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R. D. DODGE

2,328,624

TYPEWRITING MACHINE

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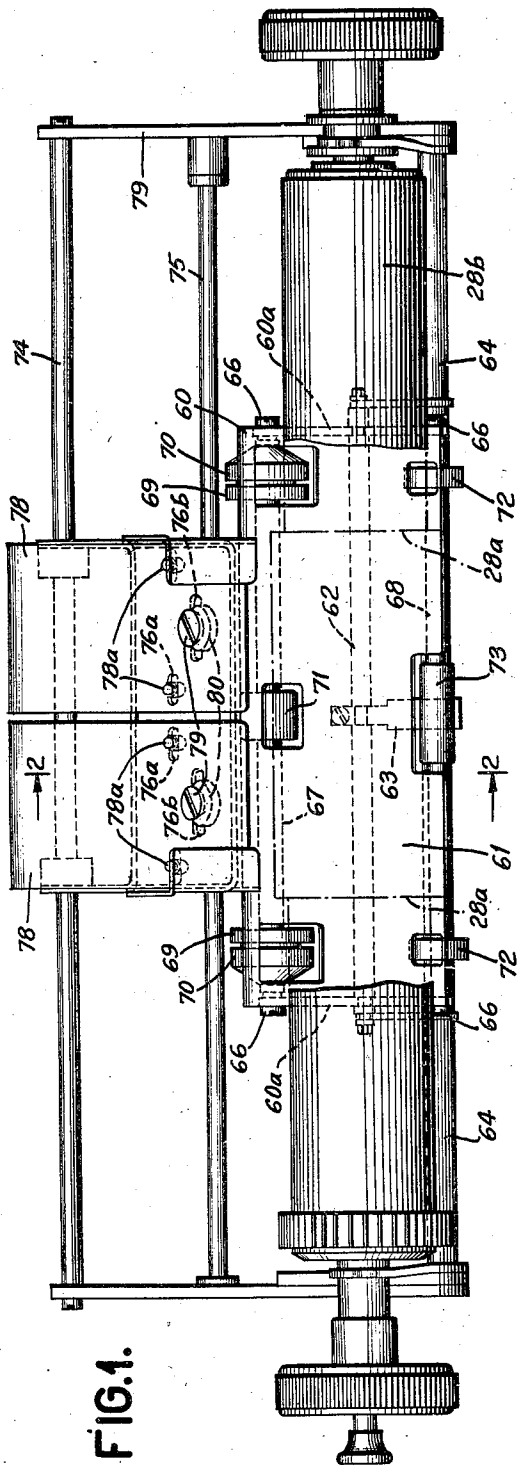
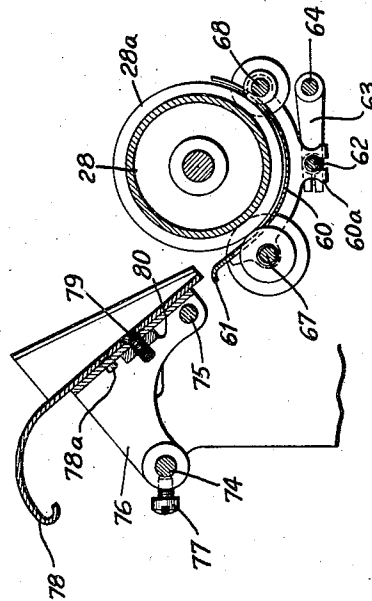


FIG. 1.

ASH 4-1234	BROOKLYN TELEPHONE COMPANY	
	Out-of-town Calls and Telegrams	
Place Called	Amount	Tax
YONKERS	20	
N ROCHELLE	20	
"	20	
ALBANY TLGRM	30	.03
PTCHESTER	15	
NEWBURGH	30	
ALBANY	50	10
YONKERS	20	
MTVERNON	20	
"	20	
PTCHESTER	25	
APR		
3		
5		
6		
10		
11		
12		
13		
16		
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20		

FIG. 4:



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2,328,624

TYPEWRITING MACHINE

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14 Claims. (Cl. 197—127)

This invention relates to typewriting machines.

