchet teeth idly when the platen is line-spaced. The table 46 keeps pace with the line-space movements of the platen and advances until the last line is written of the piece of work or bill. With a new bill written, the feed rolls are released and the work and carbon sheets withdrawn, displaced and returned to the platen as before.

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. The combination with a platen, of means for interleaving a plurality of sheets of carbon between a plurality of work-webs, and direct driving means for both said platen and said interleaving means, connected so as to drive them simultaneously.

2. The combination with a platen, of means for withdrawing a pack of interleaved sheets and work-webs from said platen in a reverse direction, and a direct drive

common to both said platen and said withdrawing means, so as to drive them reversely in unison; means being provided to afford advancement of the webs around the platen independently of the carbon sheets.

3. The combination with a platen, of a table for handling a plurality of assembled work and carbon sheets, said platen and said table being arranged to advance in unison with each other and with said work and carbon sheets, and driving means for said platen and table, having a lost-motion with respect to said table, so as to permit the advancement of said work-sheets relative to said carbon sheets.

4. The combination with a platen, of a traveling table arranged to handle assembled work and carbon sheets, a driving belt for said platen, and pick-up connections between said driving belt and said table, arranged to traverse said table during a part of the rotation of said platen by said belt.

5. The combination with a platen, of a traveling table arranged to handle assembled work and carbon sheets, of driving means common to both said platen and said table, acting to traverse said table for a portion of the rotation of said platen, and pass idly with respect to said table for another portion of the rotation of said platen, and a latch for preventing a traveling movement of said table during a certain rotation of said platen by said driving means, whereby said work-sheets may be displaced relatively to said carbon sheets.

6. The combination with a platen, of a table arranged to handle assembled work and carbon sheets, driving means connectible to traverse said table, and a trip for disconnecting said driving means from said table to permit a continued movement of said driving means after said table has stopped.

7. The combination with a platen, of a traveling table arranged to handle assembled work and carbon sheets, pressure rolls cooperating with said platen to assist in the feeding of the work and carbon sheets around said platen, and driving means for rotating said platen for a predetermined period, and traversing said table for a portion of said period, whereby said platen may, with the aid of said pressure rolls, draw on said work-sheets to space them relative to said carbon sheets, while said table remains stationary.

8. The combination with a platen, of means for withdrawing reversely an assembled pack of work and carbon sheets to straighten out the assembled pack where the work-sheets and carbon sheets overlap each other, and a drive for said platen and said withdrawing means, acting on said withdrawing means during the withdrawing action, and acting on said platen to

advance said work-sheets relative to said carbon sheets, while said withdrawing means remains passive, and then advance said work-sheets and carbon sheets as a unit.

9. The combination with a platen, of a traveling table arranged to carry one or more carbon sheets to interleave them between a plurality of work-sheets, a clamp for securing said work-sheets to said table, driving means for traversing said table, acting when traversing said table to bring said clamp into play, said driving means having a movement greater than the travel of said table, and a trip for disconnecting said driving means, and releasing said clamp when the limit of movement of said table has been reached.

10. The combination with a platen, of a knife-gage for determining the length of work-members, means for adjusting said knife-gage to vary the length of the work-members, a traveling table cooperating with said platen to manipulate work-sheets, and carbon sheets with respect to said platen, a drive common to said platen and said table, and a stop for limiting the extent of movement of said drive adjustable to correspond with the adjustment of said knife-gage.

11. The combination with a platen arranged to support intermingled work-sheets and carbon sheets, of a table cooperating to manipulate said carbon and work-sheets and carrying said carbon sheets, swinging members mounted on said table, a clamp pivoted to said swinging members, a jaw cooperating with said clamp to grip the work-sheets to said table, so as to move therewith, and a trip lying in the path of the travel of said swinging members arranged to release said clamp, so as to permit a movement of said work-sheets relative to said table and to said carbon sheets.

12. The combination with a platen arranged to support interleaved work and carbon sheets, of a belt connected to drive said platen, a one-way acting pawl and ratchet for driving said platen in an advancing direction, a second one-way acting pawl and ratchet facing opposite the first-mentioned pawl and ratchet for rotating said platen in a counter-line spacing direction, said second pawl and ratchet being normally silenced, feed rolls cooperating with said platen to advance the work-sheets and carbon sheets on said platen, a release for said feed rolls connected to render said second-mentioned pawl and ratchet operative, and means driven by said belt for withdrawing work-sheets and carbon sheets from said platen when said feed rolls are released.

