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FEEDER FOR CHECKS AND LIKE PAPER

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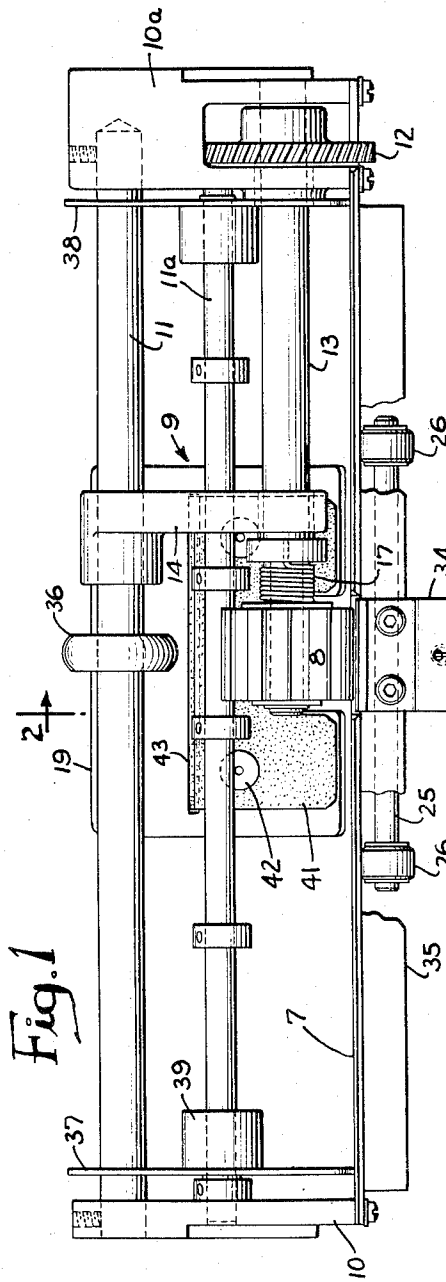


Fig. 1

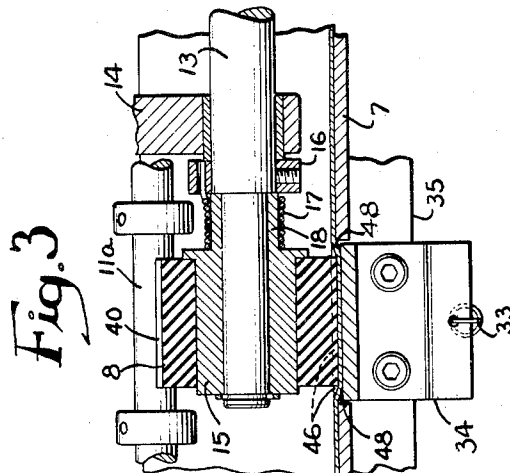


Fig. 3

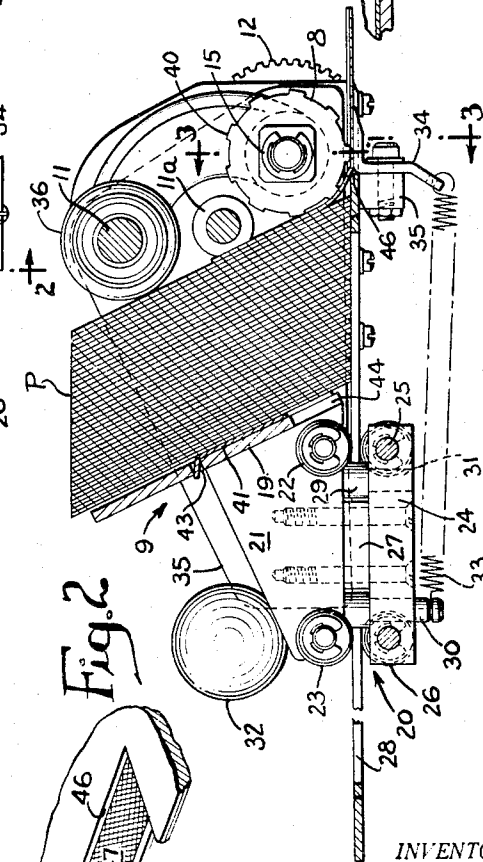
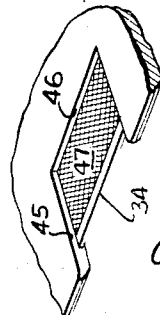


Fig. 2

Fig. 4



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FEEDER FOR CHECKS AND LIKE PAPER

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6 Claims. (Cl. 271—39)

My invention is directed to the successive feeding of bank checks or like strips of paper to a machine such as an endorsing machine, for performing a printing or other operation thereon, and it has for its object a better separation of the foremost one of a pack of checks to the end that the checks will be fed singly and in rapid succession notwithstanding wide differences in the thickness, size, weight, and texture of the paper and variations in atmospheric conditions affecting the operation.

