

Feb. 16, 1932.

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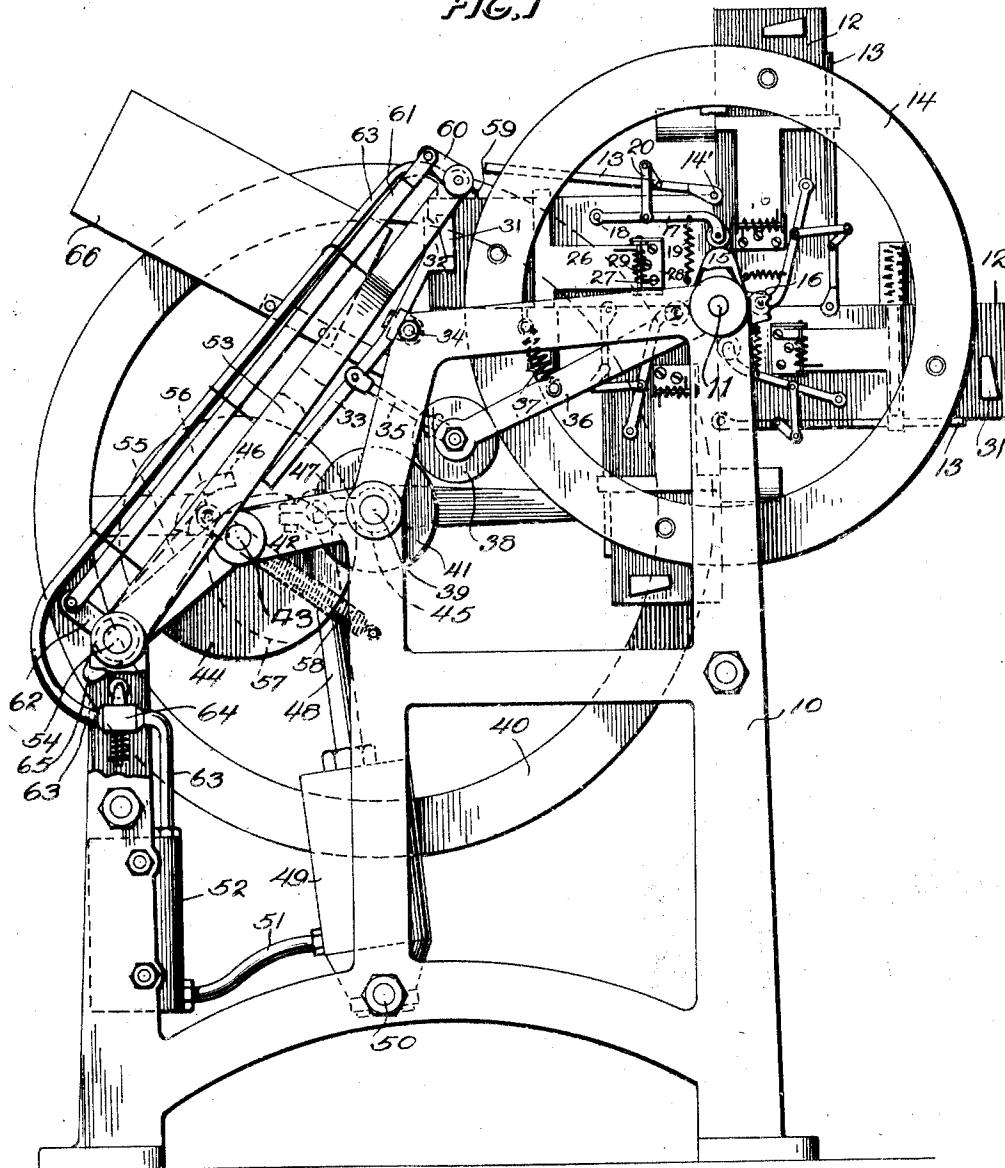
1,845,907