13. The combination with a platen ar-

65 ranged to support intermingled carbon and work-sheets, of pressure rolls for binding said sheets in a pack to said platen, a release for said pressure rolls, and a support for said carbon sheets capable of moving said work-sheets and carbon sheets as a unit, and enabling a relative spacing movement between said carbon sheets and said work-sheets by alternately clamping and releasing said work-sheets to travel with and relatively to said carbon sheets, said support being controlled in its action from said release.

14. The combination with a platen, of means cooperating with said platen to manipulate interleaved work-sheets and carbon sheets, said work-sheets and carbon sheets traveling as a unit at times and traveling relatively to each other at other times to effect a spacing operation, and mechanism for oscillating said platen, and reciprocating said means, the strokes of said means being shorter than the corresponding oscillation of said platen, so as to permit an advancing movement of said platen in excess of the advancing movement of said means, drawing said work-sheets beyond relative to said carbon sheets, to bring a fresh surface into cooperation with said carbon sheets.

15. The combination with a platen arranged to support interleaved work and carbon sheets, of pressure rolls cooperating with said platen to bind a pack of sheets to the platen, a traveling table for assisting in manipulating the carbon and work-sheets, a release for said pressure rolls, and a drive for said table controlled from said release.

16. The combination of a revoluble platen, means for holding a plurality of carbons at the introductory side of the platen and constructed to permit the carbons with interleaved webs to be drawn forwardly by the platen, means connected with the platen for retracting the carbons and webs, means for holding the carbons while the webs are advanced, and means for automatically limiting the relative advance of the webs.

17. The combination of a revoluble platen, a carbon-holder at the introductory side thereof and constructed to permit the carbon to be drawn forwardly by the platen, means connected with the platen for retracting the carbon-holder with the web, and means for restraining the carbon-holder while the web is advanced by the platen.

18. The combination of a revoluble platen, a carbon-carrier supported at the introductory side of the platen for bodily movement toward and from the platen, and means for holding the carbon-carrier against movement toward the platen, to per-

mit a work-web to be advanced relatively to the carbon.

19. The combination of a revoluble platen, means to carry a work-web around the platen, a carbon-carrier at the introductory side of the platen and movable toward and from the platen, means connected to said platen to retract the carbon-carrier, and means for automatically locking the carbon-carrier against movement upward the platen, to permit the web to be advanced relatively to the carbon.

20. The combination of a revoluble platen, means to carry a work-web around the platen, a carbon-carrier at the introductory side of the platen and movable toward and from the platen, means connected to said platen to retract the carbon-carrier, means for automatically locking the carbon-carrier against movement toward the platen, to permit the web to be advanced relatively to the carbon, and means for automatically unlocking the carbon-carrier.

21. The combination with a revoluble platen, of a carbon-holder, an operative connection between said platen and carbon-holder to cause simultaneous reverse rotation of the platen and retraction of the carbon by means of said holder, and means for releasing the holder from connection with the platen, to permit rotation of the platen in line-feeding direction to advance the web independently of the carbon.

22. The combination with a revoluble platen, of a carbon-holder, a driving connection between said platen and carbon-holder to cause simultaneous reverse rotation of the platen and retraction of the carbon, means for automatically releasing the carbon-holder, means for restraining the carbon-holder to permit the web to advance as the platen advances while the carbon remains stationary, and means for automatically releasing said carbon-holder from said restraining means.

23. The combination with a revoluble platen, of a carbon-holder, a driving connection between said platen and carbon-holder to cause simultaneous reverse rotation of the platen and retraction of the carbon, means for automatically releasing the carbon-holder, means for restraining the carbon-holder to permit the web to advance as the platen advances while the carbon remains stationary, means for automatically releasing said carbon-holder from said restraining means, and means for re-connecting the carbon-holder to the platen to advance therewith.

24. The combination of a revoluble platen, a carbon-holder at the introductory side thereof and constructed to permit the carbon to be drawn forwardly by the platen, a driver, and a pawl-and-ratchet mechanism

connecting said driver with the platen for retracting the carbon and web, said pawl-and-ratchet mechanism constructed to be idle during line-feeding operations of the work effected by the rotation of the platen.