An object of the invention is to provide a novel feeding mechanism which is particularly well adapted for the feeding of small bills or statements, for example, the statements used by telephone companies to report to the subscriber toll charges for a given period, such as a month.

An object is to provide a feeding mechanism which is capable of automatically realigning work sheets which may be initially inserted and fed in a skewed relation.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a plan view of the carriage.

Fig. 2 is a vertical section on the line 2—2 in Fig. 1.

Fig. 3 is a plan view of a modified form of the construction shown in Fig. 1.

Fig. 4 is a specimen of a statement.

Fig. 5 shows a modified form of feed roller assembly.

There are certain classes of business in which it is necessary to render bills or statements itemizing charges, for example, for telephone service. These statements or bills usually involve detail listing of small charges from 10 to 50 cents and are in the nature of small forms, approximately 3½" wide by about 5" long. The statements are usually connected together at top and bottom by a line of perforations which enables the statements to be separated after they are typed and are usually manufactured in zig-zag folded packs of continuous forms. An example of such a statement is shown in Fig. 4.

The small bills or statements illustrated in Fig. 4 are extremely difficult to feed due to the fact that they are so narrow and are not gripped evenly by the feed rollers, with the result that they tend to skew and require frequent manual readjustment on the platen. This requires a great deal of time which, in view of the small amount involved in the total of the items, causes the overhead cost of the billing operations to be high. One of the objects of the present invention is to provide a novel feeding mechanism which enables these small bills to be fed more evenly and without constant manual readjustment to guide them straight and in the proper position on the platen. The proper positioning of the material written in the various columns of the bill is

accomplished by means of the tabulating mechanism and the skewing of the bill causes the items to be misplaced in the columns and results in untidy looking statements.

One form of feeding mechanism is shown in Figs. 1 and 2 and includes the platen 20 which is of usual construction except for the fact that the rubber covering 28a is only slightly longer than the width of the bill as shown by the dot-dash lines designated 28a in Fig. 1. Cooperating with the platen is the paper deflector generally designated 60 which, except for its length, is quite similar to the paper deflector usually employed. This paper deflector includes a curved deflector plate 61, to the ends of the convex sides of which are secured the end pieces 60a having open slots (see Fig. 2) fitting annular grooves in a rod 62. Rod 62 thereby loosely supports the paper deflector 61 which may be removed at any time after first detaching the platen. Releasable latches 29a (Fig. 1) hold the platen in plates 29.

The rod 62 is mounted at its midpoint on an arm 63 which is secured to a shaft 64 journaled in the side plates of the carriage and operated by the usual pressure roller release lever with which the carriage is provided. A suitable spring, not shown, urges the arm 63 in a clockwise direction, Fig. 2, so as to tend to press the paper deflector upwardly to engage the pressure rollers with the platen. The paper deflector 61 is steadied at its ends by check links 65 which are loosely mounted on the shaft 64 and loosely engage the ends of rod 62. These arms 65 hold the paper deflector parallel with the platen and prevent the ends of the paper deflector from following the platen in its rotation. The links also keep the paper deflector parallel with the platen when the pressure rollers are released.

The end pieces 60a may be secured to the curved plate 61 by any suitable means such as welding or soldering and are provided with four pivot screws 66 on which are rotatably mounted and supported the two pressure roller shafts 67, 68 to which the pressure rollers are secured. The rear pressure roller shaft 67 is provided at each end with a pair of rollers 69, 70 of which the roller 69 is made of metal, preferably steel, while the roller 70 is made of a resilient material such as dense soft rubber, and is of slightly larger diameter than the roller 69. The shaft 67 is also provided with a central roller 71 which is made of very soft rubber such as sponge rubber, and is considerably smaller in diameter than either of the two pairs of rollers 69, 70. The latter ride on the metallic tube 28b which forms the core of the

platen. The central roller 71 bears very lightly on the rubber covering 28a so as to very lightly grip the bill at substantially its middle. The front pressure roller shaft 68 is provided with two metallic rollers 72 at its ends which bear on the shell 28b and at its center is provided with a smaller diameter rubber roller 73 which bears firmly on the rubber sleeve 28a. All the rollers 69 to 73 are secured to the shafts carrying them.

