

May 19, 1959

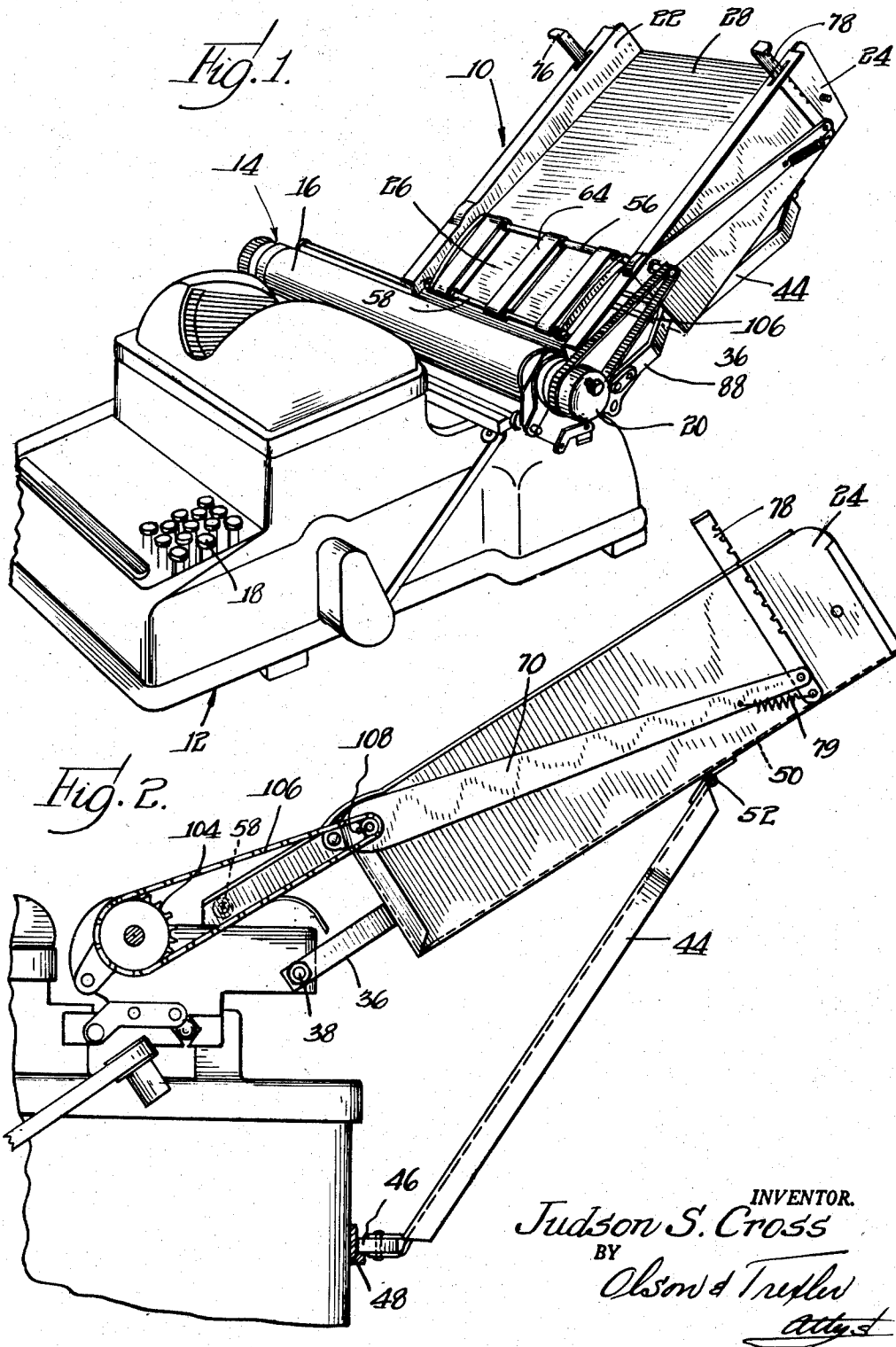
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SHEET FEEDING ATTACHMENT FOR TYPEWRITERS

