

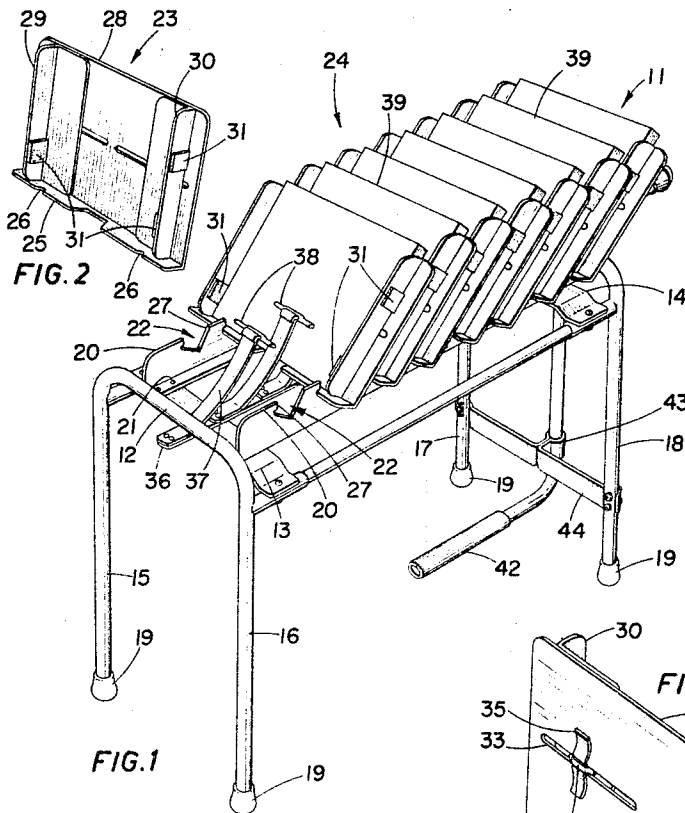
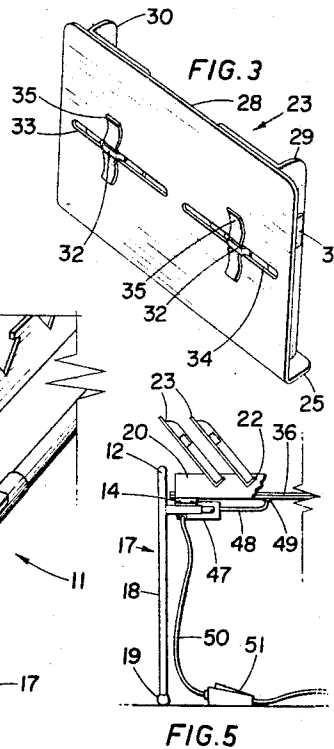
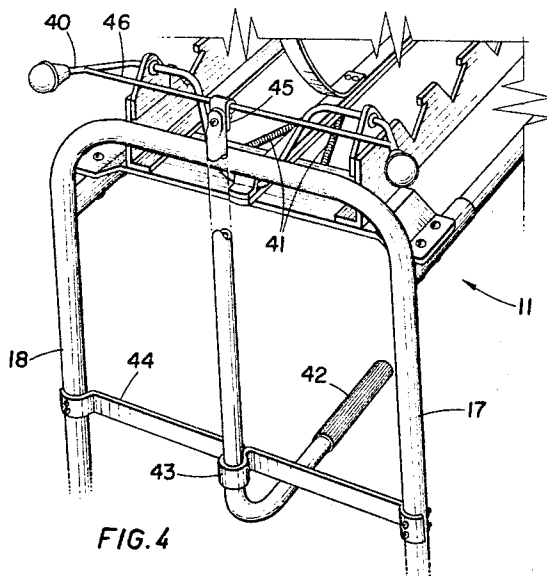
Aug. 30, 1966