The steel rollers 69, 72 keep the paper deflector evenly spaced from the platen and act as spacing members to prevent the rollers 71, 73 from pressing too heavily upon the paper. The rollers 69 to 73 are so proportioned that the front roller 73 is the primary feeding means and the roller 71 is mainly used in introducing bills to bring the leading edge of the bill to the roller 73. Because the roller 71 is very soft and the spring which operates the arm 63 is quite strong, the roller 71 would tend to flatten and become deformed in a short time, if it were not for the provision of the spacing rollers 69. The rubber rollers 70, by cooperation with the platen core 28b, cause the roller 71 to be rotated whenever the platen is turned. The roller 72, by cooperation with the platen core 28b, drives the roller 73. However, the primary purpose of the roller 72 is to prevent flattening of the roller 73 against the strong pressure of the spring operating the arm 63 and are not intended to act as drivers for rollers 73. As a matter of fact, due to the dissimilar driving ratios between the platen core 28b and the roller 72, and between the sleeve 28a and roller 73, and the smoothness of rollers 72 and core 28b, there may be some slippage of rollers 72 on the shell 28b.

The carriage includes cross-rods 74, 75 on which is mounted a bail-like frame 76 including side arms having holes through which pass the rods 74, 75 and a connecting flat table which is substantially tangent to the surface of the platen covering 28a. This frame 76 is secured on the rods 74, by means of set screws 77 in bushings attached to the side arms of frame 76. Adjustably mounted on the front face of frame 76 are two side guides 78 provided with pins 78a which are riveted to the side guides and pass through aligned slots 76a in the frame 76, whereby the side guides 78 may be adjusted longitudinally of the platen a limited extent and secured in place by means of flat-head screws 79 which pass through holes in the side guides 78 and through aligned slots 76b in the frame 76. The screws 79 are threaded into round nuts 80 formed with lugs which project into the slots 76b and prevent the nuts 80 from turning when the screws 79 are turned.

The bills shown in Fig. 4 are usually in the form of a continuous strip supplied in zig-zag folded packs which may be placed in a suitable container behind the machine. The leading edge of the first bill is introduced into the chute formed by the side guides 78 and pressed down far enough to be lightly gripped between the roller 71 and platen 28. When the platen is turned roller 71 grips the bill at its middle, and pushes the leading edge thereof around the platen until the bill is gripped by the roller 73. This roller also grips the bill at the middle and the positive feeding of the bill is effected thereby.

It has been found that by drawing the bill around the platen by a single narrow roller which contacts the center of the bill, the bills will be fed evenly without skewing and it is not necessary that the operator readjust the bills from

time to time. Ordinarily the work sheet is fed not only by a plurality of small diameter front pressure rollers like the roller 73, but also by large diameter rear pressure rollers with the result that once a sheet is started in the wrong direction, it will continue in that direction because it is held against any possibility of twisting in the direction necessary to straighten the bill. With the form of feed mechanism shown in Figs. 1 and 2, the bill is positively fed at a point near its middle and close to the printing point, and the tendency is to continuously draw the bill straight ahead in a direction at right angles to the platen. This readjustment will not be effective with a single bill but requires the feeding of several bills before they are finally forced to feed at right angles to the axis of the platen.