Filed Nov. 10, 1953

2 Sheets-Sheet 1



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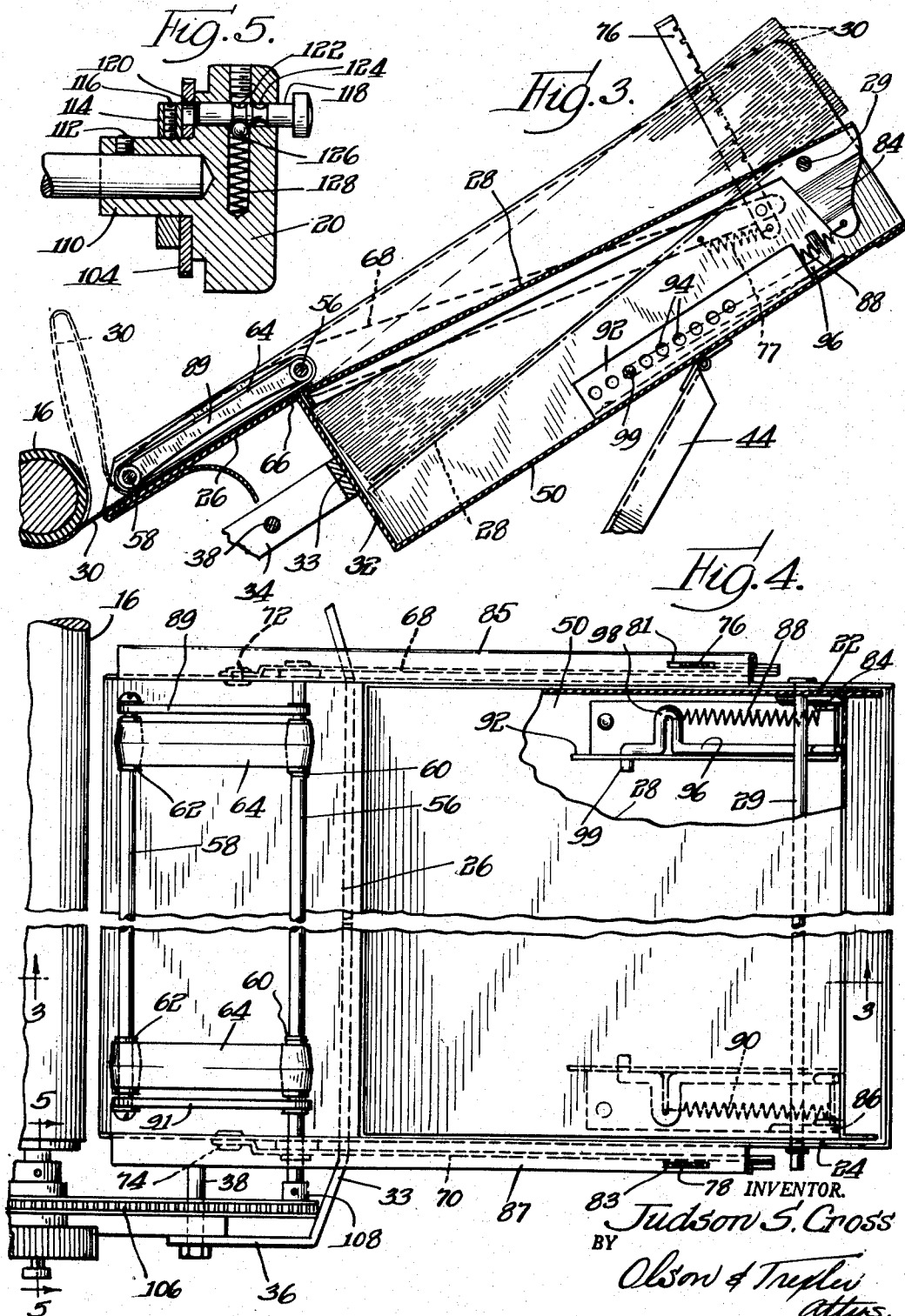
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2 Sheets-Sheet 2



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SHEET FEEDING ATTACHMENT FOR TYPEWRITERS

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11 Claims. (Cl. 197—130)

The present invention relates to a novel sheet feeding device, more particularly a novel device for feeding sheets or unit sets of sheets into a typewriter machine.