The object of the invention thus generally stated, together with other and ancillary advantages, is attained by the construction and arrangement shown by way of illustration in the accompanying drawings, in which:

Figure 1 is a front elevational view of the improved check feeder, with a portion in section to show a detail of construction;

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view on an enlarged scale taken approximately on line 3—3 of Fig. 2; and

Fig. 4 is a fragmentary perspective view showing a special structural feature of the base plate, which is of importance in achieving effectual separation of the foremost check.

The feeder comprises in general a base in the form of a flat plate 7 for supporting a pack of checks with the lower edges thereof resting on the plate, a feed roller 8 mounted for rotation on a horizontal axis above the plate, and a follower 9 yieldably urging the pack of checks toward the feed roller.

The base plate 7 carries at opposite ends upright standards 10 and 10a connected by tie rods 11 and 11a disposed one above the other. One of the standards, herein the standard 10a, is made in the form of a housing for partially enclosing a driving gear element 12 and also providing bearings on opposite sides of the gear element for one end of a shaft 13 to which the gear element is fixed. The other end of the shaft carries the feed roller and is supported by a bracket 14 mounted on the upper tie rod 11.

The feed roller is preferably made of relatively soft rubber or other resilient material. It is supported in outboard relation to the bracket 14 substantially centrally of the base plate in an arrangement such that the roller is readily removable and replaceable. For supporting the roller a multi-sided supporting and driving element, herein in the form of a rectangular block 15 is journaled on the free end of the shaft, the roller being formed with a similarly shaped central hole sized to cause a frictional engagement between the roller and the block. The latter has a one-way driving connection with the shaft through the medium of a collar 16 fast thereon and a coiled spring 17 encircling a sleeve 18 rigid with the block and projecting axially therefrom, one end of the spring being anchored to the collar so that when the shaft is rotated in a counterclockwise direction (Fig. 2) the spring grips the shaft. This construction provides an overrunning clutch connection between the drive shaft and the feed roller

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so as to permit rotation of the feed roller independently of the shaft at a rate in excess of the driving speed of the shaft as is conventional in devices of this character.

The follower 9 is mounted for front to rear movement on the base plate rearwardly of the feed roller. It comprises in the present instance a substantially rectangular backer plate 19 inclined upwardly and rearwardly relative to the base plate, and a supporting roller carriage 20 coacting with the base plate to assure free movement of the follower relative to the base plate while holding the backer plate parallel to the axis of the feed roller.

The follower carriage 20 comprises, as shown, a thin central block 21 generally triangular in form, to the forward edge of which the backer plate is attached. This block carries front and rear pairs of upper guide rollers 22 and 23 with the rollers of each pair disposed closely adjacent opposite sides of the block in position for engagement with the upper surface of the base plate. A lower carriage block 24 is disposed beneath the base plate and supports two shafts 25 of substantial length (Fig. 1) having two pairs of guide rollers 26 for engagement with the under side of the base plate. A spacer member 27 between the two blocks travels in a slot 28 extending in a front-to-rear direction in the base plate, and disposed at opposite ends of the spacer member are a pair of rollers 29 mounted on upright pins 30 and 31 carried by the roller block, the rollers being of a diameter somewhat less than the width of the slot. For convenience in manipulating the follower the upper triangular block of the carriage is provided with a finger piece or knob 32.

It has been found that a substantial compaction of the checks being operated upon is desirable in effecting the separation thereof from the pack one at a time. Accordingly, not only is provision made, as above set forth, for the free movement of the carriage, but the follower is yieldably urged toward the feed roller by means of a contractile spring 33 having one end anchored to the lower carriage block 24 and the other end to an angular bracket 34 depending from the base plate at the forward edge thereof. As shown, the bracket 34 is secured to a bar 35 rigidly attached to the underside of the base plate.

As above indicated, the backer plate of the follower is inclined upwardly and rearwardly from the base plate, an angle of sixty-five degrees from the face of the plate having been found preferable. The roller is positioned immediately above the base plate for engagement with the lower central portion of the foremost one of a pack of checks resting against the backer plate. Above and somewhat rearwardly of the feed roller the pack is sustained by a pressure element preferably in the form of a free running roller 36 which is conveniently mounted on the upper tie rod 11. By this arrangement frictional resistance to the feeding of the foremost check by the feed roller is minimized.