Ordinarily the feeding of a work sheet in a typewriting machine is effected by a plurality of separate pressure rollers arranged in two rows and the rollers are so close together and so wide that a narrow bill like the one shown in Fig. 4 would, in all probability, be fed by at least five rollers. As a result, the sheet will be very firmly gripped and it cannot be twisted sidewise except by releasing the pressure rollers. Thus, if a sheet starts to feed in a skewed condition, it will remain in skewed condition and with continuous rotation of the platen will creep longitudinally of a platen until ejected. If the sheet is long enough, the longitudinal movement may be so great as to cause the edges of the sheet to crumple or become torn against the side guides or the end plates of the carriage. The sheet cannot be straightened by twisting it in the proper direction while the pressure rollers are engaged. It has been found that the usual paper deflector does not work very satisfactorily in feeding very narrow forms like the statement shown in Fig. 4 because it is difficult to initially start the bills square with the platen owing to the shortness of the leading edge which would be gripped by only one or two of the rear pressure rollers, whereas wide sheets will be gripped by all or nearly all of the rear pressure rollers and the contact points of such rollers with the platen will be so closely in alignment and parallel with the axis of the platen that in most cases the sheet will start square with the platen. The result is, that after a few forms have been fed, there is a tendency for the forms to slowly creep longitudinally of the platen. After a few forms have been fed they begin crumpling against the side guides 78 and must be readjusted to avoid damage.

In the form of the invention disclosed in Figs. 1 and 2, the roller 71 grips the forms so lightly that it is possible to shift the forms in a direction to straighten them, the roller 73 acting in a certain measure as a pivot point. For example, let it be assumed that the forms have been inserted in such a way in the chute formed by guides 78 that the trailing portions form an angle less than 90° with the right hand half of the platen. Were it not for the right hand side guide 78, the forms would tend to creep to the right (Fig. 1) with progressive rotation of the platen and ultimately the forms would travel completely off of the rubber covering 28a. Owing to the presence of the right hand side guide, however, a pressure is constantly exerted on the right hand edges of the forms while the roller 73 is constantly tending to pull the forms forwardly at right angles to the platen. As a result, a constant turning movement is applied to the forms allowing them to gradually swing in a counterclockwise direction

(Fig. 1) about the right hand side guide 78 as a pivot until ultimately the forms commence to feed straight. If the roller 71 did not press very lightly upon the forms, this action would not be possible because the frictional force between the rollers 71, 73 and the platen would be considerably greater than the straightening force or reaction exerted by the right hand side guide 78, with the result that the edges of the forms would be unable to travel to the right (Fig. 1) and would become crumpled against the right hand side guide 78.

The form of the invention shown in Figs. 1 and 2 has the disadvantage that the machine cannot be used for other purposes, such as the writing of larger forms and letters. It is desirable that equipment used in offices be as flexible as possible, in order that it may be used as far as possible for all purposes, particularly where the demands for special equipment are not sufficient to require continuous use of such equipment.

In Fig. 3 there is shown a modified form of the feed mechanism which not only permits the machine to be used for regular office work, but also permits two different bills or forms to be written at once, or alternately, as desired. In the form of the invention shown in Fig. 3, the machine is standard in every respect except in the size and arrangement of the rollers on the paper deflector and the paper table which is slightly modified in construction. In this case the platen is of standard construction with a rubber covering extending the full length of the core to accommodate any size sheet within the capacity of the carriage.

The reference numeral 85 designates the usual paper table on which two sets of side guides 78 are mounted in the same fashion as the guides 78 in Fig. 1 to form two form guiding chutes. The paper deflector 61 also extends the full length of the platen and is constructed similarly to the one shown in Fig. 1. It differs mainly in the number and arrangement of the pressure rollers and the steel rollers shown in Fig. 1 are omitted. The pressure roller shafts are designated 67a, 68a (Fig. 3) of which the rear pressure roller is provided with three rubber rollers 86 of dense soft rubber, and two sponge rubber rollers 87.

The front pressure rollers shaft 68a is provided with two feed rollers 88 located in front of rollers 87 and of smaller diameter than the rollers 86, 87. The rollers 88 are similar to the rollers 73 in Fig. 6. At the ends of the pressure roller shaft 68a are the shorter rollers 89 which are located in front of the other of the rollers 86 and are of slightly smaller diameter than rollers 88. The rollers 86 and 89 always bear directly upon the surface of the platen outside of the side guides 78. Only rollers 87 and 88 cooperate with continuous forms drawn through the chutes formed by the guides 78. The rollers 87 grip the forms very lightly while the rollers 88 grip fairly firmly. The rollers 86, in this case, serve as means of preventing the rollers 87 from gripping the work sheets firmly. The rollers 87, as in the case of roller 71, effect feeding of the forms by light surface contact.