SHEET ASSOCIATOR

Filed Nov. 8, 1930

2 Sheets-Sheet 1

FIG. 1



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2 Sheets-Sheet 2

FIG. 2

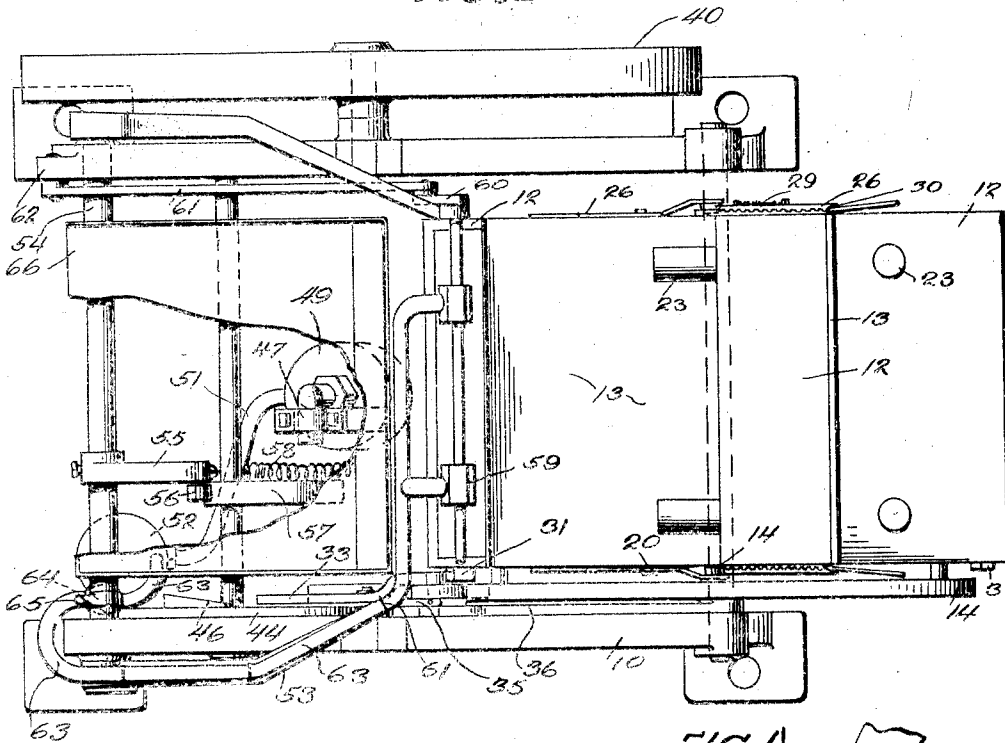
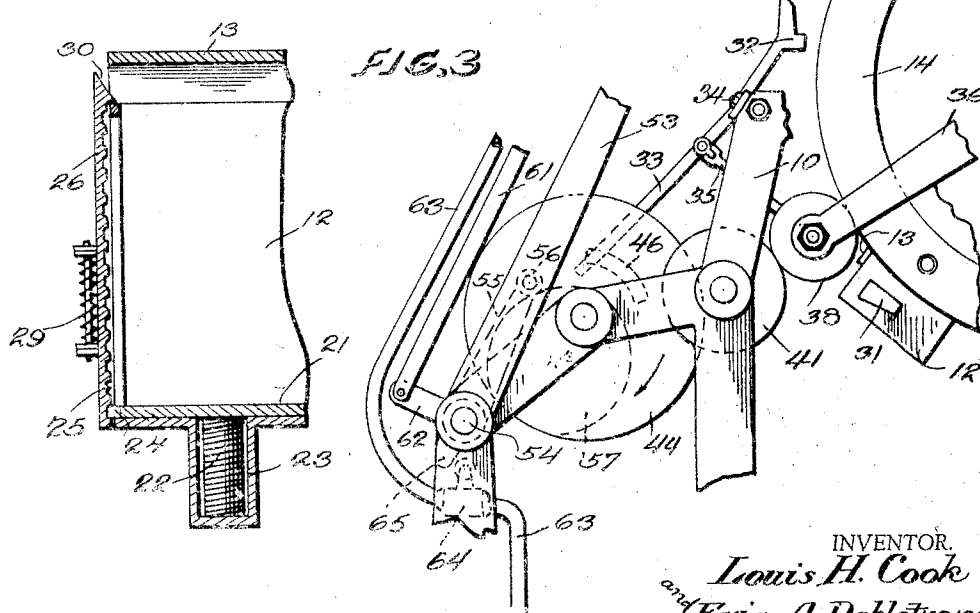


