April 4, 1961 E. S. PEARSON ET AL 2,978,088

PAPER FEEDING DEVICE

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FIG. 1

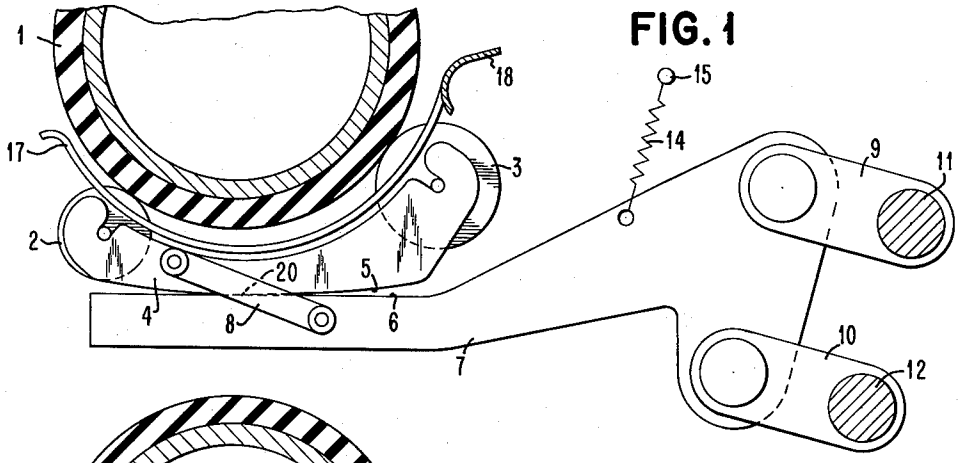


FIG. 2

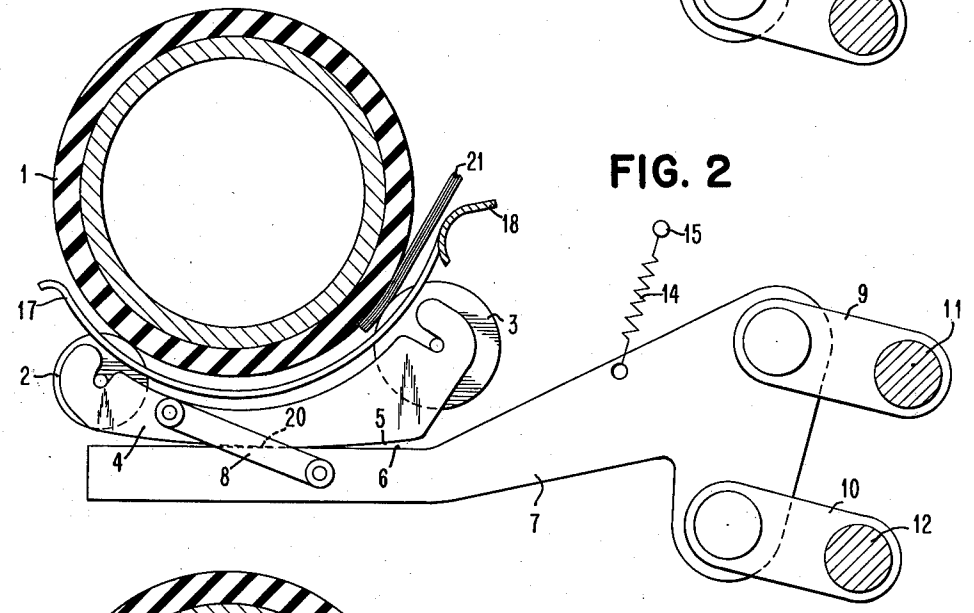
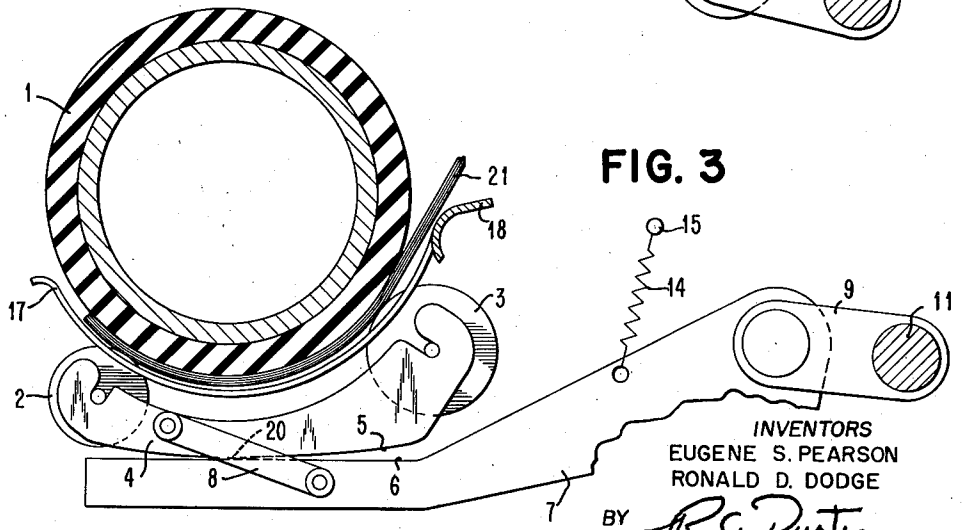