For guiding the ends of the checks a pair of plates 37 and 38 are provided. These plates are adjustably mounted on the lower tie rod 11a. For this purpose, each plate has rigid therewith a collar 39 for frictionally holding the plates in adjusted positions lengthwise of the tie rod.

With the feed roller driven in a counterclockwise direction (Fig. 2) and a pack of checks P yieldably urged forwardly by the follower spring, the foremost one of the checks is engaged by the feed roller and advanced thereby with the lower edge of the check sliding along the upper smooth face of the base plate. As shown, the roller is preferably provided with equidistantly spaced longitudinal ribs or teeth 40.

The backer plate 19 of the follower is preferably provided with a strip of friction cloth 41 in accordance with conventional practice. This strip may be conveniently attached to the backer plate by means of snap fasteners 42, the backer plate being provided with an elongated slot

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43 for receiving the upper edge of the strip. To provide clearance for the said roller after the pack of checks has been removed from the face of the follower, the backer plate is preferably provided with a notch 44 in its lower edge. This prevents unnecessary wear on the feed roller.

As first above indicated, my invention is especially directed to the consistent and uniform separation of the foremost check from the next succeeding check, especially when these two checks are relatively thin. In general, this is achieved through a novel cooperative relationship between the feed roller and the face plate.

As shown in Figs. 1 and 2 the base plate provides a smooth bearing surface upon which the lower edges of a pack of checks rest in an angular position determined by the inclination of the follower backer plate 19. Beneath the roller the base plate is cut away to form a generally rectangular notch having the edges 45 spaced from the opposite ends of the feed roller, and a rear edge 46 disposed rearwardly of a vertical plane passing through the axis of the forward roller. The notch is open at its forward end and preferably has a closed bottom wall 47 formed in the present instance by one leg of the angular bracket 34, so as to form a shallow recess or cavity.

The side edges of the recess define shoulders 45 adjacent the ends of the roller, about which the checks are bent by the roller. Also, the bottom wall 47 of the cavity is disposed closely adjacent the under side of the feed roller with the result that double reverse bends 48 are formed in the paper at each opposite side of the feed roller, as shown clearly in Fig. 3. Such double reverse bends occurring at lines spaced laterally from one another and extending longitudinally of the check, lend stiffness to each check as it is advanced by the feed roller, which is important, particularly in the case of very thin paper. Additionally, the paper is more effectually engaged by the lower corners of the feed roller formed in the present instance by the ends of the ribs or teeth 40.

The rear edge of the recess or cavity forms a sharp shoulder 46 extending transversely of the path of travel of the checks. The position of this shoulder with respect to the roller is such that the shoulder coacts with the roller so as to tend to block the passage of more than one check at a time in the cases of thicker checks, which may be as thick as .008 inch.

On the other hand, the aforesaid spacing of the shoulder 46 may in some instances be sufficient to permit the simultaneous passage of two of the thinner checks, which may be on the order of .003 inch. To assist in the separation of the foremost of two such thin checks, I provide one or more retarding surfaces engageable by the lowermost of these two checks, for the purpose of holding it back while the upper or first check is being advanced by the roller. In the present instance such a retarding surface is formed by knurling or roughening the bottom of the cavity, but it may if desired be faced with any suitable friction material.

It will thus be seen that in addition to forming the sharp double reverse bends 48 extending in a direction parallel with the path of travel of the checks, the portion intermediate such bends is depressed to form a downwardly offset lip for engagement with the friction surface.

Because of the use of a feed roller of rubber or other yieldable material, it is of course contemplated that the feed roller will become worn and thus increase the spacing thereof with respect to the shoulders 45 at opposite sides of the roller and the shoulder 46 transversely of the roller, as well as to the bottom of the recess. It has been found, however, that by the construction and arrangement employed substantial variations in spacing due to wear are permissible. It has been found, for example, that satisfactory results are obtained in a feeder in which: (a) the roller, having an initial diameter of 1.425 inches, is positioned centrally between the shoulders 45 of the recess with a spacing of approximately .025 inch between such shoulders and the ends of the roller; (b) the trans-

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verse shoulder 46 has an initial spacing from the arcuate path of travel of the feed roller of .008 inch, with an allowable increase of .006 inch, indicating replacement of the roller when the spacing exceeds .014 inch; and (c) an initial spacing of the retarding surface 47 forming the bottom of the recess from the arcuate path of travel of the roller of .004 inch, the permissible increase in this spacing due to wear of the roller being .010 inch.

