

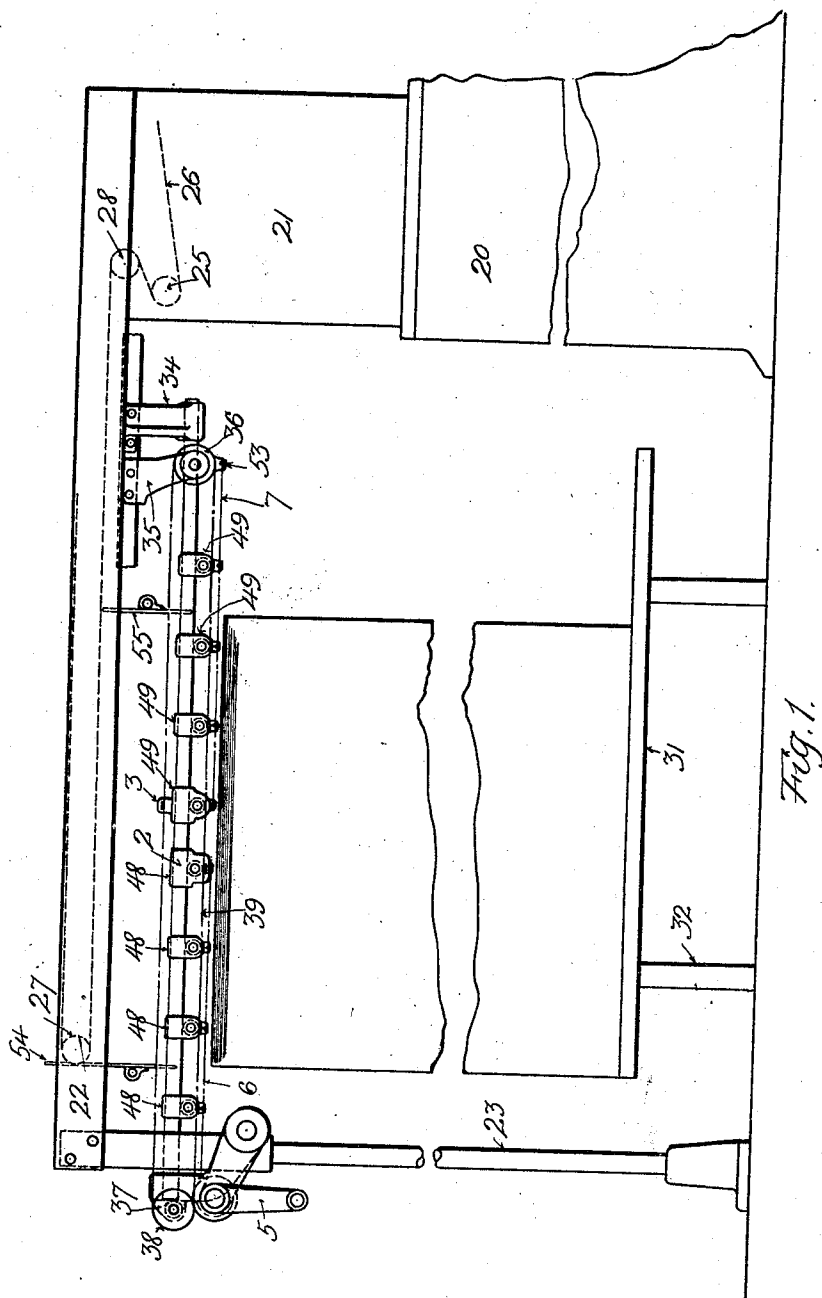
Jan. 6, 1931.