As is well known, there are many business activities which require the filling out of a large number of forms. These forms may be single sheets, but more often they are typed in multiple and provided in unit sets including a plurality of sheets. It is obvious that the time required to position and insert each form unit set into a typewriter is extensive and, therefore, in order to economize, it is desirable to provide some means for automatically feeding such forms into a typewriter. Such sheet feeding means have heretofore been suggested but in general have not been wholly acceptable because they have in some cases been unduly complicated and expensive, and in other cases they often feed successive forms into a typewriter in overlapping relationship, which is objectionable. It is, therefore, an object of the present invention to provide a novel device adapted to be attached to a typewriter or the like, which device is capable of feeding a plurality of separate sheets or unit sets successively into a typewriter.

More particularly, it is an object of the present invention to provide a novel device for feeding sheets or unit sets from a stack and into a typewriter or the like in a manner so that a unit set being fed is completely separated from the stack before feeding of the next unit set begins whereby to prevent overlapping of successive sheets or unit sets.

Another object of the present invention is to provide a novel feeding device of the above described type which may be readily adjusted for feeding sheets or unit sets of various thicknesses.

A further object of the present invention is to provide a novel feeding device of the above described type which may be mounted for movement with a typewriter carriage without applying an excessive load to the carriage and impairing the operation thereof.

Still another object of the present invention is to provide a novel feeding device having the characteristics set forth herein above, which device is of relatively simple and rugged construction and may be economically produced.

A more specific object of the present invention is to provide a novel device for feeding sheets or unit sets successively into a typewriter, which device is constructed so that the typewriter platen may be turned in a reverse direction to adjust a sheet or unit set thereon without interfering with the following sheet or unit set.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings, wherein:

Fig. 1 is a perspective view, illustrating the manner in which a feeding device embodying the principles of this invention may be applied to a typewriter;

Fig. 2 is an enlarged fragmentary elevational view, showing a feeding device embodying the principles of this invention supported on a typewriter;

Fig. 3 is an enlarged fragmentary cross-sectional view taken along line 3—3 in Fig. 4;

Fig. 4 is a fragmentary plan view, showing certain

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novel features of this invention in greater detail; and

Fig. 5 is an enlarged fragmentary cross-sectional view taken along line 5—5 in Fig. 4.

Referring now more specifically to the drawings in which like parts are designated by the same numerals throughout the various figures, a feeding device 10 embodying the principles of this invention is shown best in Figs. 1 and 2. The device 10 is adapted to be mounted on a typewriter 12 which may be of any conventional design. For the purpose of illustrating this invention, the typewriter may be of the electric type including a carriage generally designated by numeral 14 and having a platen roll 16. As is understood, a typewriter of this type is provided with a carriage return key 18 for actuating the mechanism operable to return the carriage 14 and also to rotate the platen for feeding a sheet. In addition, the platen may be manually operated by means of a knob 20 affixed to one end thereof. As shown best in Figs. 1 and 4, the feeding device 10 includes a pair of spaced parallel side plates 22 and 24 between which a fixed guide plate 26 is secured. A movable table or platform 28 is pivotally mounted between the side plates by a shaft 29 and is adapted to support a stack of sheets or unit sets of sheets 30 thereon. As will appear from the description given herein below, the movable table 28 is adapted to move upwardly as sheet units are removed from the stack and a wall member 32 extends from the guide plate 26 to substantially the lower edges of the side plates for maintaining the edges of the sheet in the stack in aligned relationship with each other. Furthermore, since the device 10 is supported in an inclined position, as illustrated in the drawings, the wall 32 forms an abutment surface for supporting the stack and preventing the individual sheets or unit sets from sliding off of the stack until they have reached a predetermined feeding position.

In accordance with one feature of this invention, the feeding device 10 is supported on the typewriter for movement with the typewriter carriage and without applying an undue load to the carriage. In order to accomplish this, a bracket member 33 is secured to the wall 32 and is provided with forwardly projecting apertured arm portions 34 and 36 adapted to receive a rod 38 which is a conventional part of standard typewriters. In order to support the main weight of the feeding device, an arm 44 extends downwardly from the device and is provided with a roller 46 adapted to ride on a track 48 fixed on the typewriter housing. Preferably, the roller 46 is mounted on the arm by means of ball bearings, not shown, to facilitate easy operation. As shown best in Fig. 2, the arm 44 is connected to a bottom plate 50 secured between the side plates 22 and 24 by means of a hinge 52 so that the position of the arm may be adjusted to adapt the device for installation on various typewriting machines. It has been found that optimum results are usually obtained when the length of the arm is such that the feeding device, and thus the stack and guide plate 26, are inclined at an angle of about 40 to 45 degrees with respect to the horizontal.