W. C. HOFF
COLLATING DEVICE

3,269,719

Filed July 8, 1964

3 Sheets-Sheet 1



Inventor

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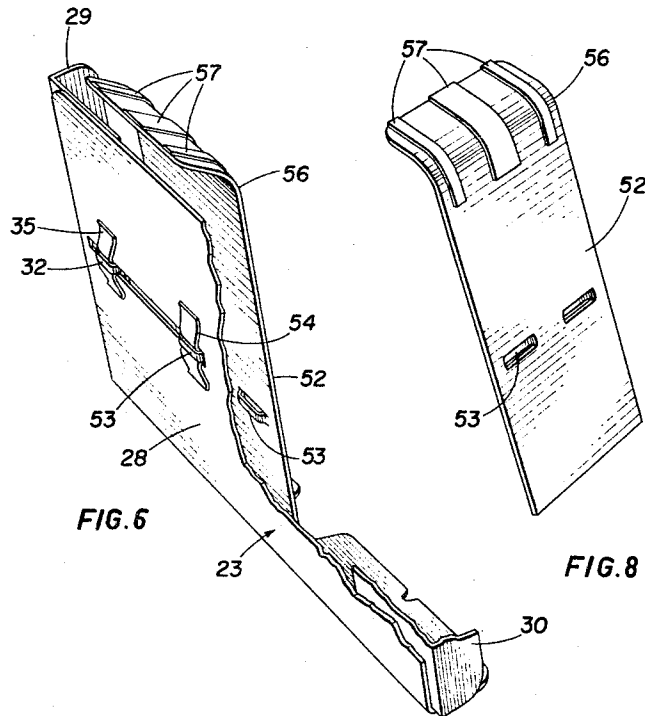
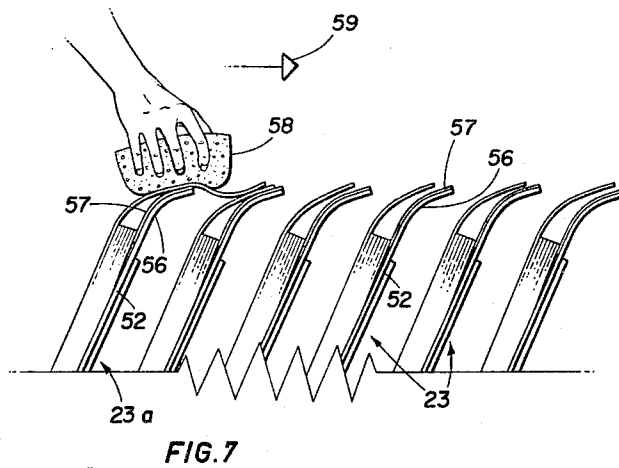
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3 Sheets-Sheet 3

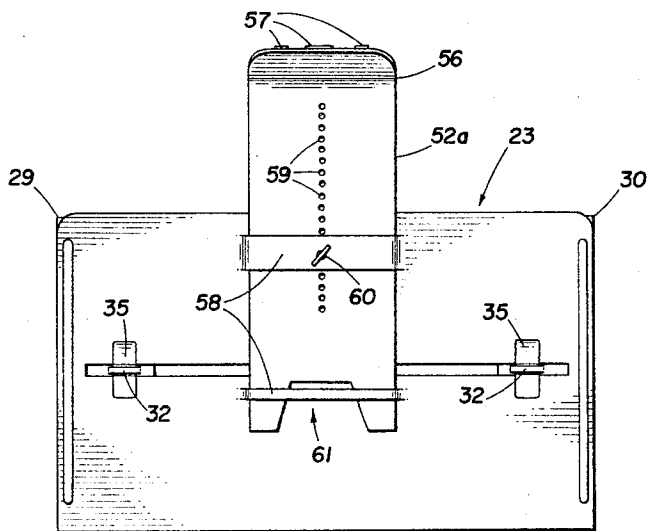


FIG. 9

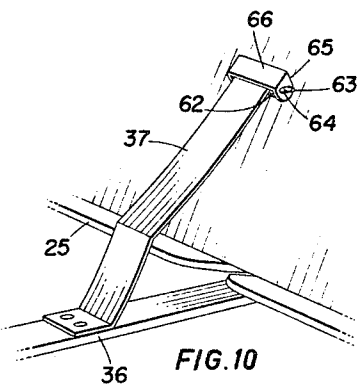


FIG. 10

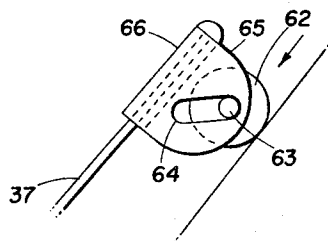


FIG. 11a

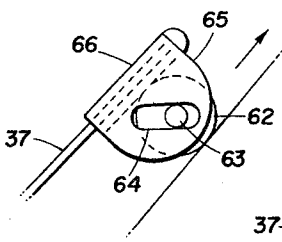


FIG. 11b

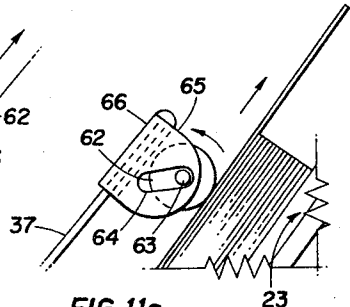


FIG. 11c

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3,269,719

COLLATING DEVICE

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4 Claims. (Cl. 270—54)

This invention relates to collating devices and is a continuation-in-part of S.N. 358,977, filed April 9, 1964, for Collating Device.