F. S. ENGLISH
SHEET RACK FOR PRESSES

1,787,572

Filed March 30, 1928

4 Sheets-Sheet 1



Inventor
Fred S. English
By his Attorney
Charles E. Hensley

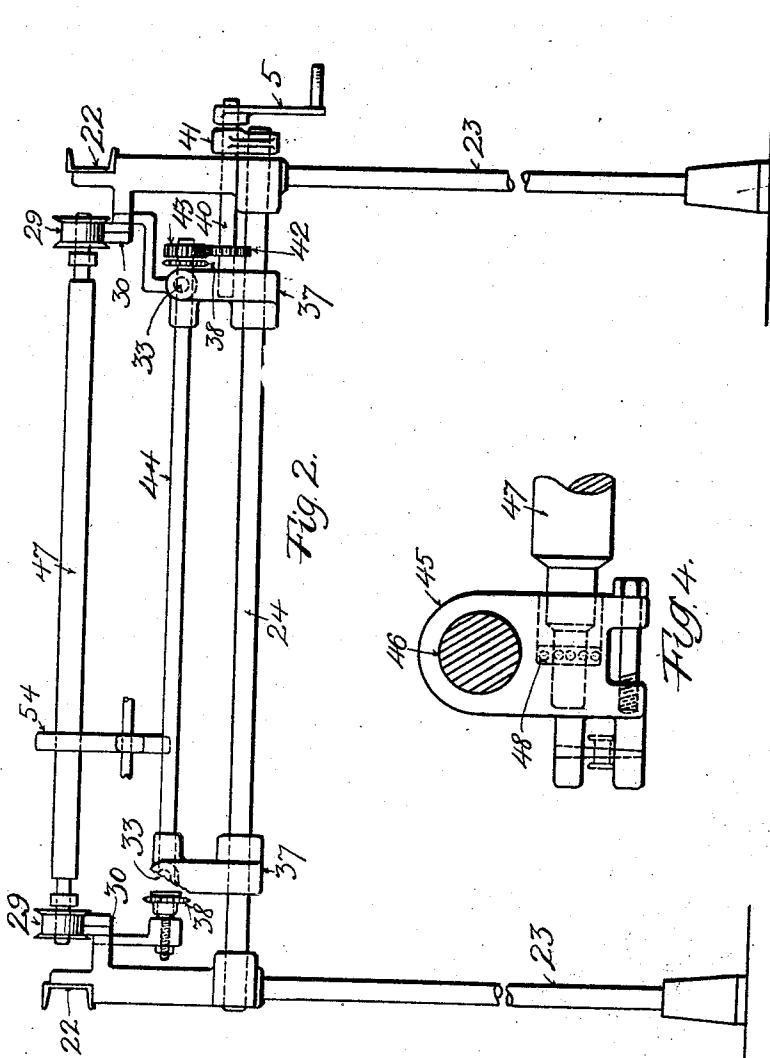
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

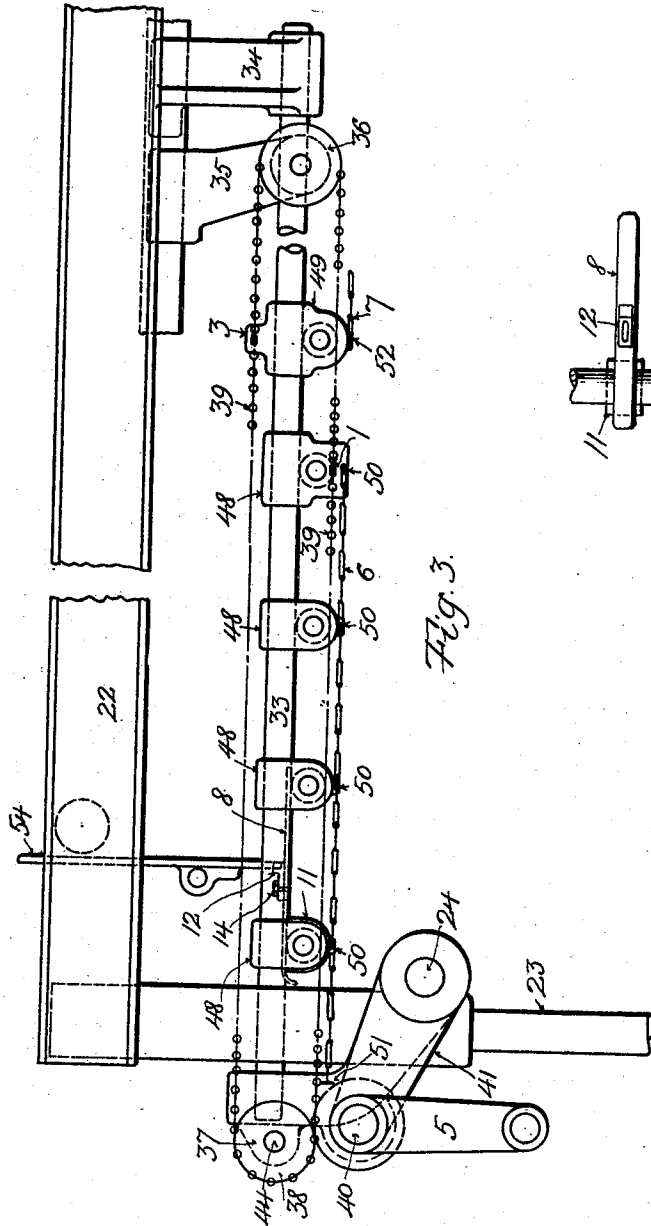


Fig. 3.

