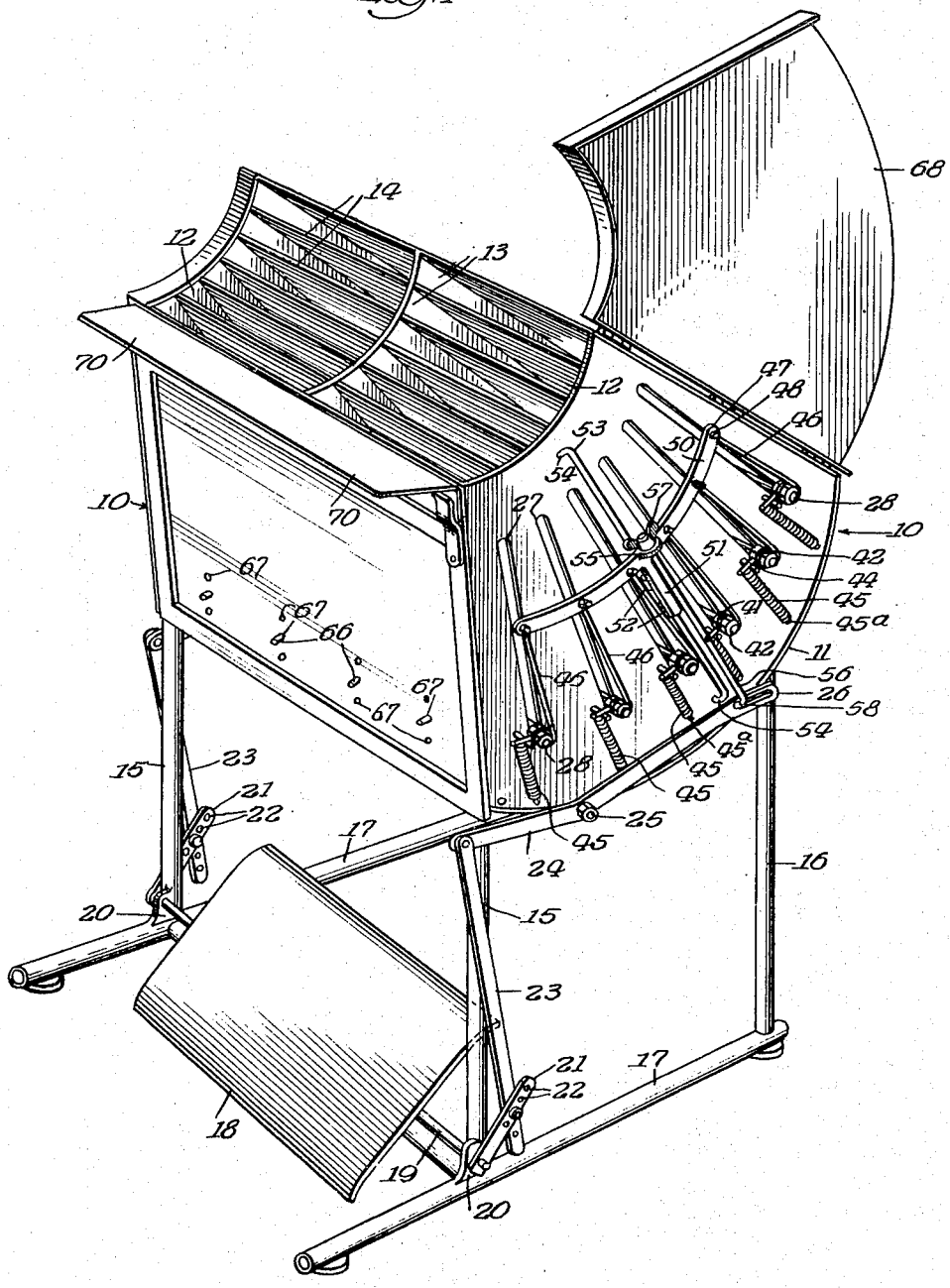
Sept. 21, 1948. J. M. DRULINER 2,449,594