In actual practice the checks vary substantially in thickness. Thus, as above indicated, they range from very thin paper, on the order of .003 inch, to relatively heavy paper or thin cardboard on the order of .008 inch. It will be observed in this connection that the initial spacing of the roller from the bottom of the recess is considerably less than the thickness of the heavier or thicker checks. This is not objectionable in view of the fact that the roller is made of relatively soft rubber or other yieldable material.

In general, the position of the transverse control shoulder 46 is such that in cooperation with the roller it tends to block the passage beyond the shoulder of more than one check at a time, but in the event of the passage of two checks at one time, the lowermost one of these checks will engage with the knurled surface and thus its movement will be retarded until the upper check has been removed.

I claim as my invention:

1. A check feeder comprising, in combination, a base, a feed roller mounted for rotation on a horizontal axis above the base, and means yieldably urging a pack of checks toward the feed roller including a follower plate inclined upwardly and rearwardly from the base, said base having a smooth bearing surface for engagement by the lower edges of the checks presented to the feed roller, said bearing surface being relieved to provide a recess having a pair of relatively sharp lateral edges extending parallel to one another and disposed on opposite sides of the feed roller, said edges being formed of hard smooth material so as to offer minimum surface friction to the passage of a check said roller being nestingly positioned in said recess and dimensioned to have limited lateral clearance with said edges so that the checks are drawn down singly from said pack into said recess for discharge one by one.

2. A check feeder comprising, in combination, a base, a feed roller mounted for rotation on a horizontal axis above the base, and means yieldably urging a pack of checks toward the feed roller including a follower plate inclined upwardly and rearwardly from the base, said base providing a smooth bearing surface for engagement by the lower edges of the checks as they are fed downwardly by the feed roller, said base further having a sharp-edged rectangular notch defining a recess underlying the roller and of a width slightly greater than the length of the roller, said roller being nestingly positioned in said recess so that a portion of each of the successive checks is drawn downwardly into said recess below the plane of the bearing surface for discharge of the checks one by one.

3. A check feeder comprising, in combination, a base, a feed roller mounted for rotation on a horizontal axis above the base, and means yieldably urging a pack of checks toward the feed roller including a follower plate inclined upwardly and rearwardly from the base, said base providing a smooth bearing surface for engagement by the lower edges of the checks presented to the feed roller, said base further having a notch in said bearing surface defining a recess underlying the feed roller and having hard and relatively sharp side edges spaced a short distance from the ends of the roller, and a bottom surface closely adjacent the roller, said roller having a friction surface for engaging successive checks and for pressing corresponding portions thereof downwardly about said side edges and into engagement with said bottom surface so as to form sharp reverse bends at

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lines spaced laterally from one another and extending longitudinally of the checks.

4. A check feeder comprising, in combination, a base, a feed roller mounted for rotation on a horizontal axis above the base, and a follower for urging a pack of checks toward the feed roller, said base providing a smooth bearing surface for engagement by the lower edges of the checks presented to the feed roller, said base further having a notch defining a recess underlying the roller and presenting rigid side edges disposed adjacent opposite ends of the roller, said notch having a rear edge spaced a short distance rearwardly of a vertical plane passing through the axis of the feed roller, and a bottom wall closely adjacent the feed roller, said roller having a friction surface for engaging successive checks and for pressing corresponding portions thereof downwardly about said side and rear edges and into engagement with the bottom wall of the recess.

5. A check feeder comprising, in combination, a base, a feed roller mounted for rotation on a horizontal axis above the base, and means yieldably urging a pack of checks toward the feed roller including a follower plate inclined upwardly and rearwardly from the base, said base having a smooth bearing surface for engagement by the lower edges of the checks presented to the feed roller and a recess underlying the roller and defining side edges disposed adjacent opposite ends of the roller, a rear edge spaced a short distance rearwardly of a vertical plane passing through the axis of the feed roller, and a bottom wall underlying the feed roller and spaced closely adjacent thereto, said roller having a friction sur-

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face for engaging successive checks and for pressing corresponding portions thereof downwardly about said side and rear shoulders and into engagement with the bottom wall of the recess, the bottom wall of the recess being roughened to present a multiplicity of sharp edges for engaging any unwanted checks which may be drawn inadvertently into said recess.

6. A check feeder comprising, in combination, a base, a friction faced feed roller mounted for rotation on a horizontal axis above the base, and a follower for urging a pack of checks toward the feed roller, said base having a bearing surface for engagement by the roller edges of the checks presented to the feed roller, a notch in said base having parallel lateral edges and an edge which extends transversely of the path of travel of the checks, said lateral edges being spaced to straddle the lower peripheral portion of said roller and said transverse edge being disposed with respect to the roller a distance on the order of twice the thickness of the average check.

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