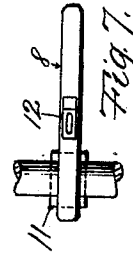


Fig. 7.

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1,787,572

SHEET RACK FOR PRESSES

Filed March 30, 1928

4 Sheets-Sheet 4

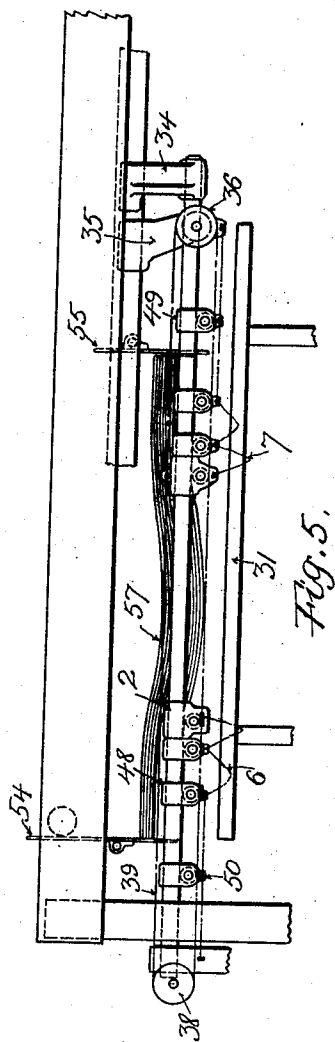


Fig. 5.

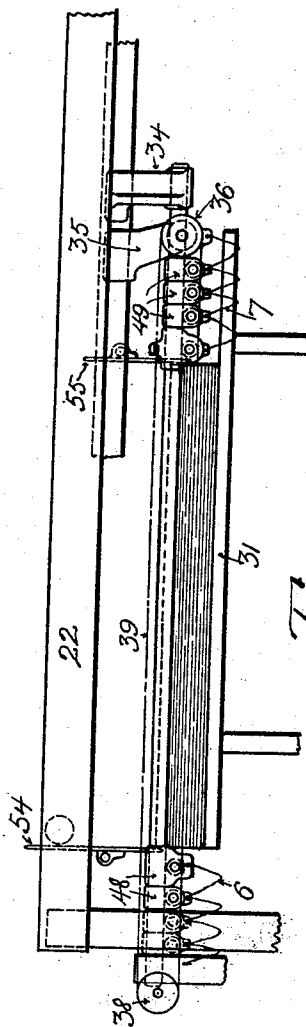


Fig. 6.

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UNITED STATES PATENT OFFICE

FRED S. ENGLISH, OF NEW LONDON, CONNECTICUT

SHEET RACK FOR PRESSES

Application filed March 30, 1928. Serial No. 265,859.

The present invention relates to sheet racks for presses. In the application of Fred S. English and Robert H. Dodds, Serial No. 139,615, filed October 5, 1926, there was shown a folding sheet rack and the present invention relates to a device of somewhat similar character and is intended to accomplish similar results but in a more efficient manner.

In presses, particularly printing presses and cutting and creasing presses, where large runs are made, it has become the practice to provide a lowering pile table set off at the delivery end of the press where the table can be lowered automatically from a high position to a position near the floor, in order to receive a large pile of sheets delivered from the press. The present invention is most useful when combined with a press and such a lowering pile table, and its purpose primarily is to receive the sheets delivered from the press to temporarily hold them while the pile table and its pile of sheets are being removed and a new pile table placed into receiving position. After this, the temporary rack is folded up out of receiving position to allow the sheets to continue to deliver upon the pile table, and in this folding operation the sheet rack delivers the sheets which have accumulated thereon upon the pile table. The object of the present invention is to provide a folding sheet rack of divided construction, or one wherein the rack as a whole separates intermediate its ends, the two halves folding in opposite directions and allowing the sheets accumulated upon the rack to bend downwardly at the middle to gradually pass to the pile table, until the sections of the rack move entirely out from under the sheets. During the folding of the sheet rack, therefore, the support of the rack is first taken away from the sheets near the center, so that they begin to sag at this point and to touch the pile table, the contact increasing until the rack has been entirely disengaged from the sheets, and the latter are completely deposited upon the pile table. This allows the sheets to be discharged from the sheet rack smoothly and in perfect order. Another advantage is that there is no tendency for the sheets to shift longitudinally on