In order to feed the forms or form units 30 from the stack, means is provided for engaging the uppermost sheet or form in the stack and moving it upon any forward rotation of the typewriter platen. This means includes a pair of parallel shafts 56 and 58 extending between the side plates and having fixed thereon a plurality of pulleys 60 and 62 respectively. Feeding belts 64 of any suitable friction material extend between and around the pulleys in the manner shown in Figs. 1 and 4. Preferably, the pulleys are arranged so that one belt is disposed for engagement with one side of the stack, another belt is disposed for engagement with the other side of the stack and a third belt is disposed for engagement with a mid portion of the stack. However, it should be under-

stood that the particular number and arrangement of the feeding belts may be varied in accordance with requirements dictated by the particular size and shape of the forms or form units being fed.

In accordance with an important feature of the present invention, the feeding belts and pulleys are constructed and arranged so that only a single sheet or form unit may be fed from the stack at a time. Thus the shaft 56 is adjustably mounted so that the distance between the feeding belts and the upper edge 66 of the wall 32 is substantially equal to the thickness of the sheet or form unit set being fed. In order to adjustably mount shaft 56, a pair of brackets or levers 68 and 70 are pivotally connected to the side walls 22 and 24 respectively by means of bushings 72 and 74. The shaft 56 extends through slots in the side walls and is journaled at its opposite ends in brackets 68 and 70. The levers 68 and 70 extend rearwardly along the side walls 22 and 24 and notched bars 76 and 78 are pivotally connected to the levers 68 and 70 respectively. The notched bars extend upwardly through slots 81 and 83 in flanges 85 and 87 projecting from the upper edges of side walls 22 and 24. The notches are formed to permit entry therein of the flange edges defining the slots 81 and 83 so that the bars may be retained in any desired adjusted position. Thus the levers 68 and 70 may be pivoted to adjust the distance between the feeding belts 64 and the guide plate 26 and this adjustment may be made accurately and rapidly since the shaft 56 is positioned relatively close to the pivotally supported ends of the long levers 68 and 70. Springs 77 and 79 are connected between the bars 76 and 78 and their associated levers for yieldably maintaining the bars in engagement with the slot edges. Furthermore, it should be noted that the shaft 56 is located a relatively short distance behind the wall 32 whereby the top sheet or form unit will be fed substantially past the surface of the wall 32 before the next form unit is engaged by the belts. The shaft 58 is journaled between a pair of arms 89 and 91 pivotally mounted on the shaft 56 whereby the belts float upon a sheet unit being fed.

As set forth hereinabove, the stack of sheets or form units is supported on the movable table 28 and in order to raise the stack as each sheet or form unit is fed therefrom means is provided for resiliently biasing the table upwardly. This means includes a pair of ears 84 and 86 integral with and depending from the table. These ears are respectively connected to springs 88 and 90 for resiliently urging the table upwardly or, in other words, in a clockwise direction as viewed in Fig. 3. In order to substantially reduce any possibility of feeding two sheets or form units in overlapping relationship or of jamming a second form unit between the feed belts and the upper edge 66 of wall 32 before the preceding form unit has cleared the stack, it has been found that the tension of the springs 88 and 90 should be such as not to urge the stack upwardly against the feed belts with too great a force. Therefore, means has been provided for adjusting the tension of the springs and is shown best in Figs. 3 and 4. This means includes a bracket 92 fixed to the bottom 50 and having a plurality of apertures 94. A member 96 which may be formed from heavy wire is positioned along the bracket and is provided with an intermediate looped portion 98 to which the spring 88 is connected. The member 96 is also provided with a finger portion 99 adapted to be inserted through any of the apertures 94 whereby the tension in the spring 88 may be adjusted as desired. It is understood, of course, that identical adjustable means may be provided for the spring 90. Furthermore, it has been found that any tendency for feeding of two sheets or form units simultaneously may be further restrained by limiting the area of contact between the feed belts and the uppermost sheet and, therefore, the pulleys 60 are formed so that they taper inwardly toward their opposite ends as shown best in Fig. 4. With this arrangement, it is seen that the feed belts will primarily engage the sheets

along a narrow area adjacent the center or high portions of the pulleys.