FIG. 3



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FIG. 4

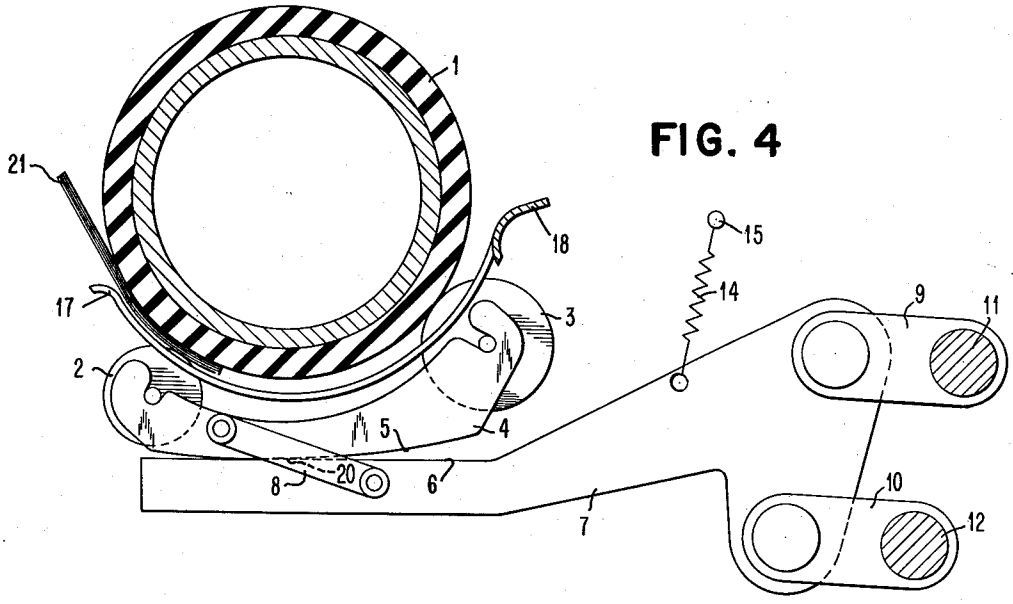
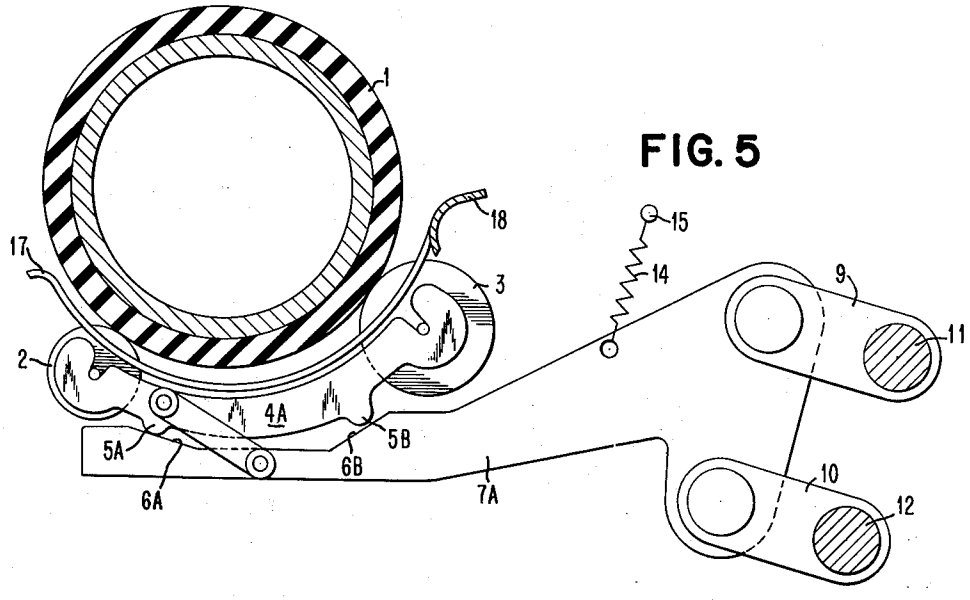