the rack while the latter is being withdrawn; or, rather, the tendency to shift in one direction is neutralized by the tendency to move in the reverse direction. Another advantage is that the various parts of the folding rack may be operated with a reduction in the distance traversed by the various parts, so that a sheet rack of a given size may be folded in a shorter time than in the device shown in said co-pending application, and likewise, the rack may be placed in extended position in a shorter period of time. Another advantage is that no adjustment is required to adapt the rack for receiving sheets of different sizes as it may be set at all times for maximum size sheets and still be adapted to operate on sheets of less than maximum size without adjustment.

Another object of the present invention is to avoid the necessity of the use of supporting tapes for the sheets such as are shown in the said co-pending application, and to utilize in place thereof a small bridge to prevent the forward edge of the sheets from dropping under the forward cross members of the rack. Other improvements and advantages will be made apparent in the following detailed description of one embodiment of the invention.

In the drawings forming part of this application,

Figure 1 is a side elevation of the invention showing also one end of the press to which the same is applied, and parts of a lowering pile table,

Figure 2 is an end elevation thereof,

Figure 3 is an enlarged elevation of the sheet rack in extended or receiving position,

Figure 4 is a detail sectional view showing the end of one of the supporting rollers and its hanger,

Figure 5 is a diagrammatic side elevation showing the sheet rack in the process of being folded to deliver the sheets from the rack onto the pile table,

Figure 6 is a similar view with the rack completely retracted or folded and the sheets completely delivered upon the pile table,

Figure 7 is a plan view of one of the bridges which span the top of certain rollers.

In the present case the end of the press frame is indicated at 20 and from this extends upwardly a bracket 21 which supports one end of the frame of the extended delivery device. It will be understood that the press indicated in the drawings may be a printing press, a cutter and creaser, or any other machine adapted to operate on sheets of stock which are afterwards delivered into a pile. Only so much of the extended delivery device is shown in the present case as is necessary to illustrate the application of the present invention thereto. In the drawing the frame of the pile table is shown composed partly of channel beams 22 extending longitudinally in the general direction of the line of the press and laterally beyond opposite sides of the path of the sheets as they are delivered from the press. These channel beams are shown mounted at one end upon the bracket 21 adjacent the end of the press and at the opposite end they are supported or mounted upon vertical posts or legs 23 which rest upon the floor some distance from the end of the press. Suitable cross members or tie bars 24 unite the above described frame members to steady them laterally and to form a supporting unit. Only part of the delivery device of the press is indicated in the drawings, and in so far as illustrated, the same comprises a stationary roller 25 fixed in position in the bracket 21 and extending crosswise of the press and around which engages, in well known manner, a series of endless tapes 26. The reciprocating delivery carriage which moves from a position over the press to a position over the extended pile table, has a roller 28 around which the tapes 26 also engage, and at its forward end the carriage has a roller 27 around which these tapes also pass, the upper runs of the tapes being adapted to support and convey the sheets from the press to a position over the pile table. The carriage is supported by means of rollers 29 at opposite sides of the carriage which rollers are flanged and travel upon parallel rails or tracks 30 which are rigidly secured to the table frame. Delivery devices of this character are well known in the art, and further detailed description is not necessary to a full understanding of the present invention. It is sufficient to add that when the delivery carriage reciprocates, its stroke is usually fixed so that the forward tape roller 27 stops at the position indicated in Figure 1, at which time the sheet being delivered is positioned over the pile table, hereinafter described, and upon the return or backward stroke of the delivery carriage the tapes 26 peel from under the sheet and allow the latter to drop by gravity.

The lowering pile table is indicated at 31 and consists of a platform having cleats or bars 32 on its under side. It is understood

that this table is adapted to move from a position just under the sheet rack to a position near the floor, and there are various well known devices in the art for gradually lowering the pile table as the sheets are received thereon, so that the top of the pile of sheets remains substantially in the same plane until the table has received a full pile; and it is unnecessary to show the details of the mechanism for automatically lowering the pile table. Unless a device is employed to temporarily receive the sheets delivered from the press while the filled pile table and its pile are being removed and a new table put into place, it would be necessary to stop the press. The present device, however, is intended to receive the sheets during this interim, so that the press may continue in its operation and then the sheet rack may be folded up to allow the sheets to fall upon the new pile table when it has been placed into receiving position.