The feed belts are driven in timed relationship with the typewriter platen 16 and, in order to accomplish this, a sprocket wheel 104 is interconnected with the platen shaft and a drive chain 106 encircles this sprocket wheel and a second sprocket wheel 108 preferably fixed on the shaft 56. With this arrangement, it is obvious that upon any forward or feeding rotation of the typewriter platen, the feed belts 64 will be positively driven so as to advance a sheet from the stack a distance directly proportional to the movement of the platen.

As will be understood, there are many instances when it may be desirable to turn the typewriter platen in a reverse direction in order to adjust the position of a form so that a blank or space inadvertently missed may be filled out or for any other desired purpose. However, it is undesirable to permit reverse or rearward movement of the feeding belts 64 since such reverse movement might cause overlapping of the form sets or jamming of the feeding device. Therefore, means is provided to permit the sprocket wheel 104 to be easily connected with and disconnected from the platen shaft. This means is shown best in Fig. 5 wherein the hand knob 20 is illustrated as having a hub 110 fixed to the platen shaft by a set screw 112. The sprocket wheel 104 is rotatably mounted on the hub and retained thereon by a collar 114 fixed by a screw 116. In order to provide a driving connection between the knob 20 and the sprocket wheel, a pin 118 slidably extends through a suitable aperture in the knob and is adapted to enter a hole 120 in the sprocket wheel. The pin is provided with a pair of spaced annular grooves 122 and 124 which are adapted to receive a ball 126 yieldably pressed against the pin by a spring 128 in order to hold the pin in the desired adjusted position. It is readily apparent that the pin may be pushed into the hole in the sprocket wheel to provide a driving connection or the pin may be withdrawn to the position shown to disconnect the sprocket wheel and permit reverse rotation of the platen. Thus, upon rearward rotation of the platen, the feeding belt 64 will remain stationary and a sheet or form unit 30 already in the typewriter will be looped upwardly between the platen and the shaft 58 as shown in dotted lines in Fig. 3. Such looping of the sheet of course prevents overlapping of the sheet with a subsequent sheet and also prevents jamming of the feeding device.

While the operation of the above described feeding device is believed to be clear, a brief summary of such operation is as follows. A stack of sheets of form units is placed on the table 28, which table is depressed by the weight of the stack. The space between the feeding belts 64 and the upper edge 66 of the abutment wall 32 is then adjusted so as to be substantially equal to the thickness of each sheet unit. It is understood that such units may consist of a single sheet of paper or may include a plurality of sheets fixed together. The tension in the springs 88 and 90 is adjusted as described above so that the upper or endmost sheet unit in the stack presses against the feeding belts 64 with the proper pressure. After these adjustments have been made, the typewriter platen 16 is rotated forwardly either by pressing the carriage return key 18 or by manually turning the knob 20. Upon such forward rotation of the platen, the feeding belts 64 are driven by the sprockets 104 and 108 and the chain 106 so that the endmost sheet unit is fed over the guide plate 26 and onto the platen. As the endmost sheet unit is fed from the stack to the position shown in Fig. 3, it prevents the stack from moving upwardly so that a subsequent sheet cannot engage the feeding belts until the endmost sheet unit is substantially completely removed from the stack.

From the above description, it is seen that the present invention has provided a novel feeding device for typewriting machines and the like, which device is capable of automatically feeding sheet units from a stack without

any overlapping between the units. In addition, it is seen that the present invention has provided a novel feeding device which is of relatively simple and economical construction and may be readily adapted for use with all standard typewriting machines. Furthermore, it is seen that in accordance with one feature of this invention, the novel feeding device is connected with a typewriter platen so that it is operative to feed sheet units only when the platen is rotated in a forward direction.

While the preferred embodiment of the present invention is shown and described herein, it is obvious that many structural details may be changed without departing from the spirit and the scope of the appended claims.

The invention is claimed as follows:

1. A sheet feeding device for typewriting machines and the like comprising frame means adapted to be connected with a typewriting machine carriage for movement with the carriage, means on said frame means for supporting a stack of sheet units, means for feeding an endmost sheet unit from said stack to the typewriting machine, said feeding means including endless belt means having one end portion overlying the proximate end of said stack for engagement with the end of an endmost sheet unit and having the other end portion in floating engagement with the sheet unit issuing from the stack, an abutment means engageable with a forward edge of said stack, said abutment means and said belt means being spaced from each other a distance substantially equal to the thickness of a sheet unit so as to restrain overlapping of successive sheet units.