A number of devices for collating paper sheets have heretofore been proposed such devices having as a prime object the positive delivery and stacking of sheets having a variety of sizes. While such devices generally do collate paper of a given size some difficulty is often experienced in attempting to change over to sheets of a different size.

Furthermore, it is of importance to provide adjustment to different paper sizes of sufficient range to cover at least those paper sizes encountered in normal business practice, the adjustment being conveniently achieved by average office personnel. Many prior devices usually provide some means of adjusting to different paper sizes, however the range of adjustment is often limited to two or three paper sizes thus seriously limiting the application of such machines in even a small office.

Accordingly, it is an object of the present invention to provide a collating device which is adaptable to a wide range of paper sheet sizes by simple manipulation of each paper tray thereon.

It is a further object of this invention to provide a collating device which will positively deliver a number of single sheets from a number of single stacks by the operation of a single hand knob or foot pedal.

It is a still further object of this invention to provide a collating device having individual trays which may be removed in order to replenish the paper thereon.

These and other objects and features of this invention will become apparent from the following detailed description and accompanying drawings in which like numerals refer to like parts.

In the drawings:

FIGURE 1 is a perspective view of a collating device according to the present invention;

FIGURE 2 is a perspective view of an individual paper tray as removed from the device in FIGURE 1 and without paper sheets thereon;

FIGURE 3 is a rear view of the tray illustrated in FIGURE 2;

FIGURE 4 is a rear view of the device as illustrated in FIGURE 1;

FIGURE 5 is a partial side view of a further embodiment of the invention;

FIGURE 6 is a perspective of an individual paper tray as shown in FIGURE 2 provided with a paper feed attachment, partially cut away;

FIGURE 7 is a schematic side elevation of the collating apparatus of this invention showing the mode of operation of the paper feed attachment of FIGURE 6;

FIGURE 8 is a perspective of a paper feed attachment.

FIGURE 9 is a rear elevational view of a further embodiment of the invention,

FIGURE 10 is a perspective of a portion of the apparatus shown in FIGURE 1 showing an alternative form thereof, and,

FIGURES 11a, 11b and 11c are schematic side elevational views of the apparatus shown in FIGURE 10 illustrating the operation thereof.

With reference to FIGURE 1 a collating device indicated generally as 11 comprises frame 12 to which is secured a pair of cross supports 13 and 14. Frame 12 is

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provided with legs 15, 16, 17, and 18 to which are normally fitted pads 19 to prevent slippage and marring of polished surfaces.

A pair of rails 20, 20 are in substantially parallel alignment and are rigidly secured to supports 13 and 14 by convenient means such as rivets 21. A plurality of cut-outs 22 are provided along the top edges of each rail 20, 20 and are adapted to receive trays 23, 24, each of similar construction.

Each tray 23, 24 has a lower turned up lip 25 being provided with notches 26 which engage with projections 27 on rails 20, 20 upon trays 23, 24 being installed thereon, notches 26 and projections 27 cooperating in holding trays 23, 24 within cutouts 22. Slidably secured to each back plate 28 of trays 23, 24 is a pair of side members 29, 30 detail of which may be seen by reference to FIGURE 2 and FIGURE 3. Each side member 29, 30 has an upstanding portion to which is secured resilient pad 31 and a sliding portion adjacent plate 28 having a stirrup 32 secured to the back thereof which projects through slots 33 and 34 in plate 28. A formed spring 35 engages with plate 28 and stirrup 32 in the manner as illustrated in FIGURE 3 to pressurably bias side members 29, 30 to plate 28.

With reference to FIGURE 1 and FIGURE 4 it will be seen that the device is provided with a slide bar 36 reciprocally mounted on cross supports 13 and 14. A number of resilient fingers 37 are rigidly secured along the length of bar 36 and support an equal number of soft pads 38 at the free extremities thereof. In normal operation each pad 38 is adapted to bear on paper 39 stacked in each trays 24 located on the device.

Handle means 40 swingably mounted on frame 12 is adapted by reciprocal movement to cause bar 36 to slide and thus tensions springs 41. A foot operated pedal 42 is mounted for vertical movement in bearing 43 formed as part of cross brace 44 secured to legs 17, 18. Attachment of pedal 42 to handle means 40 is provided by link 45 secured to rod 46 between said handle means.