COLLATOR

Original Filed Aug. 30, 1943 3 Sheets-Sheet 1

FIG. 1



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FIG. 2

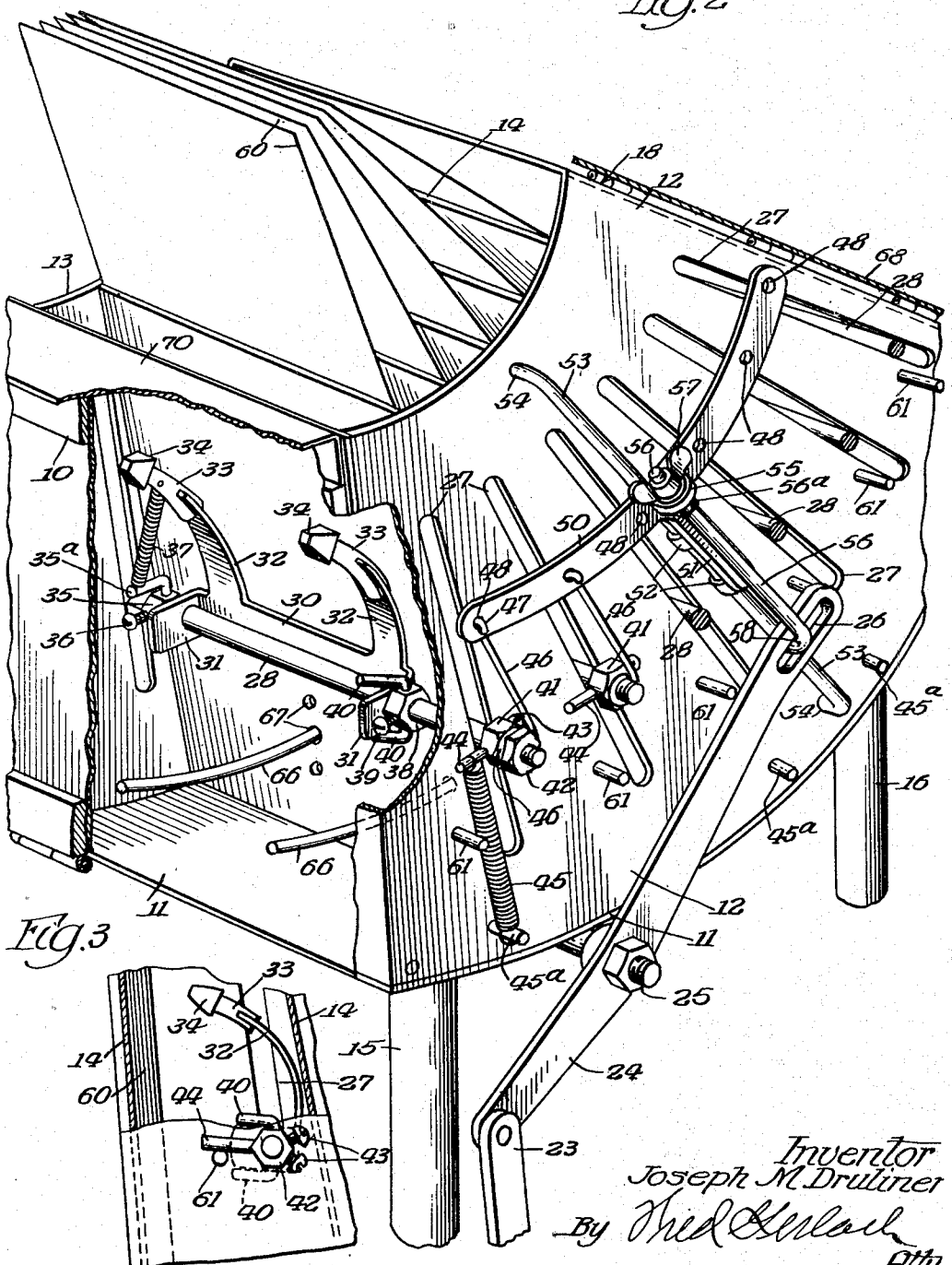


FIG. 3

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FIG. 5

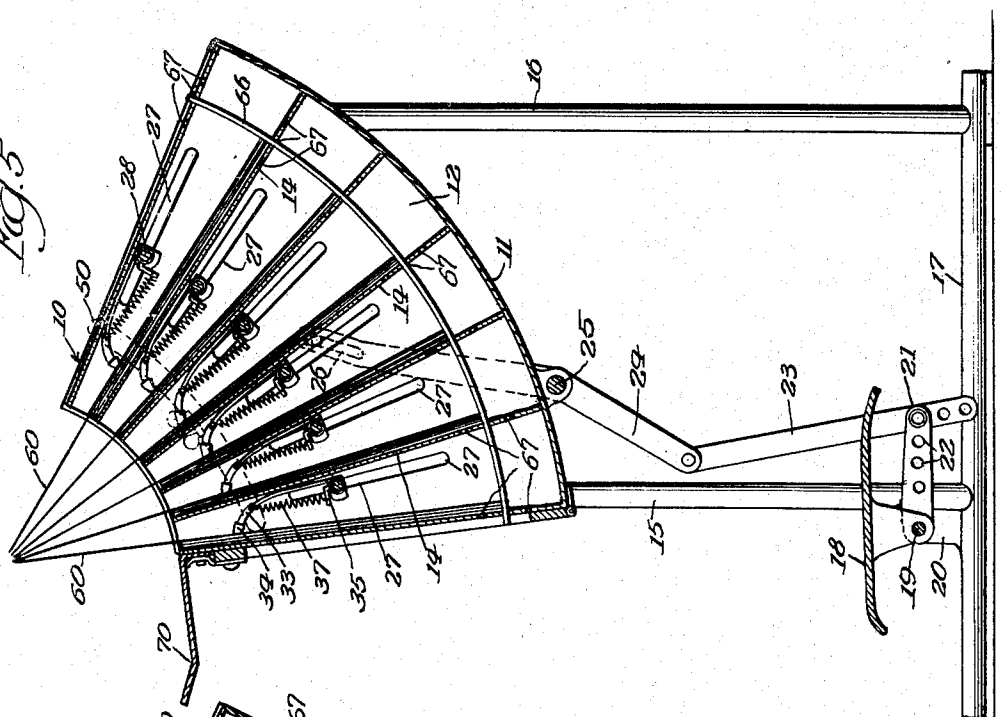
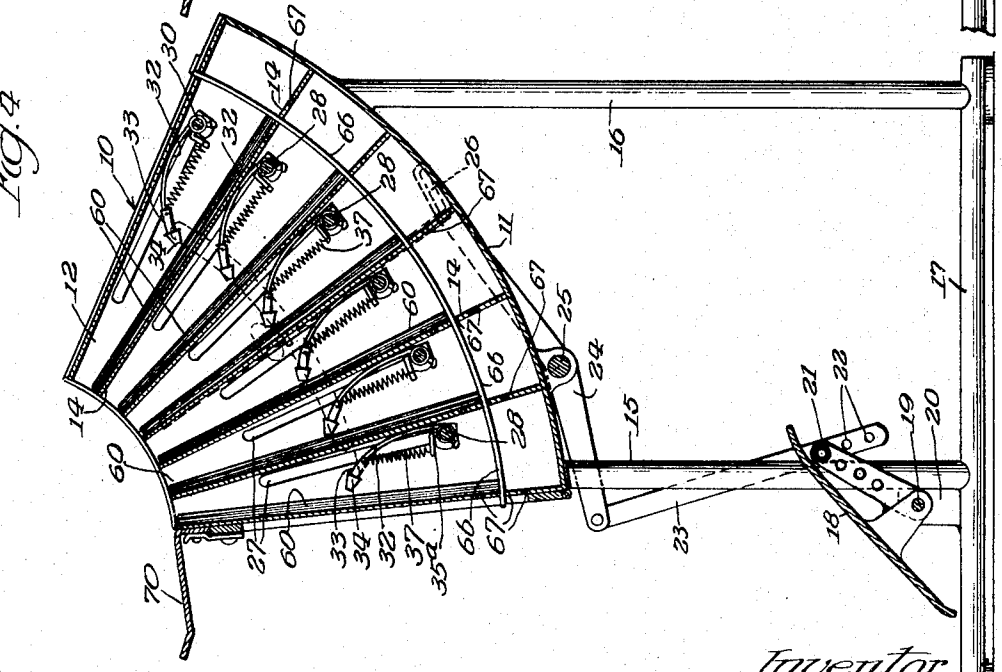


FIG. 4



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2,449,594

UNITED STATES PATENT OFFICE

2,449,594

COLLATOR

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Continuation of application Serial No. 500,504, August 30, 1943. This application June 24, 1946, Serial No. 678,774

9 Claims. (Cl. 270—58)

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This invention relates in general to a sheet collator for simultaneously feeding a set of sheets from an arcuate series of closely spaced radial bins which converge to a common center when the sheets are partially ejected from the bins so that the entire set of sheets may be grasped with one hand.