In the drawings there are shown parallel supporting bars or rails 33 mounted at one end upon suitable brackets 34 connected with the stationary portions of the table frame, and in the brackets 37 on the tie rod 24 at their opposite ends, and these bars or rails are disposed at opposite sides of the delivery device and outside of the path of the sheets as they travel with the delivery carriage and pass onto the pile table. These bars or rails form the supporting means for the collapsing or folding members of the sheet rack. At the right hand end of Figures 1, 3, 5 and 6 there is a bracket 35 rigidly connected to the table frame, and this bracket is duplicated at opposite sides of the apparatus, and in fact, all of the parts at one side of the machine are duplicated at the opposite side. These brackets 35 form supports for sprockets 36 which revolve but do not shift in position while the device is in operation. Likewise at the opposite ends of the supporting bars 33 there are brackets 37 which support sprockets 38 arranged in the same planes and in the same horizontal lines with the sprockets 36. There are parallel endless chains 39 which travel around the sprockets 36 and 38 there being one chain at each side of the mechanism, engaging around the companion sprockets. At the forward end of the device there is a shaft 40 mounted in the bracket 41 and the bracket 37 fixed to the tie bar 24 and on one end of this shaft there is a hand crank 5 by means of which the operator may revolve the shaft 40. On this shaft there is a gear 42 which meshes with and drives a gear 43 which is fastened to the shaft 44 on which the sprockets 38 at the forward end of the machine are carried. By revolving the crank 5 the shaft 40, the sprockets 38 and chains 39, and the sprockets 36 (the latter

being idlers) are all operated in unison, and the motion may be in either direction.

On the guide bars or rails 33 are supported a number of brackets or sliding members which act as hangers. As shown in Figure 4 each hanger has an upper portion 45 provided with an aperture 46 through which one of the supporting bars 33 passes with sufficient looseness to allow the hanger to slide easily along the supporting bar. The sheet supporting members of the rack consist of rollers 47 extending crosswise of the machine and each one of these has the ends of its shaft mounted or journaled in one of the hangers. Preferably ball bearings, as indicated at 62 in Figure 4, are provided for the shafts of these rollers 47 in order that the latter may turn on the hangers with a minimum of friction. The several hangers which are slidable upon the rods 33 are provided in sufficient number, so that the several rollers 47 when in extended position, will support the maximum size sheet without undue sagging and the number will naturally depend upon the size of the sheets to be handled in the press. The several hangers are adapted to be moved in different directions and preferably they are divided so that one-half move to the right in Figure 1 and the others move to the left in this figure when the sheet rack is to be collapsed; and, conversely, when the rack is to be extended into receiving position, the direction of movement of the hangers is reversed, so that they approach from opposite ends toward the common center. While it is preferable to arrange the separating point midway of the length of the sheet rack, this is not imperative, but it is fundamental of the invention that the separation takes place at some point between the extreme ends of the sheet rack in order to obtain the advantage claimed for the present invention. In the embodiment herein illustrated, the several hangers 48 are all adapted to move between the left hand end of the bars 33 in Figures 1, 3, 5 and 6 and a point intermediate the length of these bars. The hangers 49 on the other hand, are adapted to move between a point adjacent the rear sprockets 36 and the middle line of the bars 33. The several hangers are connected to each other and to a fixed point by what may be called towing chains 46, 7. There is a flexible member 6 at each side of the machine, preferably in the form of a chain, and it is connected at the points 50 with each of the several hangers 48 forming part of one-half of the folding sheet rack. The points of connection 50 of this chain with the several hangers is such as to cause the several hangers to be extended apart as shown in Figure 3 when the foremost hanger 48 is drawn out. One end of this chain is fastened to a fixed point, as indicated at 51. This chain is duplicated at the opposite

side of the machine, so that it is connected with the hangers which are in parallel relation to the hangers 48 and which support the opposite ends of the same rollers 47. The hangers 49 forming a part of the rear half of the sheet rack are likewise connected with each other by a flexible member 7 which is also preferably in the form of a chain, the same being connected at the preferably equidistant points 52 with these several hangers 49. This chain has one end fixed preferably by attaching it to the bracket 35 as shown at 53 in the drawings.