In use a number of stacks of paper 39 are placed within trays 24, the number of stacks depending of course upon the number of sheets to be collated. In order to load the device it is considered more convenient to incline trays 24 in a direction opposite to that shown in the drawings so that back plates 28 are uppermost. This method is of especial value when adding subsequent amounts of paper to sheets already stacked in the device.

Once paper 39 has been placed in the trays side members 29, 30 may be pushed up snug so that resilient pads 31 are in contact with the edges of the paper. By depression of handle means 40 slide bar 36 is caused to move forward against spring 41 and at the same time fingers 37 move pads 38 downwardly over paper 39 which is prevented from moving by clip 25 on trays 24.

Upon release of handle 40 pads 38 move back over the surface of the topmost sheet of paper. Since the friction between pad 38 and paper 39 is greater than that between the individual sheets, one sheet, that is the topmost one, is forced upwardly above the normal position in the stack. This is true for all top sheets in all stacks in the device and upon all such sheets being proud of the rest it becomes a comparatively simple matter to remove such sheets from the device, these sheets now being in the required order.

It will be noted that pedal 42 may be used in place of handle means 40 in order to operate the device, this method having the particular advantage of leaving the operator's hands free to remove the sheets from the device as aforesaid.

Upon it being desirable to use paper of a different size it will be seen that adjustment of trays 23 may be done simply and easily by moving side members 29, 30 to the

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desired width. Moreover, it will be understood that side members may be removed by withdrawing springs 35 and reversed in order that the upstanding portions may be placed close together to accommodate unusually narrow paper stock.

According to a further embodiment the invention may be provided for electrical operation. FIGURE 5 shows the collating device 11 having legs 17 and 18 and rails 20 extending therefrom as in FIGURE 1. Cutouts 22 receive trays 23 therein and sheets of paper are individually moved therefrom by means of fingers 37 which are themselves collectively operated in unison by slide bar 36. In this further embodiment, however, slide bar 36 is operated by means of electrical solenoid 47 mounted on cross support 14 and rails 20 and having an armature connecting rod 48 extending therefrom fastened to slide bar 36 by link 49, actuation of electrical solenoid 47 causing axial movement of connecting rod 48 and corresponding movement of slide bar 36 in one direction, reverse movement being produced by springs 41. Cable 50 connects solenoid 47 to a suitable electrical outlet, through footswitch 51 which may be permitted to lie on the floor beneath the instant collating device in any suitable location.

In order to reduce the time taken in manually collecting each sheet of paper fed from each paper tray as aforesaid, paper feed attachment devices are provided on each tray as shown in FIGURES 6 and 7. The paper feed device will be seen to comprise the metal chute 52 of a width designed to permit side members 29 and 30 to be slid together to handle all conventional paper sizes, and of a length sufficient to extend somewhat above the plate 28 of tray 23 and above the side of a stack of paper 39 supported therein. Chute 52 is formed with struck out portions or stirrups 53 extending through slots 33 and 34 and being retained by spring clips 54 thus permitting the same to be readily attached to existing collating apparatus without modification. The upper end of chute 52 is formed into a curved guide portion 56, around a relatively substantial radius, portion 56, when in position on the collating apparatus being directed substantially horizontally and rearwardly of its respective tray 23. Portion 56, at least, of chute 52, is preferably highly polished being of nickel, chromium plate or stainless steel to ensure virtually frictionless guiding of paper sheets thereon. In this preferred embodiment, slide members 57 are provided of any suitable self lubricating plastic such as polytetrafluoroethylene or the like, extending around guide portion 56 to still further reduce friction at this point, and provided with an adhesive backing for easy attachment.

In operation paper sheets are fed upwardly from the stacks 39 by operation of handle 40, or foot pedal 42, or electric solenoid 47, as described above. When such sheets are all in such upper positions the operator takes a pad 58 of felt, sponge rubber, foam plastic or the like material having preferably a degree of both resilience and frictional grip, and presses the first sheet of paper, in tray 23a (FIGURE 6) for example, gently downwardly against guide portion 56 of chute 52 and moves pad 58 directly rearwardly over the remaining trays 23 in a sweeping motion, as indicated by arrow 59. The paper sheet will thus glide over slide members 57 and contact the next paper sheet upstanding from the next adjacent tray 23. In this way each sheet of paper extending up from each tray 23 is sequentially pressed rearwardly over its respective guide portion 56 and moved therefrom by the friction of the overlying sheet, slide members 57 permitting free movement thereof. With the disengaged hand the operator will then catch the gathered sheets at the end of the collating apparatus and can stack them and repeat the operation as many times as required.