An important object of the invention is to provide an arcuate series of radially arranged bins with means therein for simultaneously feeding a sheet from a stack in each bin to a common central position free from deflectors or guides adjacent the common center, so that each collected set of sheets or pamphlets may be grasped with one hand and removed thereby as a unit.

Another object of the invention is to provide two groups of a plurality of radial bins arranged close together with means for simultaneously feeding sheets therefrom to common centers without necessitating guides or other directing means for the outer edges of the sheets so that these edges of the sheets will be substantially in contact with each other and each set may be grasped by one of the hands of the operator.

A further object of the invention is to provide collator bins arranged in two arcuate sets, each radiating from a common center, adapted to hold the stacks of sheets therein with power operated means for actuating sheet feeders to partially expel sheets from the bins until the outer edges of the sheets engage each other in a common central position for each set, leaving both hands of an operator free for grasping each group of sheets and assembling them in practically a single movement.

A further object of the invention is to provide a curved back stop for the arcuate radial sets of collector bins having a single strip extending through all of the bins to change the effective depth for containing sheets of different lengths.

A further object of the invention is to provide means for feeding the sheets by feed levers in each bin, held by variable spring tension to control the frictional contact of the feed lever.

Still another object of the invention is to provide a power operated lever which operates feed levers in all of the bins of the collator simultaneously when the power lever is pressed in one direction, with the provision that upon back pressure, it will raise all the feed levers simultaneously to free all of the bins for loading them with both hands if desired.

Another object of the invention is to provide a collator which is generally of new and improved construction and is characterized by simplicity of

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design as well as ease and facility of assembly and operation.

Other objects of the invention and the various advantages and characteristics of this collator will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter described and more particularly defined by claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure:

Figure 1 is a perspective of a collator constructed in accordance with this invention having a plurality of bins arranged in two arcuate radial rows, some of the operating mechanism being located at each end, and the hinged casing at the near end being raised to uncover the operating mechanism;

Figure 2 is a partial perspective view of some of the parts shown in Figure 1, with parts broken away and illustrating other features of the operating mechanism;

Figure 3 is a detail end view showing the position of the feed arms at the end of the back stroke and when back pressure is applied to the operating pedal;

Figure 4 is a sectional view showing the feeding mechanism in a lower sheet feeding position; and

Figure 5 is a sectional view showing the feeding mechanism in an upper sheet feeding position with the outer edges of the sheets in contact with each other.

Various types of collators having parallel bins or compartments or stacks arranged in circular form have been proposed, but none of them is designed or intended to locate the plurality of stacks in arcuate converging arrangement with unobstructed inner ends such that when the sheets are simultaneously advanced and partially ejected from the bins, they will converge at common centers free from the bins and without requiring guides or deflectors to direct them together, the outer edges of the sheets being substantially in alignment so that adjacent sets may be easily engaged and grasped by each hand of an operator and the two sets thus received placed separately or joined together, depending upon the number of sheets to be assembled.

Referring now more particularly to the drawings, a receptacle 10 of somewhat segmental form has an outer curved base 11, ends 12 and a central partition 13 conforming thereto, and radial partitions 14 disposed between the ends 12 and central partition 13 dividing the receptacle into a number

of required receiving bins which are radially arranged converging toward the top and with their open ends at a distance from the common center of the two sets of bins less than the length of a sheet which is contained within and partially ejected from the bins. In the present example, six bins are shown in each set, but any number may be provided depending upon the number of sheets or the like, to be collated.