25. The combination of a revoluble platen, a carbon-holder at the introductory side thereof and constructed to permit the carbon to be drawn forwardly by the platen, a driver, and a pawl-and-ratchet mechanism connecting said driver with the platen for retracting the carbon and web, said pawl-and-ratchet mechanism constructed to be idle during line-feeding operations of the work effected by the rotation of the platen; means being provided for automatically disconnecting said pawl-and-ratchet mechanism from the platen.

26. The combination of a revoluble platen, a carbon-holder at the introductory side thereof and constructed to permit the carbon to be drawn forwardly by the platen, a driver, a pawl-and-ratchet mechanism connecting said driver with the platen for retracting the carbon and web, said pawl-and-ratchet mechanism constructed to be idle during line-feeding operations of the work effected by the rotation of the platen; means being provided for automatically disconnecting said pawl-and-ratchet mechanism from the platen, a pawl-and-ratchet device for rotating the platen to advance the webs in line-feed direction while the carbon remains stationary, and a line-spacing mechanism for said platen.

27. The combination of a revoluble platen, means to feed webs around the same, means at the introductory side of the platen for carrying a plurality of carbons interleaved with the webs, a flexible connection extending from said platen to said carbon-carrying means, and means for rotating the platen and operating the flexible connection and carbon-carrying means to return the carbons and webs.

28. The combination of a revoluble platen, means for carrying sheets of duplicating material interleaved between plies of web carried around the platen, means for both reversely rotating the platen and retracting the duplicating material and web, means to limit the reverse movement of the platen, duplicating material and web, means for automatically locking the duplicating material against advance while the web is advanced by the rotation of the platen, and means for automatically releasing said locking means.

29. The combination with a revoluble platen, of a carrier mounted at the introductory side thereof to travel toward and away from the platen, a driving connection between said platen and said carrier, a sheet-clamp upon said carrier, and means rendered

effective automatically at the retraction of said carrier for closing the sheet-clamp.

30. The combination with a revoluble platen, of a carrier mounted at the introductory side thereof to travel toward and away from the platen, a driving connection between said platen and said carrier, a sheet-clamp upon said carrier, means rendered effective automatically at the retraction of said carrier for closing the sheet-clamp, and means for automatically opening said sheet-clamp.

31. The combination with a revoluble platen, of a carrier mounted at the introductory side thereof to travel toward and away from the platen, a driving connection between said platen and said carrier, a sheet-clamp upon said carrier, means rendered effective automatically at the retraction of said carrier for closing the sheet-clamp, means for automatically opening said sheet-clamp, a carbon-carrying device mounted upon said carrier, means for arresting the retraction of said carrier, means for automatically restraining said carrier to permit the platen to draw the webs forwardly independently of the carbons, and means for automatically releasing said carrier from control of said restraining means.

32. The combination with a revoluble platen, of a crank, a pawl-and-ratchet mechanism driven by said crank to advance the platen, a separate pawl-and-ratchet mechanism driven by said crank to retract the platen, means for automatically disabling one of said pawl-and-ratchet mechanisms, a carbon-carrier mounted at the introductory side of the platen, and a driving connection between said platen and said carrier to retract the latter.

33. The combination with a revoluble platen, of a crank, a pawl-and-ratchet mechanism driven by said crank to advance the platen, a separate pawl-and-ratchet mechanism driven by said crank to retract the platen, means for automatically disabling one of said pawl-and-ratchet mechanisms, a carbon-carrier mounted at the introductory side of the platen, a driving connection between said platen and said carrier to retract the latter, said carrier having a web-clamp, and means for automatically closing said clamp.

34. The combination with a sprocket wheel provided with a crank, of a platen provided with a sprocket wheel, a carbon-carrier, and a flexible belt or connection driven by said crank and extending over said sprocket wheels to said carrier.

35. The combination with a revoluble platen and a pawl-and-ratchet mechanism for giving the same an extensive revolution at a single stroke, of a feed-roll to run upon the platen, a feed-roll-releasing mechanism, and means connecting said feed-roll-releas-

ing mechanism to said pawl-and-ratchet mechanism to render one mechanism effective while the other is ineffective, and a line-spacing mechanism for said platen.

36. The combination with a revoluble platen, of a normally ineffective pawl-and-ratchet mechanism for retracting the same, a feed-roll to run upon the platen, and means to release the feed-roll and simultaneously restore said pawl-and-ratchet mechanism to effective condition, so that the same may be employed at will to retract the platen.