FIG. 4

FIG. 3



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SHEET ASSOCIATOR

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The present invention relates to a sheet associator, and more particularly to a machine adapted for use in the printing and bindery business for gathering and assembling sheets of paper which are to be padded together, such as in bills of lading, order pads, dray receipts, and other office receipts or the like.

Another object of the present invention is to provide a sheet associator or assembling machine of this type which is provided with means for carrying a plurality of stacks of sheets and means for intermittently bringing the stacks one at a time into such position that mechanism may engage a sheet from each stack and deposit the sheets in desired order on a main table or tray, the invention embodying certain features for effecting the automatic control and operation of the various devices in proper timed relation with respect to one another.

The invention also aims at the provision of a machine embodying these characteristics and which is of relatively simple construction, which comprises but few parts and which cannot easily get out of order.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views.

Figure 1 is a side elevation of a sheet associator constructed according to the present invention and showing the parts adjusted for taking off the topmost sheet of one of the stacks.

Figure 2 is a top plan view of the same with parts broken away to disclose the sub-adjacent mechanism.

Figure 3 is a fragmentary enlarged sectional view taken through one of the receptacles in which a stack of sheets are carried, and

Figure 4 is a fragmentary side elevation of the controlling mechanism of the machine shown in a position opposite to that disclosed in Figure 1.

Referring now to the drawings, 10 designates the main frame which may be of any suitable construction and height to adapt it for supporting and accommodating the various mechanisms of this machine.

In the upper part of the frame and adjacent one end thereof, which may be termed the rear end, is journaled a transverse shaft 11 on which is mounted a rotary sheet stack carrier adapted to accommodate a desired number of stacks of sheets to be assembled in a predetermined order. The shaft 11 carries thereabout a plurality of substantially radially disposed boxes or compartments 12 of suitable dimensions to receive each a stack of sheets of the desired size. Each box 12 is provided with a cover plate 13 hingedly connected by pins 14' to the inner ends of the boxes 12 and adapted to be swung upwardly a short distance at their free ends to admit of the reception of a suitable pick-up device for the sheets in the box 12. These boxes 12 may be interconnected at one side and near their outer ends by a drive wheel 14 which is shown in the present instance as being of the friction type although any suitable gearing may be used for carrying out the objects of the machine.

The shaft 11 carries a stationary cam 15 which extends upwardly and over which passes one at a time rollers 16 mounted in the free ends of arms 17 which are pivotally connected at their inner ends on pins 18 disposed at the sides of the boxes 12 and in position to hold the rollers 16 in line with the cam 15. Springs 19 are disposed between the boxes 12 and their arms 17 for normally urging the arms inwardly, and the arms 17 are connected by links 20 to the cover plates 13 for swinging the latter into open position when the cam 15 raises the arms 17. The springs 19 normally maintain the cover plates 13 in closed position and with sufficient pressure to support the stack of sheets in each box when the box swings around into an angle or into an inverted position.

Means is provided in each box 12 for intermittently advancing the stack of sheets toward the cover plate 13 as the sheets are removed from the respective stacks. Referring

to Figure 3 it will be noted that each box 12 is provided with a follower or bottom plate 21 normally urged outwardly toward the cover plate 13 by a desired number of springs 22 seated in spring cups or housings 23 projecting from the bottom of the box 12.

