G. J. DANIELL.

TURNOVER MECHANISM.

APPLICATION FILED APR. 22, 1921.

1,429,327. Patented Sept. 19, 1922.

3 SHEETS—SHEET 1.

Fig. 1.

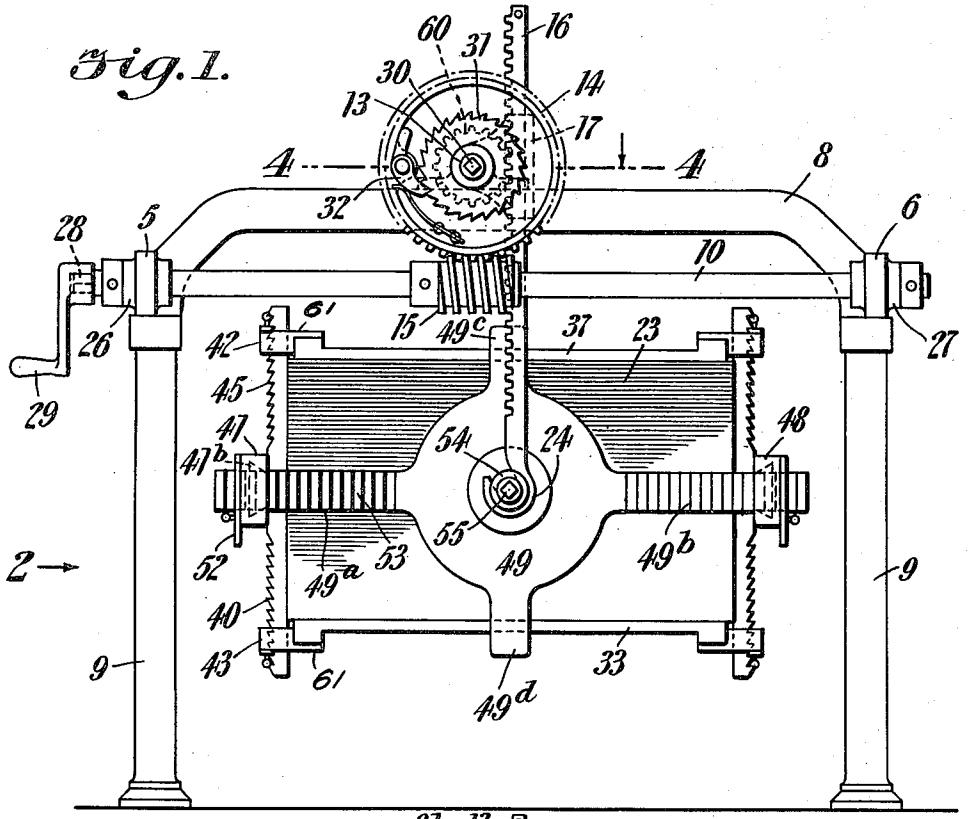
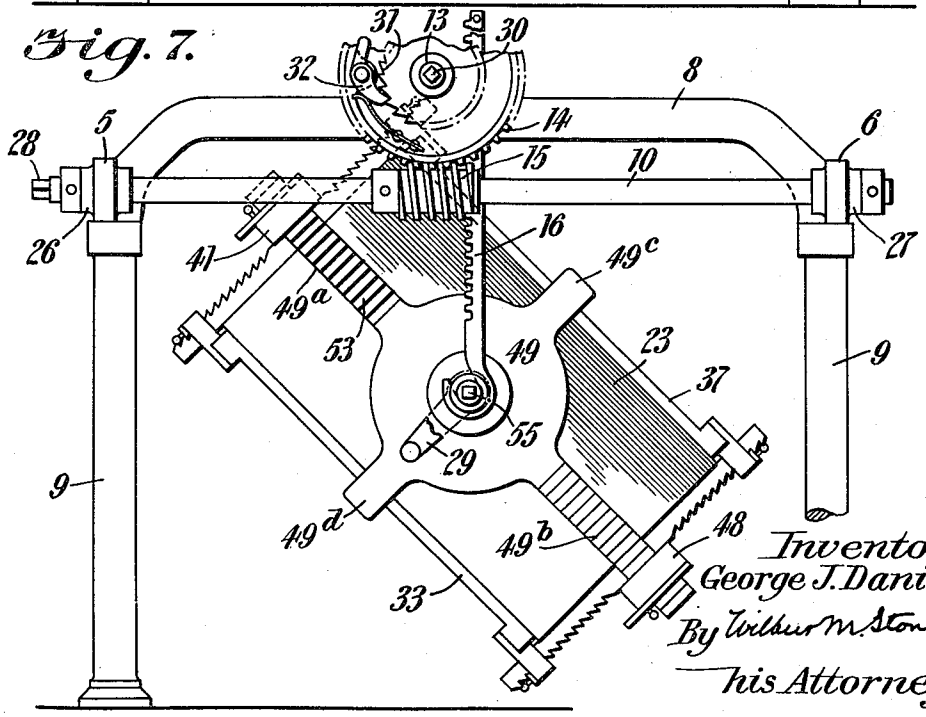


Fig. 7.