37. The combination with a revoluble platen upon which webs may be manifolded by use of carbons, of means for retracting the webs with the carbons until the portions of the webs upon which the carbons lie are in substantially straight condition, means for restraining the carbons while the webs are advanced to new positions to bring succeeding forms thereon into positions to be typed, a paper-table at the delivery side of the platen to accommodate the last typed form on the web, and a severing device above said table in position to sever from the web the next to the last typed form thereon.

38. The combination with a revoluble platen upon which webs may be manifolded by use of carbons, of means for retracting the webs with the carbons until the portions of the webs upon which the carbons lie are in substantially straight condition, means for restraining the carbons while the webs are advanced to new positions to bring succeeding forms thereon into positions to be typed, a paper-table at the delivery side of the platen to accommodate the last typed form on the web, and a severing device above said table in position to sever from the web the next to the last typed form thereon; means being provided for adjusting said severing device up and down along said table.

39. The combination with a revoluble platen upon which webs may be manifolded by use of carbons, of means for retracting the webs with the carbons until the portions of the webs upon which the carbons lie are in substantially straight condition, means for restraining the carbons while the webs are advanced to new positions to bring succeeding forms thereon into positions to be typed, a paper-table at the delivery side of the platen to accommodate the last typed form on the web, a severing device above said table in position to sever from the web the next to the last typed form thereon, means being provided for adjusting said severing device up and down along said table, and a table extending up beyond said first table to support the said next to the last typed form.

40. The combination of a revoluble platen, a carbon-carrier at the introductory side of the platen, a driving connection be-

tween said platen and said carrier, means for effecting a release of the carbon-carrier, to permit webs to be advanced by the platen independently of said carrier, and a clamp connected to said carrier for clamping the webs to retract the same together with the carbon.

41. The combination with a revoluble platen and a feed-roll to run thereon, of a crank, pawl-and-ratchet mechanism operable by said crank to rotate said platen either forwardly or backwardly, but normally ineffective to rotate the platen backwardly, and means for releasing said feed-roll and rendering said mechanism effective to rotate said platen backwardly.

42. The combination with a platen and a feed-roll to run thereon, of a manually operable driver normally capable of rotating the platen in only one direction, and means for releasing said feed-roll and simultaneously rendering said driver capable of rotating the platen in the opposite direction.

43. The combination with a platen and a feed-roll to run thereon, of a manually operable driver normally capable of rotating the platen in only one direction, means for releasing said feed-roll and simultaneously rendering said driver capable of rotating the platen in the opposite direction, and a carbon-carrier connected to be retracted simultaneously with the platen.

44. The combination with a platen and a feed-roll to run thereon, of a manually operable driver normally capable of rotating the platen in only one direction, means for releasing said feed-roll and simultaneously rendering said driver capable of rotating the platen in the opposite direction, a carbon-carrier connected to be retracted simultaneously with the platen, and web-gripping means connected to said carbon-carrier to be effective to grip the web during the retraction of said carrier.

45. The combination with a platen and a feed-roll to run thereon, of a manually operable driver normally capable of rotating the platen in only one direction, means for releasing said feed-roll and simultaneously rendering said driver capable of rotating the platen in the opposite direction, a carbon-carrier connected to be retracted simultaneously with the platen, web-gripping means connected to said carbon-carrier to be effective to grip the web during the retraction of said carrier, means for releasing said gripping means, and means for retaining said carrier while the platen is rotated in line-space direction to advance the web independently of the carbons.

46. The combination with a revoluble platen, of a carrier mounted at the introductory side of the platen to move toward

and away therefrom, means upon said carrier to hold a carbon sheet, a gripper upon said carrier to grip work-sheets, and a driver for said carrier having means to engage said gripper to close the same and retract said carrier.

47. The combination of a revoluble platen, a carbon-carrier in rear of the platen, a work-sheet gripper upon said carbon-carrier, a driving connection extending from said platen to said carrier and having means to engage said gripper to close the same and to retract said carrier, and means for arresting said carrier and releasing it from said driving connection.

48. The combination of a revoluble platen, a carbon-carrier in rear of the platen, a work-sheet gripper from said carbon-carrier, a driving connection extending from said platen to said carrier and having means to engage said gripper to close the same and to retract said carrier, means for arresting said carrier and releasing it from said driving connection, and means for automatically holding said carrier against advance movement.