There is a front stop 54 against which the forward edge of the sheet is adapted to strike in order to stop the sheet in position to fall upon the sheet rack or the pile table, and if desired, a back stop 55 may be used to prevent back thrust of the sheet. There is a tendency for the leading or forward edge of the sheet to drop below the plane of the tops of the several rollers 47, especially if there is not a roller adjacent the leading edge of the sheet; and in the said co-pending application the sheets are prevented from dropping below this plane by means of belts or tapes. It is preferable in the present construction to eliminate such tapes and to substitute in place thereof a bridge which is illustrated in detail in Figure 3. The bridge 8 is adapted to span the space between the two forward rollers of the sheet rack when the rack is in extended position, in order that the leading edge of the sheet will not turn under the foremost roller 47. This bridge 8 is merely a flat piece of metal one end of which rests on the top of the second roller 47 from the left hand end of the rack in Figure 3. There is a yoke 11 extending downwardly from the plate or bridge 8, and this extends around the extreme left hand roller 47 and is secured thereto by means of a set screw. Preferably, there are several of these bridges or plates 8 arranged crosswise at intervals on the rollers 47. It may be preferable to provide brackets 13 on the upper side of each bridge plate 8, these brackets having an upstanding flange 12 which slightly overlaps the lower edge of the front stop 54 in order that the sheets may not pass under the latter. The brackets 13 are secured to the bridge 8 by means of screws 14 which engage in slots in the brackets 13 and secure these brackets to the plate 8.

The lower run of the drive chain 39 is attached to one of the hangers 48 at the point 1, but not to any of the other hangers on this half of the rack. The upper run of each chain 39 is connected, as shown at 3, with the hanger 49 of the right half of the sheet rack, but to no other hangers of this part of the rack.

Operation

When the pile table is in position to receive the sheets delivered from the press, the sheet

rack will be in retracted position, shown in Figure 6, at which time all of the hangers forming the left half of the device will lie close to each other upon the bars 33 and to the left of the pile table, as viewed in Figure 6. In this position, the tow chains 6 will hang down loosely from their points of connection with the several hangers. The hangers on the other half of the device will lie in close position upon the bars 33 and to the right of the pile table, as shown in Figure 6, so that the vertical space between the delivery carriage and the pile table is free, or clear, so that the sheets may fall from the delivery device onto the pile table. It will be understood that the pile table is gradually lowered as the sheets accumulate thereon, until it has reached a position on or near the floor, or until for some other reason it is desired to remove the pile table and its pile, and to replace the table with another one. When this operation is to be carried out, the hand crank 5 is turned clockwise in Figure 6, and this will cause the shaft 44 to be operated through the gears 42, 43 so that it revolves in a counter clockwise direction, viewing the parts as in Figure 3. The upper run of the chain 39 will travel to the left, and as the chain is connected, as above described, with a hanger 49 it will carry this hanger to the left from the position shown in Figure 6, until this hanger arrives at a point approximately intermediate the length of the sheet rack; whereupon the operation of the crank 5 will be discontinued. While the hanger 61 is thus moving to the left, it first separates from the next adjacent hanger 49 until the loop in the chain 7 has been taken up, whereupon the first hanger 49 will act through the chain 7 to tow the second hanger 49. When the movement continues further, the next loop in the chain 7 will be taken up, and then the third hanger of the group will begin to move. This operation continues until all of the hangers have been moved along the bars 33 to the position indicated in Figure 1, where they will lie in preferably equally spaced relation to each other. The supporting rollers 47 will, of course, move bodily with the respective hangers on which they are supported. While the crank 5 is being operated in the manner above described the lower run of the chain 39 is moving to the right as viewed in Figure 6, and as this chain is attached at 1 to one hanger 48 the operation of this chain in the manner above described will cause the hanger 48 to move to the right from the position shown in Figure 6, until this hanger reaches a point adjacent the center of the apparatus. While the right hand hanger 48 is thus moving to the right, the chain 6 will perform the same function regarding the hangers of this section or half of the rack as was performed by the chain 7 on the hangers 49. That is,

as the right hand hanger 48 moves to the right the first loop in the chain 6 is taken up, whereupon the next hanger 48 begins to move and then the second loop in the chain 6 is taken up, and the third hanger begins to move, etc. When the sections of the rack have thus been placed in extended or active position, as shown in Figure 3, the sheets delivered by the delivery carriage will fall upon the several rollers 47 which will support them over the pile table.