2. A sheet feeding device for typewriting machines and the like comprising frame means adapted to be connected with a typewriting machine carriage for movement of the carriage, means on said frame means for supporting a stack of sheet units, means for feeding an endmost sheet unit from said stack to the typewriting machine, said feeding means including endless belt means having one end portion overlying the proximate end of said stack and having the other end portion in floating engagement with the sheet unit issuing from the stack, an abutment wall means engageable with a forward edge of said stack extending substantially perpendicularly to said belt means, said abutment wall means having an upper edge spaced from said belt means a distance substantially equal to the thickness of a sheet unit so as to restrain overlapping between successive sheet units being fed.

3. A sheet feeding device for typewriting machines and the like comprising frame means adapted to be connected with a typewriting machine carriage for movement with the carriage, means on said frame means for supporting a stack of sheet units, means on said frame means for feeding an endmost sheet unit from the stack to the typewriting machine, said feeding means including a pair of spaced rotatably mounted pulley means, endless belt means encircling said pulley means, said pulley means being disposed so that one end portion of the endless belt means is located for engagement with the proximate end of an endmost sheet unit in said stack and the other end portion is in floating engagement with the sheet unit issuing from the stack, and means for positively retaining subsequent sheet units in such stack until the endmost sheet unit has been substantially completely removed from the stack.

4. A sheet feeding device, as defined in claim 3, wherein said pulley means have inwardly tapered ends whereby said belt means is formed around said pulley means so as to present a relatively narrow area for engagement with the sheet units.

5. A sheet feeding device for typewriting machines and the like comprising frame means adapted to be connectible with a typewriting machine carriage for movement with the carriage, means on said frame means for supporting a stack of sheet units, means for feeding an endmost sheet unit from said stack to the typewriting ma-

chine and including a pair of spaced parallel shafts and endless friction belt means carried by and extending between said shafts for engaging and feeding sheet units, abutment means engageable with the forward edge of the stack, and means for adjusting said abutment means and said feeding means relative to each other so as to provide a space therebetween substantially equal to the thickness of a sheet unit whereby to restrain overlapping of successive sheet units being fed, said adjusting means comprising lever means pivotally supported adjacent one end thereof, one of said shafts being rotatably mounted on said lever means adjacent the pivotal support of the lever means, arm means pivotally mounted on and extending from said one shaft, and the other of said shafts being rotatably supported by said arm means whereby said endless friction belt means may pivot about said one shaft for floating engagement with the sheet units, and means for manipulating the opposite end of said lever means whereby the position of the feeding means may be adjusted accurately.

6. A sheet feeding device for typewriting machines and the like comprising frame means adapted for connection with the typewriting machine, means on said frame means for supporting a stack of sheet units by engagement against the outer face of the lowermost sheet unit adjacent a typewriting machine with confining pressure on the stack only at the forward end thereof and the remaining portion of the stack having no confining pressure thereon for ease of feeding sheet units therefrom, the outer face of the uppermost sheet unit being free except at the forward end thereof, feeding means complementing the stack supporting means to confine the forward end of the stack and engaging the proximate end of the endmost sheet unit for feeding only the endmost sheet unit to the typewriting machine, and abutment means adjacent the feeding means and engaging the stack below the endmost sheet unit to prevent a subsequent sheet unit from being fed until the endmost sheet unit has been substantially removed from the stack.

7. A sheet feeding device as claimed in claim 6, wherein the stack supporting means includes a spring urged support pivoted on the frame means at the rear of the stack and urged upwardly at the forward end of the stack.

8. A sheet feeding device as claimed in claim 6, wherein the feeding means includes a forwardly projecting portion in advance of the abutment means and mounted for floating engagement with the sheet unit issuing from the stack.

9. A sheet feeding device as claimed in claim 8, wherein the portion of the feeding means adjacent the abutment means is adjustable relative thereto.

10. A sheet feeding device as claimed in claim 6, wherein the feeding means includes endless belt means operating over spaced pulley means.

11. A sheet feeding device as claimed in claim 10, wherein the pulley means adjacent the abutment means is fixed in predetermined adjusted position and the other pulley means is connected thereto and in advance thereof for floating engagement with a sheet unit issuing from the stack.

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