The forms of the invention shown in Figs. 1 and 3 in which the rollers 71 and 87 are made of a material like spongy rubber have been found to work very satisfactorily. However, it has been found by experience that sponge rubber is somewhat difficult to work and difficult to cement on the pressure roller shafts. In order to avoid the production difficulties experienced with sponge rubber rollers, a pressure roller shaft assembly

has been devised in which all of the rollers are of firm soft rubber of the quality usually used in standard machines for all of the pressure rollers. This pressure roller assembly is shown in Fig. 5 and is designed to replace the assembly shown in Fig. 1 comprising the rollers 69, 70, 71 and the shaft 67.

Two pairs of rollers designated 86a, 87a are cemented on the shaft 67b which may be of the same length as the shaft 67 in Fig. 1. The rollers 86a are formed with shoulders 86b which are designed to support but not grip the edges of the forms and the raised portions of the rollers 86a are located in the same relative positions as rollers 86 in Fig. 3 with respect to the edges of the forms whereby the pressure roller shaft assembly shown in Fig. 5 will be rotated by the platen but the forms will not be positively gripped by the rollers 86a.

Each of the rollers 87a is provided with several fins 87b but more than half of each roller is of the same diameter as the shoulders 86b of rollers 86a. The fins 87b are so thin as to be incapable of feeding the forms positively but flex very readily when the forms pass between them, whereby the forms are very lightly gripped and may be easily shifted longitudinally of the platen without the fins exerting any appreciable binding force upon the forms. Thus, the fins grip a sheet introduced into the form by the side guides 78 to the extent barely necessary to bring the leading edge of the first form to the roller 73 but the forms, nevertheless, can pivot slightly about the roller 73 and the fins 87b will merely bend or flex slightly. The portions of rollers 87a adjacent the fins 87b and the shoulders 86b on the rollers 86a merely loosely support the forms during their introduction and prevent the leading edges of the forms from catching upon the edges of the openings which are provided in the paper deflector 61 for the rollers. In Fig. 1, the paper deflector is shown as provided with three openings for the rollers 69, 70, 71.

The form of the pressure roller assembly shown in Fig. 5 has the advantage that it can be used in the short paper deflector which is used in wide carriage machines. In such machines it is common to provide a plurality of short paper deflectors approximately seven inches long rather than one long deflector as it has been found that when a single long paper deflector of 16" or more in length is used the pressure rollers do not grip the sheets evenly. Thus with a construction as shown in Fig. 5 a minimum number of additional parts must be manufactured to apply the present invention to a standard machine, such as one with a 12" carriage. In the form of the invention shown in Figs. 1 and 3, the paper deflector must be made special for machines for writing the narrow bills shown in Fig. 4.

The short paper deflector used in wide carriage machines usually has at the rear of the paper deflector four rollers of the same over-all length and spacing as the roller shown in Fig. 5 and a shaft similar to 67b with three slightly longer rollers of which the outer two are directly in front of the rollers 86a while the middle roller is directly in line with the space between the rollers 87a. When utilizing the roller assembly shown in Fig. 5 in a standard short paper deflector, a platen with a full length rubber covering is used instead of a platen like the one shown in Fig. 1 with the covering extending over only approximately one-third of the core. The outer two of the front three pressure rollers utilized in

the short paper deflector may be reduced in length, like the rollers 89 in Fig. 3, to clear the edges of the forms and the middle roller may be slightly larger in diameter like the roller 88. With this arrangement, a minimum number of special parts must be made to apply the invention to any standard machine.