The side walls of the box 12 are suitably slotted to receive projections 24 carried by the follower 21, the projections 24 interfitting with rack teeth or serrations 25 which are formed upon the free ends and inner faces of wings 26. The wings 26 are mounted upon pivots 27 connecting the wings to attaching plates 28 and springs 29 are disposed between the attaching plates 28 and the wings 26 for normally urging the latter under pressure against the outer sides of their respective boxes 12 and into engagement with the projections 24 of the follower 21. The wings 26 therefore hold the followers 21 from moving outwardly when the cover plates 13 are raised.

The upper ends of the wings 26 are provided with beveled or cam faces 30 disposed beneath the opposite lateral edge portions of the cover plates 13 so that when the latter move down into closed position under action of the springs 19, the wings 26 are forced outwardly from the sides of the boxes 12 and release the followers 21 so that the springs 23 may force the followers 21 outwardly to maintain the topmost sheets of the stacks immediately beneath the covers 13.

Each box 12 is provided at one side and near its outer end with a stop lug 31 suitably shaped and shouldered to engage one at a time with a stop shoulder 32 carried upon the outer end of a trip lever 33 pivotally mounted at 34 upon the frame 10 in spaced relation forwardly of the rotary member. The trip lever 33 is connected by a link 35 with the outer end of a radial arm 36 mounted on the shaft 11 and the arm 36 is connected by a spring 37 to the frame 10 for urging the arm 36 into a raised position for swinging the trip lever 33 in a direction to dispose its stop shoulder 32 in the path of the stop lugs 31 of the rotary member.

The outer end of the arm 36 carries a friction pulley or wheel 38 disposed in frictional contact with the face of the large wheel 14 for transmitting motion to the latter when the wheel 38 is turned.

The frame 10 is also provided with a main shaft 39 which may carry a fly-wheel 40 and which is also provided with a friction drive wheel 41 adapted to engage the friction wheel 38 when the arm 36 is swung downwardly by the trip lever 33. The frame 10 is provided at its forward end with projecting arms 42 which carry a transverse shaft 43 on which is mounted a friction wheel 44 which meshes with a small friction wheel 45 mounted on the drive shaft 39. This drive wheel 44 carries a cam 46 at one side which lies in the path of the free end of the trip lever 33 and is

adapted to engage and move the same downwardly and hold it in such position for a predetermined length of time and effecting the driving of the rotary stack member through the friction wheel 38.

The shaft 39 is also provided with a crank bearing 47 in which is mounted the outer end of a piston rod 48 of an air pump 49 pivotally mounted at 50 in the lower portion of the frame 10. Air from the pump 49 passes through pipe 51 into an air reservoir 52 mounted on the frame and it is stored for operation of a pneumatic pick-up later to be described.

The frame 10 also carries at its forward end a pivoted frame 53 pivotally mounted at one end on a shaft 54 carried by the frame and which extends upwardly and rearwardly from the shaft and is adapted to swing on the shaft 54 toward and from the rotary member. The frame 53 carries an arm 55 which extends upwardly and rearwardly from the shaft 54 and which is provided with a roller 56 held against the face of a cam 57 by a spring 58. The spring 58 is anchored at one end to the frame 10 and at its other end is secured to the arm 55 whereby the pivoted frame 53 is normally urged rearwardly as shown in Figure 1.

The cam 57 is mounted on the shaft 43 and is adapted to turn with the drive wheel 44 and when turned is adapted to intermittently raise the arm 55 and swing the pivoted frame 53 upwardly and forwardly upon each revolution of the cam. The drive gearing between the rotary member and the shaft 43 is such that the cam 57 is moved through a complete revolution during the turning of the rotary member through a distance sufficient to bring the boxes 12 one at a time into a position of rest at the front of the rotary member.

On the upper free end of the frame 53 is disposed a sucker head 59, pivotally mounted on the frame 53 and connected by an arm 60 and a link 61 with a stationary arm 62 carried upon the frame adjacent to the pivot shaft 54 so as to maintain the face of the sucker head 59 in a downwardly extending position during the swinging of the frame 53 forwardly and upwardly.