The receptacle 10 is conveniently mounted upon supporting legs 15 and 16 secured to base rods 17 so that the upper open ends of the bins will be at a convenient height for the hands of an operator. At the front of the supporting base, a foot plate or pedal 18 is mounted to swing upon a cross shaft 19 which is pivoted in end brackets 20 secured to the legs 15 and base rods 17. If desired, the shaft 19 may be extended beyond the bracket 20 at each end and a similar pedal may be located at the outside of each leg 15. The pedal 18 may be mounted intermediate its front and rear edge upon the shaft 19 so that it may be pressed in opposite directions by pressure at the front or rear portions respectively.

Connected to shaft 19 at each end near the mounting bracket 20 is an arm 21 which rotates therewith, and pivoted to the outer end of the arm by any one of a number of perforations 22 is a link 23 pivoted at its upper end to one end of a lever 24. Each operating lever 24 has an intermediate pivot 25 connecting it to the base of the receptacle 10 and having a slot 26 in its opposite or free end located adjacent the center of the lower curved edge of the corresponding end 12.

In each end 12 and in the partition 13 and corresponding to the number of divisions or bins within the receptacle are radiating slots 27 which terminate below the top and above the bottom of the receptacle. Extending through the corresponding slots 27 of each pair of bins or spaces is a transverse feed rod 28 which projects slightly beyond each of the ends 12. Mounted upon each rod in each of the collator bins or compartments is a feed arm bracket or holder 30 which may be made of sheet material having bent ears 31 for positioning it upon the rod 28 and with curved projecting arms 32 upon which friction fingers 33 are mounted each having a rubber or rubber-like friction fingertip 34 for engaging the innermost sheet of the stack of papers within the bin. To hold each arm bracket in proper position, a nut or collar 35 is adjustable upon the rod 28 by a set screw 36 or other suitable attaching means, and an extensible coil spring 37 is connected at one end to a projection 35a extending from the collar 35 and at the other end to one of the arms 32. At the opposite end of the bracket, a similar nut or collar 38 is adjustably held on the rod 28 by a screw 39 or other suitable means, and extending from this collar are projections 40 which extend above and below and free from the adjacent ear but limit the rotation of the bracket 30 with respect to the rod in both directions.

At each outer end of each rod 28 are two fastening nuts or collars 41 and 42 held adjustably thereon by set screws 43. One of the nuts has a projection 44 to which one end of an extensible coil spring 45 is connected, the other end being connected to a projection 45a suitably located adjacent the bottom of the receptacle at the outside of the plate 12. Between the two nuts or collars 41 and 42, one looped end of a spring connecting link 46 is confined, the other

end terminating in an open hook 47 adapted to engage in a corresponding opening 48 of a segment bar 50 which extends across the radial slots 27 outside of one end 12 of the receptacle. These connecting links 46 are preferably of wire to permit free lateral variation as the segment moves the bars in the radiating slots 27. This segment bar has an extension 51 at one side with inner collars 52 at spaced distances apart adapting it to slide upon a guide rod 53 located centrally of each end 12 and connected at the top and bottom by inserting it through a perforation 54 in the end 12, or in any other suitable manner.

Opposite the projection 51 of the segment bar is an outwardly turned perforated bracket 55 through which one end of a connecting rod 56 is inserted. A thumb screw 57 may be threaded on the upper end of the rod holding it in place against a nut 56a at the under side of the bracket 55. The lower end 58 of the rod is bent and engaged in the slot 26 of the operating lever 24.

With this construction, the springs 45 tend to draw the rods 28 and the segment bar downwardly raising the pedal to an inclined position as shown in Figure 1. The opposite movement of the pedal causes the operating lever to raise the segment bar and with it the transverse rods 28, moving the feeding fingers against the outermost sheet of each stack 60, projecting the outer end of each of said sheets from the collator.

In order to free the feeding fingers from engagement with the outermost sheet of each stack to utilize the loose stack principle, and to allow the sheets to settle back by gravity towards their original starting position, a projecting pin 61 is located at the outer side of each end plate 12 just above the lower end of each slot 27, which is in the path of the projection 44 on the nut or collar 41 so that before the transverse rod 28 reaches the lower end of the slot, the projection 44 engages the projection 61 which thereupon rotates the rod 28 carrying with it the feed arm bracket 30 as shown more clearly in Figure 3, thereby rotating the feed arm in a clockwise direction as shown free from and out of contact with the outermost sheet of the stack 60. This freedom of contact of the feeding fingers allows the sheets and particularly the outermost sheets in a stack to settle downwardly by gravity into the bottom of the receptacle or bin, or to the original starting place on the stack.