Furthermore, when it is desired to use a machine for general correspondence as well as for the writing of small bills like those shown in Fig. 4, a wide carriage machine can be used which is equipped with a standard paper deflector on one side of the machine and a special paper deflector having the rollers arranged as just described with a single set of the side guides 78. Since the platen side guides and the paper deflector are both easily removed, it is possible by providing each machine with two short deflectors of standard form and one special deflector to convert, at a moment's notice, a machine from special bill writing jobs to regular use.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to three illustrative embodiments, it will be understood that various omissions and substitutions and changes in the form and details of the devices illustrated and in their operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In combination with the platen of a typewriting machine, a forms guiding chute; a paper deflector assembly located in front of said chute for receiving forms guided by said chute including a series of rear pressure rollers and a series of front pressure rollers, at least one of said series of rear pressure rollers lightly gripping a form guided to the platen by said chute and others of said rollers engaging the platen adjacent the edges of the form to act as spacers to regulate the pressure of the forms gripping roller and also acting as a means of rotating said roller, the front series including a central roller which firmly grips the forms at the center to feed the forms positively and the remainder of said front series engaging the platen to rotate the central roller; and means to urge the paper deflector assembly against the platen.

2. In combination with the platen of a typewriting machine, a rear feed roller shaft including a central feed roller and a plurality of spacing rollers which prevent the central feed roller from firmly gripping a sheet, a front feed roller shaft having a central feed roller located in alignment circumferentially of the platen with the central feed roller on the rear shaft and a pair of driving rollers, said spacing and driving rollers being located outside the edges of a sheet fed by the central rollers, and means to urge said shafts toward the platen.

3. In combination with the carriage of a typewriting machine, a series of rear pressure rollers including at least one centrally disposed roller gripping a work sheet at or near its center and a plurality of spacing rollers contacting the platen but not the work sheet adjacent the edges of the sheet, said central roller being relatively more yielding than the spacing rollers, the latter preventing flattening of the central roller more than the thickness of the sheet, said spacing rollers driving the central roller; a series of front pressure rollers including a central feed roller en-

gaging the middle of the sheet and a pair of driving rollers coacting with the platen to drive the central front feed roller and control its pressure on the sheet; and means to yieldingly hold all of said rollers against the platen.

4. In combination with the platen of a typewriting machine; a paper deflector assembly including a front feed roller shaft and a rear feed roller shaft, a front feed roller on said front shaft engaging a work sheet at its center and operative, when the platen is rotated, to positively pull the work sheet around the platen, a rear feed roller on the rear roller shaft, said rear roller being relatively more yielding than the front roller, said paper deflector assembly also including means to limit the rear roller to a light contact with the work sheet at about its center and actuated by the platen outside the work sheet for rotating the rear roller, and means to urge the paper deflector assembly into engagement with the platen.

5. In a typewriting machine, a platen, a paper guide chute for directing a work sheet to the platen at right angles thereto, a soft rubber feed roller located at the delivery side of the platen close to the printing line and at the center line of the feed path of the work sheet for drawing the work sheet through said chute and around said platen, a softer and more yielding rubber roller located at the introductory side of the platen; means to prevent said softer roller from flattening against the platen, said means permitting the softer roller to engage the work sheet so lightly as to allow shifting of the work sheet laterally of the line of feed, and means to urge said rollers into contact with the platen.

6. In a typewriting machine, a platen, a paper guide chute for directing a work sheet to the platen at right angles thereto, a soft rubber feed roller located at the delivery side of the platen close to the printing line and at the center line of the feed path of the work sheet for drawing the work sheet through said chute and around said platen, a softer yielding roller made of sponge rubber and located at the introductory side of the platen; means to prevent said softer roller from flattening against the platen, said means permitting the softer roller to engage the work sheet so lightly as to allow shifting of the work sheet laterally of the line of feed, and means to urge said rollers into contact with the platen.

7. In a typewriting machine, a platen, a paper guide chute for directing a work sheet to the platen at right angles thereto, a feed roller located at the delivery side of the platen close to the printing line and at the center line of the feed path of the work sheet for drawing the work sheet through said chute and around said platen, a second roller formed with a plurality of thin flexible fins capable of flexing with displacement of the work sheet laterally of its line of feed and located at the introductory side of the platen; means to prevent said second roller from flattening against the platen, said means permitting the second roller to engage the work sheet so lightly as to allow shifting of the work sheet laterally of the line of feed, and means to urge said rollers into contact with the platen.