According to a further embodiment of the invention illustrated in FIGURE 9, chute 52a may be modified and made adjustable in height to accommodate a wider range of paper sizes. Thus chute 52a according to this embodiment is formed substantially flat and is located behind

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tray 23 being supported in upper and lower slides 58 formed by struck-out portions of tray 23. Chute 52a is provided with a series of holes 59 for adjustable engagement by thumb-screw 60 threadedly engaged in upper slide 58. The lower end of chute 52a is cut out as at 61 to permit the same to give clearance to bar 36. The remaining features of chute 52a are the same as in chute 52 of FIGURE 8 with the exception that stirrups 53 are absent to permit vertical sliding thereof in slides 58.

A further embodiment is illustrated in FIGURES 10 and 11a, 11b and 11c, which will be seen to comprise the roller 62 of rubber or like material mounted on spindle 63 extending from each end thereof and mounted in angled slots 64 formed in brackets 65. Brackets 65 are formed of the downwardly turned ends of cross-member 66 attached to the free end of a respective finger 37. In operation bar 36 is moved by the operator as described above causing fingers 37 to move down and up across the surface of the stacks of paper in trays 23. Upward movement of finger 37 causes rollers 62 to ride upwardly and rearwardly in slots 64 and bind against the inner surface of cross-member 66 and preventing rotation of rollers 62 (see FIGURE 11a). The rubber surface of rollers 62 will thus grip the top sheet of paper in each stack and force it upwardly. On the down stroke (see FIGURE 11b) rollers 62 will ride downwardly and forwardly along slots 64, thus freeing themselves from cross-members 66 and rotating freely, avoiding any frictional downward pull on the paper.

When the operator removes the individual sheets of paper moved upwardly by the operation of finger 37 as aforesaid, rollers 62 rotate freely substantially in the same way as if fingers 37 were moving downwardly on the down stroke operation described above, thus permitting free and substantially frictionless withdrawal of paper sheets.

It will be further understood that although one preferred embodiment of the present invention has been disclosed that various alterations in design are contemplated such as fall within the scope of the following claims.

What I claim is:

1. A collating device comprising: a supporting frame; a plurality of paper trays dimensioned to receive pads of sheet paper therein comprising a back plate having a top edge and an upwardly formed lip on a lower edge of said plate, said trays removably secured to said frame in spaced parallel relation; a pair of side members adjustably secured to said back plate to accommodate varying widths of sheet paper; a bar mounted on said frame for reciprocal movement beneath said trays; resilient fingers secured to said bar and biased against respective said trays; means for operating said bar thereby to move said fingers over said trays; paper guide members for each said tray extending upwardly from said top edge of said back plate supporting sheets of said material during upward removal from respective said trays, rearwardly upwardly angled slide means supporting said guide members for up and down reciprocal movement on said back plates of respective said trays in spaced parallel relation to one another and aligned in registration one behind the other and rearwardly curved upper ends on said guide members above said top edges of said back plates and terminating in a common plane parallel with and spaced above a plane intersecting said top edges whereby to support individual paper sheets from said trays in overlapping relation.

2. A collating device as claimed in claim 1 including roller means rotatably mounted on said fingers for contacting paper on said trays; and means locking said roller means against rotation in said upward direction.

3. A collating device as claimed in claim 1 wherein said adjustable attachment means comprises at least one slide member formed in each said back plate for slideably receiving a respective said guide member for rearwardly angled sliding as aforesaid, a thumb screw threadably en-

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gaging said slide member, and a series of aligned locking holes formed in each said guide member in registration with said thumb screw, for receiving same in locking engagement.

4. A collating device comprising: a supporting frame; a plurality of paper trays dimensioned to receive pads of sheet paper therein comprising a back plate having a top edge and an upwardly formed lip on a lower edge of said plate, said trays removably secured to said frame in spaced parallel relation; a pair of side members adjustably secured to said back plate; to accommodate varying widths of sheet paper; a bar mounted on said frame for reciprocal movement beneath said trays; resilient fingers secured to said bar and biased against respective said trays; means for operating said bar thereby to move said fingers over said trays; paper guide members for each said tray extending upwardly from said top edge of said back plate, rearwardly upwardly angled adjustment means releasably fastening said guide members to said back plates of re-

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spective said trays in spaced parallel relation to one another and aligned in registration one behind the other; rearwardly curved upper ends of said guide members above said top edges of said back plates and terminated in a common plane parallel with and spaced above a plane intersecting said top edged whereby to support individual paper sheets from said trays in overlapping relation, and, plastic slide members adhesively attached to said curved upper end of said guide members.

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