49. The combination with a revoluble platen, of a sheet-carrier or conveyer, a driving connection between said carrier and said platen, a handle connected with the platen to reverse the same and retract said carrier, and means for arresting the carrier and platen.

50. The combination with a revoluble platen, of a sheet-carrier or conveyer, a driving connection between said carrier and said platen, a handle connected with the platen to reverse the same and retract said carrier, means for arresting the carrier and platen, a sheet-gripper upon said carrier, and means for releasing said gripper before the platen is arrested.

51. The combination with a revoluble platen, of a sheet-carrier or conveyer, a driving connection between said carrier and said platen, a handle connected with the platen to reverse the same and retract said carrier, means for arresting the carrier and platen, a sheet-gripper upon said carrier, means for releasing said gripper before the platen is arrested, means for automatically restraining the carrier against advance, and means for automatically releasing said restraining means.

52. The combination with a revoluble platen and a carbon and work-sheet carrier mounted in rear thereof to travel toward and away from the platen, said parts being so arranged that the work-sheets and interleaved carbons travel in a tortuous course from the carrier to and around the platen, of a driving connection from said platen to said carrier for simultaneously reversing the platen and retracting the carrier, a stop to limit the movement of said driving con-

nection when the carbon sheets have been retracted to be sufficiently clear from said tortuous course to permit the work-sheets to be fed forward around the platen while the carbon sheets remain stationary; and means for automatically restraining the carrier against advance during such advance of the work-sheets effected by the rotation of the platen.

53. The combination with a revoluble platen and a carbon and work-sheet carrier mounted in rear thereof to travel toward and away from the platen, said parts being so arranged that the work-sheets and interleaved carbons travel in a tortuous course from the carrier to and around the platen, of a driving connection from said platen to said carrier for simultaneously reversing the platen and retracting the carrier, a stop to limit the movement of said driving connection when the carbon sheets have been retracted to be sufficiently clear from said tortuous course to permit the work-sheets to be fed forward around the platen while the carbon sheets remain stationary; means for automatically restraining the carrier against advance during such advance of the work-sheets effected by the rotation of the platen; and means for automatically releasing said carrier from said restraining means.

54. The combination with a revoluble platen and means for feeding a web around the same, of a sheet-board extending from the delivery side of the platen, a severing knife at the upper portion of said sheet-board, said sheet-board having overhanging portions at the side edges thereof between said knife and said platen, to form a chute for the work-sheets, and a rearward extension on said sheet-board beyond said knife to support the portions of the webs that are about to be torn off.

55. The combination with a revoluble platen and a feed-roll to run thereon, of a driver, a carrier connected to said driver and having a connection with said platen for retracting therefrom interleaved carbon and work-sheets, said driver normally ineffective, means to release said feed-roll and render said driver effective, means for releasing said carrier from connection with said platen, to

permit further retraction of said platen, and a stop for limiting the retraction of said platen.

56. The combination with a revoluble platen and a feed-roll to run thereon, of a driver, a carrier connected to said driver and having a connection with said platen for retracting therefrom interleaved carbon and work-sheets, said driver normally ineffective, means to release said feed-roll and render said driver effective, means for releasing said carrier from connection with said platen, to permit further retraction of said platen, a stop for limiting the retraction of said platen, and means for restraining said carrier during the subsequent advance of said platen to advance the work-sheets independently of the carbons.

57. The combination with a revoluble platen and a feed-roll to run thereon, of a driver, a carrier connected to said driver and having a connection with said platen for retracting therefrom interleaved carbon and work-sheets, said driver normally ineffective, means to release said feed-roll and render said driver effective, means for releasing said carrier from connection with said platen, to permit further retraction of said platen, a stop for limiting the retraction of said platen, means for restraining said carrier during the subsequent advance of said platen to advance the work-sheets independently of the carbons, and means for releasing said carrier from restraint and connecting it up to said platen to advance therewith at the conclusion of the independent advance of the work-sheets.

58. The combination with a revoluble platen and mechanism for retracting work-sheets and interleaved carbons from the platen and for detaining the carbons during subsequent advance of the work-sheets, of means for mechanically determining the extent of such independent advance of the work-sheets, said determining means including a stop adjustable for varying the extent of such independent advance.

BURNHAM C. STICKNEY.

Witnesses:

CATHERINE A. NEWELL,
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