8. In combination with the platen of a typewriting machine, a forms guiding chute, a paper deflector assembly located in front of said chute for receiving forms guided by the chute including a series of rear pressure rollers and a series of front pressure rollers, at least one of said series of rear pressure rollers lightly gripping a form and being made of sponge rubber and others of

said rear rollers engaging the platen adjacent the edges of the form to act as spacers to regulate the pressure of the sponge rubber roller and also acting as a means of rotating said roller, the front series including a central roller which firmly grips the forms at the center to feed the forms positively, the remainder of said front series engaging the platen to rotate the central roller, and means to urge the paper deflector assembly against the platen.

9. In combination with the platen of a typewriting machine, a forms guiding chute, a paper deflector assembly for receiving forms guided by said chute including a series of rear pressure rollers and a series of front pressure rollers, at least one of said series of rear pressure rollers being formed with a plurality of thin flexible fins lightly gripping a form and capable of flexing with displacement of the work sheet laterally of its line of feed, others of said rollers engaging the platen adjacent the edges of the form to act as spacers to regulate the pressure of the forms gripping roller and also acting as a means of rotating said roller, the front series including a central roller which firmly grips the forms at the center to feed forms positively and the remainder of said front series engaging the platen to rotate the central roller, and means to urge the paper deflector assembly against the platen.

10. In combination with the platen of a typewriting machine, means to guide forms to the platen including elements engaging the edges of the forms, a front pressure roller for positively feeding the forms by firm engagement with the platen at the center of the form, and a rear pressure roller formed with fins capable of flexing when the forms are displaced longitudinally of the platen and which lightly grips the sheet merely sufficiently to introduce a form to the front pressure roller to enable the forms to be straightened by a quasi-pivotal movement on the platen with one or the other of said elements as a pivot center.

11. In combination with the platen of a typewriting machine, a forms guiding chute, a paper deflector assembly located in front of said chute for receiving forms guided by said chute including a series of rear pressure rollers and a series of front pressure rollers, at least one of said series of rear pressure rollers lightly gripping a form and yieldable longitudinally of the platen when the work sheet is displaced in such direction, others of said rear rollers engaging the platen adjacent the edges of the form to act as spacer to regulate the pressure of the forms gripping roller and also acting as a means of rotating

said roller, the front series including a central roller which firmly grips the forms at the center to feed the forms positively and the remainder of said front series engaging the platen to rotate the central roller; and means to urge the paper deflector assembly against the platen.

12. In a typewriting machine, a platen, a paper guide chute for directing a work sheet to the platen at right angles thereto, a soft rubber feed roller located at the delivery side of the platen close to the printing line and at the center line of the feed path of the work sheet for drawing the work sheet through said chute and around said platen, a softer rubber roller yieldable longitudinally of the platen when the work sheet is displaced in such direction and located at the introductory side of the platen; means to prevent said softer roller from flattening against the platen, said means permitting the softer roller to engage the work sheet so lightly as to allow shifting of the work sheet laterally of the line of roller, means to limit the rear roller to a light contact with the work sheet at about its center and actuated by the platen outside the work sheet for rotating the rear roller, and means to urge the paper deflector assembly into engagement with the platen.

13. In combination with the platen of a typewriting machine, a rear feed roller shaft including a central feed roller yieldable longitudinally of the platen when the work sheet is displaced in such direction and a plurality of spacing rollers which prevent the central feed roller from firmly gripping a sheet, a front feed roller shaft having a central feed roller located in alignment circumferentially of the platen with the central feed roller on the rear shaft and a pair of driving rollers, said spacing and driving rollers being located outside the edges of a sheet fed by the central rollers, and means to urge said shafts toward the platen.

14. In combination with the platen of a typewriting machine, a rear feed roller shaft including a central feed roller made of sponge rubber and a plurality of spacing rollers made of firm soft rubber which prevent the central feed roller from firmly gripping a sheet, a front feed roller shaft having a central feed roller located in alignment circumferentially of the platen with the central feed roller on the rear shaft and a pair of driving rollers, said spacing and driving rollers being located outside the edges of a sheet fed by the central rollers, and means to urge said shafts toward the platen.

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