The sucker head 59 is connected by a flexible pipe 63 to the reservoir 52, and the pipe 63 is controlled by a valve 64 arranged beneath the shaft 54 and adapted to be intermittently closed by a cam 65 carried on the frame 53.

The frame 10 also carries a tray 66 which projects forwardly and upwardly from the frame in position to be traversed by the pivoted frame 53 and to receive sheets carried by the sucker head 59 when the valve 64 is operated to release the suction in the pipe 63.

In operation, the shaft 39 is driven continuously from any suitable source of power, such as through the pulley or fly-wheel 40.

The boxes 12 are provided with stacks of the various sheets adapted to be assembled into pamphlet or pad form and the stacks of sheets are held against the under sides of the cover plates 13 by the followers 21. The rotation of the shaft 39 turns the shaft 43 and when the cam 46 engages the free end of the trip lever 33 the stop shoulder 32 is moved out of engagement with the adjacent stop lug 31 so as to free the adjacent box 12. At the same time the trip lever 33 forces the friction wheel 38 into engagement with the friction wheel 41 so that the rotary member is revolved by the power transmitted through the friction wheel 38.

As soon as the next box 12 is swung down into the position shown in Figure 1, the cam 46 has released the trip lever 33 and the spring 37 then raises the arm 36 and draws the wheel 38 out of engagement with the wheel 41. The rotary member is now arrested in its turning movement while the shaft 43 and the parts carried thereby are continuously operated and at this time the cover 13 of the forward box 12 is raised by the cam 15 as shown in Figure 1. Also, the pivoted frame 53 is swung backwardly by the spring 58 as the cam 57 releases the frame 53 immediately after the box 12 engages the seat 32.

The pump 49 by its suction on the reservoir 52 evacuates the latter so that the sucker head 59 as it is swung beneath the forward edge of the cover plate 13 picks up the uppermost sheet of the stack and holds the latter while the cam 52 continues in its movement to raise and swing forwardly the sucker head 59. The topmost sheet is carried with the sucker head and when the frame 53 reaches its foremost position over the tray 66 the cam 55 is swung into engagement with the valve 64 to close the same and break the suction in the head 59 so that the sheet is released and permitted to drop into the tray 66.

Continued operation of the shaft 43 brings the cam 46 into engagement with the trip lever 33 so that the stop shoulder is retracted from the stop lug 31 of the box 12 and at the same time the drive mechanism is set in operation for turning the rotary member to bring the next stack into position. The operation is here repeated so that the sucker head 59 moves over the second box 12 and beneath its partly raised cover 13 to pick up the top sheet of the next stack. The second sheet is in a like manner carried over the tray 66 and released so as to drop into superposed relation upon the first deposited sheet.

It is apparent that this operation continues throughout the intermittent advancement of the various boxes 12 used into a forward position. The sheets are thus arranged on the tray 66 in the desired order and may be bound or formed into pads as desired.

Each time the cover plate 13 is raised into open position the adjacent wings 26 are

swung inwardly by the springs 29 so as to interlock with the follower 21 and hold it from movement toward the cover 13. Thus the stack of sheets is not projected upwardly through the top of the box when its cover 13 is open. As soon however as the cover 13 is closed the wings 26 are released from the follower 21 so that the latter may move outwardly under the action of its springs 23.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims:

What is claimed is:—

1. A sheet associator comprising a rotary member, a plurality of sheet receiving boxes carried by said rotary member, follower means for maintaining the sheets in each box in stack relation with the outermost sheet at the upper side of the box, covers for said boxes for holding the stacks of sheets from projecting from the boxes, and means carried by the boxes and engaging said followers for holding the latter from movement when the covers of the boxes are opened.

2. A sheet associator comprising a rotary member, stack receiving boxes mounted on the member, a cover for each box, means for intermittently turning the rotary member, means for arresting the movement of the rotary member when the boxes are brought into a predetermined position for discharge, means for opening said covers of the boxes one at a time when the boxes are in said position, and means for removing the topmost sheets of the stacks in said positions when the covers are opened.