As the delivery carriage moves backwardly in the operation of delivering the sheets, there is a tendency for the forward edge of the sheet to bend downwardly, but this edge of the sheet is prevented from going below the plane of the rollers 47 by the bridges 8. The delivery device will continue to deliver the sheets upon the sheet rack while the filled pile table and its pile of sheets are being removed, and while another pile table is being placed into position under the sheet rack. When the new pile table has been positioned, the crank 5 will be turned counter clockwise in Figure 3, and this will cause the several sprockets 38, 36 to revolve, so that the chain 39 is moved. The upper run of this chain will then move to the right in Figure 3 and the lower run will move toward the left. By reason of the engagement of the upper run with one of the hangers 49 at the point 3, this hanger will be moved to the right along the rod 33 until it comes up against the next hanger, whereupon that hanger will be moved by the first one, etc., until all of the hangers of this half of the rack are folded or collapsed to the position shown in Figure 6. At the same time that this is taking place, the lower run of the chain 39, by reason of its connection with the hanger 48 at the point 1, will move this hanger to the left on the rod 33. This hanger will strike against the second hanger 48 whereupon the latter will begin to move with the first hanger, and this action will be continued until all of the hangers of this half of the rack are collapsed to the position shown in Figure 6. The entire sheet rack will now be withdrawn or collapsed as shown. While the rack is being retracted, as shown in Figure 5, support of the temporary pile 57 is gradually withdrawn from the center, so that this portion begins to sag, and as the support is withdrawn simultaneously from opposite sides of the middle of the pile, any tendency of the sheets to follow one-half of the rack is offset by the tendency to follow the other half of the rack, which latter is moving in a reverse direction. As a result, the temporary pile of sheets is not displaced in the direction of their length. As in the above mentioned co-pending application, the rollers 47 revolve freely, so that in the operation of withdrawing the rack from the support of the temporary pile, these rollers revolve freely, so

that the rack withdraws with a minimum of friction on the sheets.

Having described my invention, what I claim is:

moving the members of different sections in opposite directions to deliver the sheets upon said pile table.

9. The combination of a press, a pile table thereon, tracks, a sheet rack consisting of divided sections, slidable on said tracks, each section consisting of members movable above said table and spacing connections between the movable members of each section.

10. The combination of a frame, a pile table, tracks, and a rack for temporarily receiving sheets above the table, said rack comprising a plurality of sections slidable on said tracks, each having members for supporting the sheets and adapted to be collapsed to disengage the sheets accumulated thereon for delivery upon said pile table, and means for moving said sections in opposite directions to collapse said rack.

11. The combination of a frame, a pile table, tracks, and a rack for temporarily receiving sheets above said table, said rack comprising a plurality of sections slidable on said tracks and each having members for supporting the sheets and adapted to be collapsed to disengage the sheets accumulated thereon for delivery upon said pile table, and means for moving said sections in opposite directions from a point intermediate the ends of said sheets to collapse the rack.

12. The combination of a frame, a pile table and a rack for temporarily receiving sheets above the table, said rack including revolvable members for supporting the sheets adapted to roll from under the sheets piled thereon, said rack being composed of a plurality of sections, and means for moving said sections in opposite directions to collapse said rack.

13. The combination of a frame, a pile table, tracks, members movable along said tracks and comprising sections adapted to move in opposite directions into extended and collapsed positions, and means for moving said sections in opposite directions from a point intermediate the ends of the tracks.

14. The combination of a frame, a pile table, tracks, a collapsible sheet rack consisting of divided sections, each section consisting of members movable along said tracks and adapted to support sheets above said pile table, and collapsible spacing connections between the movable members of each of said sections.

15. The combination of a frame, a pile table, tracks, a collapsible sheet rack consisting of divided sections each section consisting of members movable along said tracks and adapted to support sheets above said pile table, collapsible spacing connections between the movable members of each of said sections, and means for simultaneously moving the members of different sections in opposite directions to deliver the sheets upon said table.

1. The combination of a press, a pile table for receiving sheets from said press, tracks, and a rack for temporarily receiving the sheets above said pile table, said rack comprising a plurality of sections slidable on said tracks and adapted to be retracted in opposite directions to deliver the sheets accumulated thereon upon said pile table.