FIG. 5



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FIG. 6

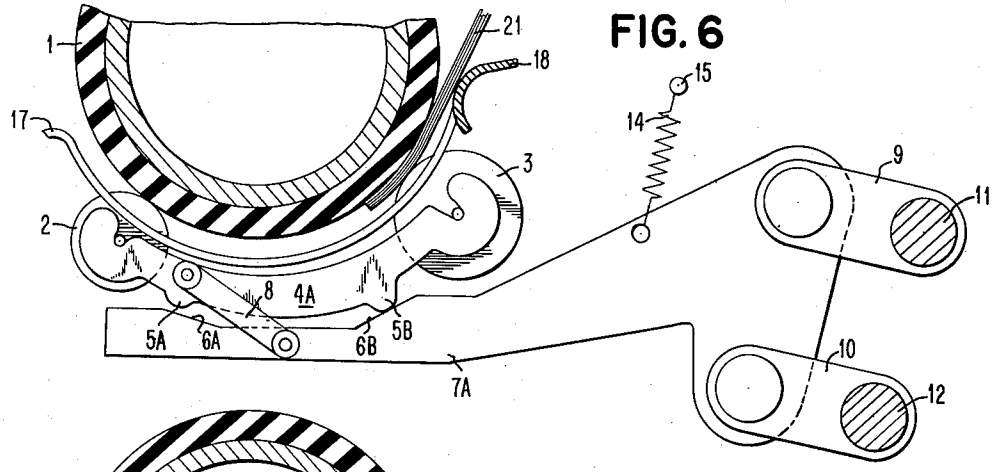


FIG. 7

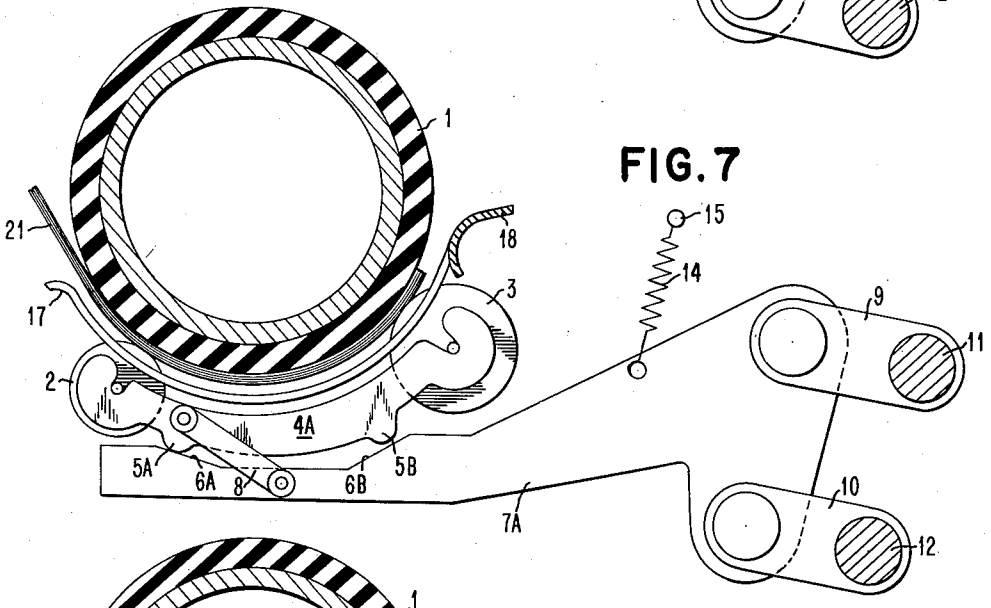
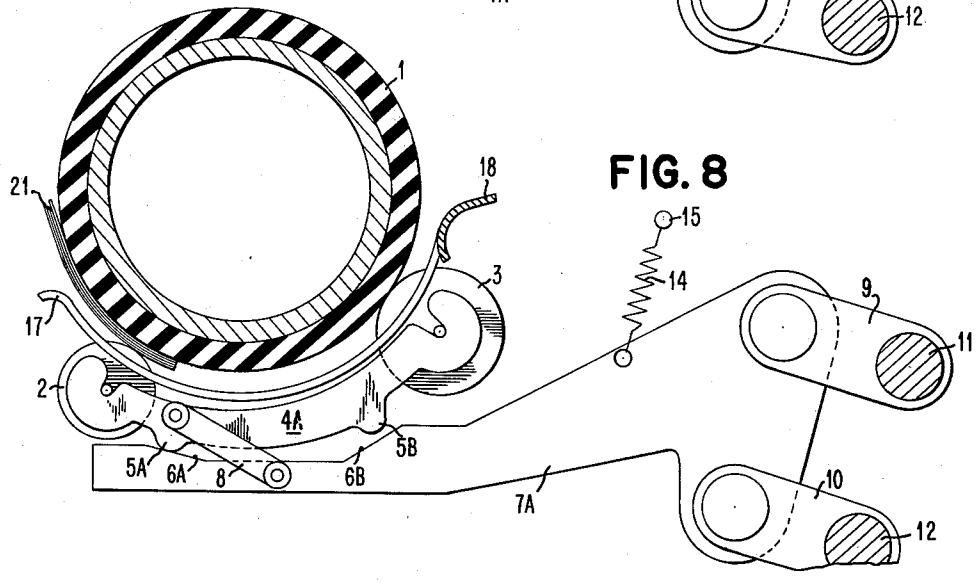


FIG. 8



United States Patent Office 2,978,088
Patented Apr. 4, 1961

2,978,088

PAPER FEEDING DEVICE

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Filed Sept. 12, 1958, Ser. No. 760,625

3 Claims. (Cl. 197—138)

This invention relates to typewriters, and more particularly to mechanisms for feeding paper sheets around the platen of a typewriter.

It is customary to provide with a typewriter platen a pair of pressure rolls cooperating with their surface to effect a feeding of paper when the platen is rotated. The rolls are yieldingly held in engagement with the platen but may be forced away from the latter by a stack of paper moving between the pressure rolls and the platen. If the rolls are urged toward the platen at a substantially constant force which is high enough to produce the necessary friction for feeding paper, then a distinct increase in resistance to rotation of the platen will be felt by the operator when the edge of a paper stack first encounters a feed roll. By providing a mechanism which holds a roll normally in engagement with the platen under a comparatively light pressure, and which increases the pressure when a paper stack is inserted between that roll and the platen, then only a slight increase in resistance to rotation of the platen is obtained when the roll is first encountered but the pressure increases sufficiently to feed the paper as soon as it gets into feeding position.