In order to accommodate sheets of various sizes in the same collator, as for example, letter size and legal size sheets, a plurality of back stop strips 66 may be inserted through the front and back of the receptacle and through perforations 67 in the radiating partitions 14.

At each end of the receptacle is a hinged cover 68 with flanges at three sides and open at the bottom to enclose the operating mechanism at each end of the receptacle but rotatable to uncover the mechanism for repair or adjustment. At the front of the receptacle is a platform 70 which serves as a table upon which to jog the edges of each handful of sheets to facilitate orderly stackings.

In operating this collator, the pedal is simply depressed at the upper or rear edge, which partially ejects two groups of six sheets radially from the arcuately arranged bins until the outer edges meet at a common center where they may be readily grasped by the two hands of an operator and either placed together or each handful jogged separately upon the platform and then assembled or used in any manner desired. To

replenish the stacks, back pressure upon the foot pedal, or depressing the front portion, releases all of the feeding fingers simultaneously from contact with the outermost sheets in their respective bins, and the bins of the collator are then clear for loading with both hands, if desired.

With this construction, the radial converging ends of the bins are omitted to provide an open and unobstructed space through which the outer portions of the sheets are fed to the common center. By partially supporting the sheets within the bins and extending the outer portion of each sheet in an upward inclined position, they are guided closely together in contact with each other or at a common center so that the operator may easily grasp all of the sheets of one set with one hand and remove the remainder of the partially fed sheets from the several bins. If there are two sets close together, both hands of the operator may be used for this purpose, the sheets being advanced by the foot pedal or by power means operating the feeding fingers within the bins.

This application is a continuation of my application for Collator, Serial No. 500,504, filed August 30, 1943, which has been abandoned.

The invention is not to be understood as restricted to the details set forth which should be regarded by way of illustration and not as a limitation since the construction, combination, and arrangement of the parts may be varied within the scope of the appended claims without departing from the spirit and scope of the invention.

I claim:

1. A collator comprising an arcuate series of bins having open and unobstructed inner ends, adapted to hold stacks of sheets respectively, and radially arranged around a common center so that when the sheets are partially ejected through said open inner ends the exposed end margins of the sheets substantially meet at said common center and hence may be grasped together in connection with conjoint withdrawal of the sheets from the bins, means for partially ejecting the sheets from the stacks, and a unitary back stop means extending transversely of all of the bins, and means supporting said stop means in various positions of adjustment with respect to the inner ends of the bins whereby the working depths of all of the bins may be equally varied in order to adapt the bins to accommodate stacks of sheets that vary in length.

2. In a collator, means for supporting a plurality of stacks of sheets in flatwise radiating position diverging downwardly from a common center, mechanism for feeding the sheets from the stacks so that the outer edges meet at the common center to permit manual withdrawal, said mechanism comprising parallel rods extending adjacent the stacks, feeding fingers extending from each of the rods to engage the outermost sheet of its stack, a common operating lever, radiating slots at the ends of the supporting means through which the parallel rods extend, a segment bar connected for movement by the operating lever and movable lengthwise of the radiating slots, links loosely connecting the feeding segment to each of the rods for moving the rods lengthwise of the slots as the lever is moved.

3. In a collator, means forming a plurality of adjacent bins radiating from a common center and diverging downwardly for holding stacks of paper sheets in flatwise radiating relation, means within the bins for feeding the sheets so that their outer edges meet at the common center to permit manual withdrawal, the ends of the bins having

corresponding radiating slots, said feeding means comprising a rod extending through each bin and through the slots at the ends thereof and feeding fingers attached to each rod for engaging the uppermost sheet in the corresponding bin, and means for simultaneously operating the rods comprising a segment bar movable lengthwise over the slots at the outer ends of the bins, connecting links each loosely connected at one end to the bar and at the other end to one of the rods to permit free lateral movement of the rod with respect to the bar, and resilient means attached to the rods for holding the fingers against the sheets and drawing the rods to the ends of the slots opposite their feeding movement by the segment bar.