2. The combination of a press, a pile table for receiving sheets from said press, tracks, and a normally inactive rack slidable on said tracks and adapted to be extended from opposite directions into sheet receiving position for temporarily receiving the sheets above said pile table.

3. The combination of a press, a pile table for receiving sheets from said press, tracks, and a plurality of rack members slidable on said tracks and normally located out of the vertical path of the sheets, said rack members being adapted to be slid inwardly from opposite sides of the path of the sheets for temporarily receiving the sheets above said pile table.

4. The combination of a frame, a pile table thereon, tracks, members slidable along said tracks and comprising sections adapted to move in opposite directions into extended and collapsed positions, and means for moving said sections from opposite ends of the tracks into extended position.

5. The combination of a frame, a pile table thereon, tracks and a rack for temporarily receiving sheets above the table, said rack being slidable on said tracks and being separable at a point intermediate its ends for the purpose of discharging the sheets accumulated thereon and means for separating said sections.

6. The combination of a frame, a pile table thereon, tracks, and a rack slidable along said tracks, for temporarily receiving sheets above the table, said rack comprising a plurality of sections normally inactive and located out of the vertical path of the sheets, said sections being adapted to be extended from opposite sides of the sheet into sheet receiving position, and means for operating said sections.

7. The combination of a press, a pile table thereon, tracks and a sheet rack slidable on said tracks and consisting of members movable in opposite directions over said pile table and adapted to support sheets above said pile table and spacing connections between said slidable members.

8. The combination of a frame, a pile table thereon, tracks, a collapsible sheet rack consisting of divided sections, each section consisting of members movable along said tracks and adapted to support sheets above said pile table, and means for simultaneously

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16. The combination of a frame, a pile table and a rack for temporarily receiving sheets above the table, said rack comprising a plurality of collapsible sections, each having members for supporting the sheets, and means for moving said sections in opposite directions, comprising endless members engaging around revolvable means to form a plurality of oppositely moving runs, each of which runs is connected with different sections of said rack. 70
17. The combination of a frame, a pile table and a rack for temporarily receiving sheets above the table comprising tracks, members movable along said tracks in opposite directions from a point intermediate the ends of the sheets, revolvable means arranged adjacent the opposite ends of said movable rack and endless members engaging around said revolvable members to form oppositely moving runs, said runs being connected with said rack so as to move the sections thereof in opposite directions. 75
18. The combination of a frame, a pile table and a rack for temporarily receiving sheets above the table comprising tracks, members movable along said tracks and comprising rack sections adapted to divide at a point intermediate the ends of the sheets, collapsible spacing members connected between the sliding members of each of said rack sections, revolvable members arranged adjacent opposite ends of said rack, and an endless member engaging said revolvable members, the opposite runs of said endless members being connected with said movable rack members whereby the rack sections will be collapsed and extended simultaneously in opposite directions. 80
19. The combination of a press, a pile support, a movable sheet rack for receiving sheets over said pile support and composed of members which are spaced apart when in sheet receiving position, and means carried by one of said sheet supports and bridging the space between adjacent supports. 85
20. The combination of a press, a pile support, a movable sheet rack for receiving sheets over said support and comprising members arranged in spaced relation when in sheet receiving position, means carried by one of said supporting members and adapted to project over an adjacent supporting member to bridge the gap between adjacent supporting members. 90
21. The combination of a press, a pile support and a movable sheet rack for receiving sheets over said pile support, said rack comprising supporting members adapted to be extended in open spaced relation and to be collapsed towards each other, and a bridge carried by one of said supporting members and extending over an adjacent supporting member to bridge the gap between said supporting members when the rack is in extended position, said second supporting member being adapted to move toward and from said first supporting member below said bridge member. 95
22. The combination of a press, a pile support for receiving sheets, a sheet rack for temporarily receiving sheets over said pile support and adapted to be moved into and out of sheet receiving position, said rack comprising supporting members adapted to be collapsed toward each other, a bridge carried by one of said supporting members and adapted to bridge the space between adjacent supporting members, a front stop for sheets disposed over said bridge and means on said bridge co-operating with said front stop to prevent the edge of the sheet passing under the front stop. 100
- Signed at the city of New London, county of New London, and State of Connecticut, the 19th day of March, 1928. 105
- FRED S. ENGLISH. 110
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