An object of this invention is to provide an improved mechanism for holding rolls in engagement with the platen of a typewriter to effect the feeding of paper.

Another object is to provide an improved device for yieldingly holding a pair of rolls in engagement with the platen of a typewriter, the device being operative upon feeding a stack of paper under one of the rolls to increase the pressure on that roll and to decrease the pressure on the other roll.

Yet another object is to provide means for holding a roll in engagement with a platen under a pressure which increases when a stack of paper is fed between the roll and the platen.

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 side elevational view with parts in section, showing an improved mechanism for holding rolls in engagement with a platen. Figs. 2, 3 and 4 are like Fig. 1 except that they show the mechanism with a stack of paper sheets in different feeding positions. Figs. 5 to 8, inclusive, show a modification of the invention with parts in positions corresponding to those shown in Figs. 1 to 4.

Referring to the drawings, and more particularly to Fig. 1, it will be noted that there is shown a platen 1 which may be rotated manually by means of a knob, not shown, at one end. Cooperating with the platen are front and rear pressure rolls 2 and 3 rotatably supported at opposite ends of a member 4. Formed at the lower edge of the member 4 is a curved surface 5 engaging a plane surface 6 on a movable arm 7. A link 8 is pivotally connected to the sides of the arm and the member 4 for holding the latter against movement transversely of the

arm. At the right end of the arm 7 are parallel links 9 and 10 pivotally connected at one end to the arm and pivotally connected at their opposite ends to stationary pivots 11 and 12. A spring 14 is connected between the arm 7 and a stationary stud 15 for holding the arm in a position to engage the rolls 2 and 3 with the platen 1, as shown. It will be appreciated that any increase in the downward pressure on the arm will cause it to move against the action of spring 14, and its position will always be parallel to that shown due to its mounting on parallel links. Spaced from and surrounding the lower portion of the platen is a paper guide 17 which is supported at one end by a stationary frame member 18.

With the pressure rolls 2 and 3 engaging the platen as shown in Figure 1, contact between the surfaces 5 and 6 takes place at point 20. The pressure at which each of the rolls is held in engagement with the platen varies inversely with the horizontal distance between the point 20 and the vertical line including the axis of the roll. The point 20 in Fig. 1 is located somewhat nearer to the front roll 2 than it is to the rear roll 3, and results in a higher pressure being placed on the roll 2 than on the roll 3. When a stack of paper sheets 21 is fed between the roll 3 and the platen, the roll is first moved easily away from the platen because the pressure on the roll is comparatively light and the length of the lever arm between the point 20 and the roll 3 is comparatively long. As the paper stack passes between the roll 3 and the platen, the member 4 rocks in a clockwise direction and causes the contact point 20 to move to the right, as shown in Fig. 2. With the parts in the positions shown in this figure, the pressure on the roll 3 is comparatively high while the pressure on the roll 2 is low. The higher pressure on the roll 3 now assures a feeding of the paper stack without slipping.

When the forward edge of the paper stack reaches the roll 2, the member 4 rocks easily in a counterclockwise direction to permit the stack to pass under the roll. As this rocking motion takes place, the contact point 20 moves to the left until it is again at the same location as in Fig. 1. Pressure is then applied through both rolls to the paper stack with the pressure at the forward roll being somewhat higher. This results in a more positive feeding action at the forward roll and has a tendency to prevent the paper from bulging between the rolls and becoming creased.

As the rear edge of the paper stack passes beyond the roll 3, as shown in Fig. 4, the member 4 rocks further in a counterclockwise direction and causes the contact point 20 to move again to the left from its location in Fig. 3. Still greater pressure is applied through the roll 2 to the paper for assuring its feed. If the platen is now rotated in a counterclockwise direction to feed the paper again past the roll 3, the member 4 will rock easily to admit the paper under the roll 3 due to the long lever arm provided between the point 20 and the axis of the roller.