4. In a collator, a plurality of bins for supporting a plurality of stacks of sheets in flatly radiating relation diverging downwardly from a common center, said bins having corresponding radiating slots in the ends, paper feeding means comprising rods extending through each of the bins and through the end slots and feeding fingers in each of the bins on the rods for moving the outer corresponding edges of the sheets to meet at the common center of the bins to permit manual withdrawal, a curved segment bar slidably movable at the ends of the bins for operating all of the rods, link means forming a laterally movable loose connection between the segment bar and the ends of the rods, spring means connected to the rods for holding the fingers in engagement with the uppermost sheet in each stack, an operating lever having a slot in the end, and a link connected to the segment bar and slidable in said slot for operating the bar in reverse directions.

5. In a collator, adjacent segmental bins for supporting a plurality of stacks of sheets in flatly radiating position diverging downwardly from a common center, said bins having corresponding radiating slots at the ends, means for feeding the outer edges of all of the sheets together from the bins to meet at their common center to permit manual withdrawal, said means comprising feeding rods extending through the bins and through the slots in the ends thereof, a holder mounted upon each rod having fingers extending therefrom to engage the outermost sheet in each stack, resilient means between the holder and the rod for maintaining the fingers in engagement with the sheets, a common operating bar and links for loosely connecting it with each of the said rods, link and lever connections for moving the bar in opposite directions, and springs connected to the ends of the rods tending to draw the rods, the common operating bar and said operating means in the direction opposite to the sheet feeding movement.

6. In a collator, means forming a plurality of adjacent radiating bins for supporting a plurality of separate stacks of sheets in flatly radiating position, said bins including a plurality of radiating partitions, sheet engaging means for each stack and a common operating bar for all of the sheet engaging means for simultaneously feeding the sheets of each set toward their common center where the outer edges of the sheets will be in register for removing them together, the partitions having corresponding perforations adjacent their inner ends, and a back stop strip insertable transversely through the corresponding perforations of the partitions forming a variable bottom for adjusting the depth of the bins to accommodate sheets of different lengths therein.

7. In a collating machine, partitions forming

a plurality of radiating bins for supporting individual stacks of paper sheets in flatwise radial arrangement with respect to each other, sheet engaging means for feeding the top sheet of each stack simultaneously with the outer edges together at their common center, a common operating bar movable in a single path having loose connections between the bar and each of said feeding means for accommodating the radial movement of the feeding means to the single movement of the bar, means for relieving the sheet engaging means from its contact with each stack to permit a backward settling movement of the sheets in the separate stacks, a common depth adjusting means for all of the bins comprising corresponding openings in the partitions, and a common curved back stop insertable transversely through the openings in all of the partitions for limiting the backward settling movement of the sheets in the separate stacks.

8. In a collating machine, an arcuate series of wedge-shape bins having common radial partitions between them adapted to hold stacks of sheets therein, the small ends of the bins being open and omitted adjacent their common center to provide an unobstructed sheet feeding space, common means for successively feeding sheets simultaneously from each of the stacks through the small ends of the bins to said common center where the outer edge of the sheets are together so that each set of sheets may be grasped together without obstruction and removed by the operator of the collator, means for releasing the sheet feeding means from engagement with the sheets at the inner ends of movement thereof

allowing the sheets to settle to the bottom of their bins, and common arcuate back stops insertable transversely at the bottoms of the wedge-shape bins for adjusting the depth thereof and limiting the backward settling movement of sheets in the separate bins.

9. A collator comprising an arcuate series of bins arranged in flatwise and juxtapositional relation diverging downwardly, adapted to hold stacks of sheets respectively, and having the upper ends thereof open in order to permit ejection of the sheets toward a common center, means for conjointly ejecting the topmost sheet from each stack through said upper ends of the bins, and a unitary back stop means extending transversely of all of the bins and means supporting said stop means in various positions of adjustment with respect to the upper ends of the bins whereby the working depths of the bins may be varied in order to adapt the bins to accommodate stacks of sheets that vary in length.

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