3. In a sheet associator, a stack receiving box, a spring pressed bottom mounted in the box, a cover carried by the box and adapted to be opened at times, a pair of wings carried at the sides of the box, said followers having projections engaging through the box and disposed in interlocking engagement with said wings for holding the follower from rising in the box when the wings are closed and the cover is raised, and interacting means between the cover and the wings for releasing the latter from the follower when the cover is closed.

4. In a sheet associator, a stack box having vertical slots in its sides, a follower mounted in said box and having projections extending through said slots, springs mounted in the bottom of the box for raising said follower, a pair of wings disposed at opposite sides of the box and having serrated inner faces adapted to interlock at various heights with said projections of the follower to hold the latter from moving upwardly when the wings are closed against the sides of the box, said wings having at their upper ends cam faces lying in the

path of said cover, said cover adapted to engage said faces for spreading said wings when the cover is closed to release the follower and permit the same to move a stack of sheets upwardly against said cover.

5. In a sheet associator, a rotary member, a plurality of boxes carried by said rotary member, a hinged cover for each box, a spring urged lever on each box connected to the adjacent cover for normally closing the same, and a stationary cam arranged at one side of the rotary member and in the path of said spring pressed levers for raising the same one at a time to open the covers when the boxes reach a predetermined position.

6. In a sheet associator, a rotary member, a plurality of stack boxes carried by the rotary member, each of said stack boxes having a pair of wings pivotally mounted at the sides thereof and normally urged against the stack box, a follower in each stack box having projections extending outwardly through the sides thereof into interlocking engagement with said wings, normally closed covers carried by the boxes, stationary means disposed centrally of the rotary member and operable to open said covers one at a time for interlocking the followers with the wings and holding stacks of sheets from raising in the boxes when the covers are open, and interacting means between the covers and the wings for retracting the wings from the sides of the boxes when the covers are closed to free the followers and admit the rise of the sheet stacks in the boxes.

7. A sheet associator comprising a rotary member having stack boxes thereon, a trip lever having a stop shoulder thereon, means operable on the trip lever for normally holding it in a position to engage the stop shoulder with one of said boxes to hold the rotary member from turning and the said box in desired position of rest, a sucker head, means for moving said sucker head into and out of operative position with respect to said box, and means co-operating with said sucker head moving means for releasing said trip lever from the box and for permitting the continued movement of said rotary member.

8. In a sheet associator, a rotary member having stack boxes thereon, a swinging frame, a trip lever arranged between the rotary member and the swinging frame and biased to a position for interlocking engagement with the rotary member to hold the boxes one at a time into delivering position, a sucker head carried by the pivoted member, means for swinging said pivoted member into position to engage the sucker head with a box in delivering position, and means for retracting said pivoted member and sucker head from the box and subsequently tripping said trip lever to release the rotary member for advancing said boxes during the travel of said pivoted member.

9. In a sheet associator, a rotary member having a stack box, a pivoted frame, a sucker head mounted on the pivoted frame, means for urging said frame into a position for engaging the sucker head in said box, operating means for retracting said pivoted member from the box to remove the sucker head therefrom, means for holding the box in position, and a releasing device connected to said operating means for releasing the box holding means subsequent to the swinging of said pivoted member.

10. A sheet associator comprising a rotary member having stack boxes thereon, drive means, a trip lever adapted for interlocking engagement with the rotary member to hold the boxes one at a time in delivering position, drive means connected to said trip lever for turning the rotary member when released, a cam carried by said operating means for engagement with said trip lever to release the rotary member and drive the same, a pivoted frame, a sucker head carried by the frame, means for normally urging the frame in position to engage the sucker head with a box, a tray remote from the box, means operable by said operating means for swinging said pivoted member in an opposite direction to carry the sucker head from the box to said tray, and suction controlling means connected to the pivoted frame for breaking suction in said sucker head at predetermined times to deliver sheets to said tray.

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