There is shown in Figs. 5 to 8 a mechanism like that described above except that the rolls 2 and 3 are rotatably supported by a member 4A having projecting portions 5A and 5B which are engageable with inclined surfaces 6A and 6B on a movable arm 7A. As shown herein, the surfaces 6A and 6B are perpendicular to radial lines extending from the center of the platen through the points of contact between the projections 5A, 5B and the surfaces 6A, 6B. With the rolls 2 and 3 engaging the platen as shown in Fig. 5, the projection 5A engages the surface 6A and a slight clearance exists between the projection 5B and the surface 6B. As a stack of paper is fed between the roll 3 and the platen, the member 4A rocks easily about the projection 5A. If the paper stack is of sufficient thickness, the projection 5B engages the

surface 6B and then operates to force the arm 7A downwardly until the surface 6A is removed from the projection 5A, as shown in Fig. 6. When the front edge of the paper stack reaches the roll 2, the member 4A rocks about the projection 5B until the projection 5A again contacts the surface 6A and causes the rocker arm 7A to be depressed further until the surface 6B moves out of contact with the projection 5B. As the trailing edge of the stack moves beyond the roll 3, the member 4A rocks further in a counterclockwise direction and increases the clearance between the projection 5B and the surface 6B, as shown in Fig. 8. This has no effect on the pressure applied through the roll 2 to the paper since the point of contact between the projection 5A and the surface 6A remains the same. It will be seen that a greater feeding pressure is applied to the front roll 2 except when the paper stack is located only between the roll 3 and the platen, and is of sufficient thickness to depress the rocker arm 7A to the position of Fig. 6.

As paper is fed past the roll 3, the leading edge of the paper engages the guide 17 and is directed by the latter around the platen to the front feed roll 2. Resistance to the feeding of paper due to its sliding contact with the guide varies somewhat with the number of sheets being fed. With only a few sheets, the resistance is low and the normal pressure applied to the roll 3 is sufficient to effect a feeding of the paper. When a larger number of sheets are fed, the member 4A is rocked to the position shown in Fig. 6 and the pressure on the roll 3 is increased to feed the paper against the increased resistance obtained by the movement of the sheets over the guide member.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment and a modification thereof, it will be understood that it may be modified and embodied in various other forms without departing from the spirit of the invention.

What is claimed is:

1. A paper feeding mechanism for a typewriter comprising, in combination, a platen, a pair of rolls, a member rotatably supporting said rolls for engagement with said platen at points spaced circumferentially thereof, an arm extending transversely of said platen and contacting said member at a point between said rolls, means supporting said arm for parallel motion, means yieldably acting on said arm for urging said member in a direction to engage said rolls with said platen, said member rocking relative to said arm on feeding a stack of paper between said platen and either one of said rolls, and said member and said arm being so shaped that the point of contact between them shifts in the direction of the roll past which the paper stack is fed when said member is rocked.

2. A paper feeding mechanism for a typewriter comprising, in combination, a platen, a pair of rolls, a member rotatably supporting said rolls for engagement with said platen at points spaced circumferentially thereof, a pair of projecting portions on said member, and means acting on said member for holding said rolls in yieldable engagement with said platen, said last mentioned means comprising an arm extending transversely of said platen and engageable at spaced points thereon with one or another of said projecting portions on said member, engagement taking place normally between one of said projecting portions and said arm but shifting to the other of said projecting portions when said member is rocked due to the feeding of a paper stack between said platen and said rolls.

3. A paper feeding mechanism for a typewriter comprising, in combination, a platen, a pair of rolls, a member rotatably supporting said rolls for engagement with said platen at points adjacent opposite sides thereof, a pair of projecting portions on said member, and means acting on said member for holding said rolls in yieldable engagement with said platen, said last mentioned means comprising an arm extending transversely of said platen and engageable at spaced points thereon with one or another of said projecting portions on said member, engagement taking place normally between said arm and one of the projections lying nearer one of said rolls but shifting to the other projection lying nearer the other of said rolls when said member is rocked due to the feeding of a paper stack between said platen and said other roll.

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