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3 SHEETS—SHEET 2.

Fig. 2.

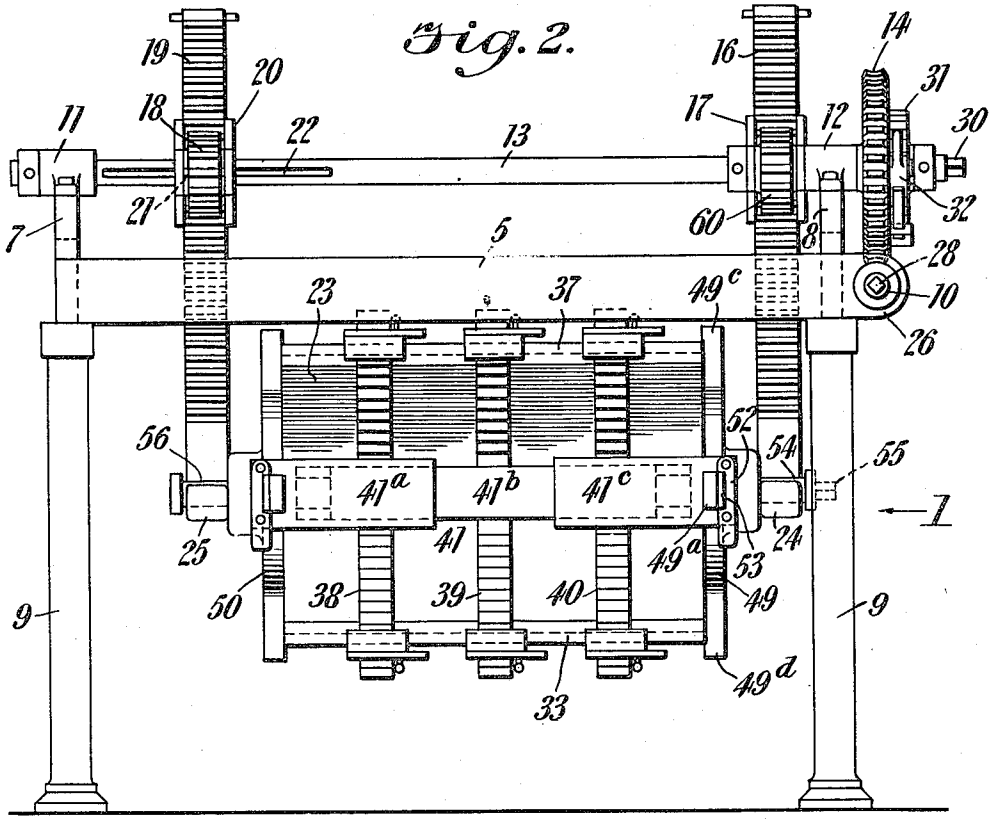
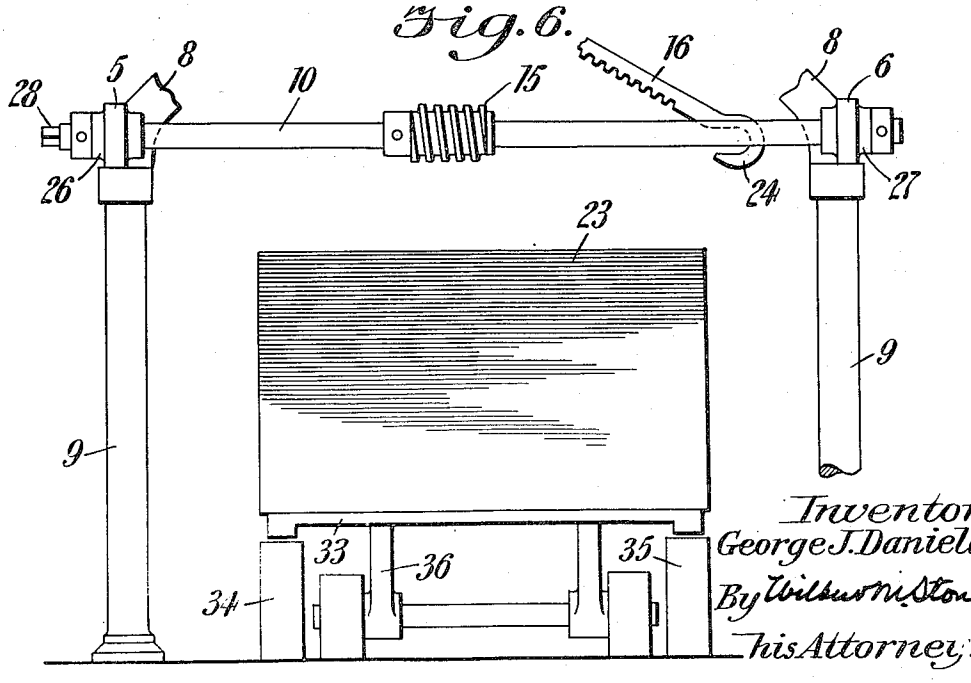


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 3.

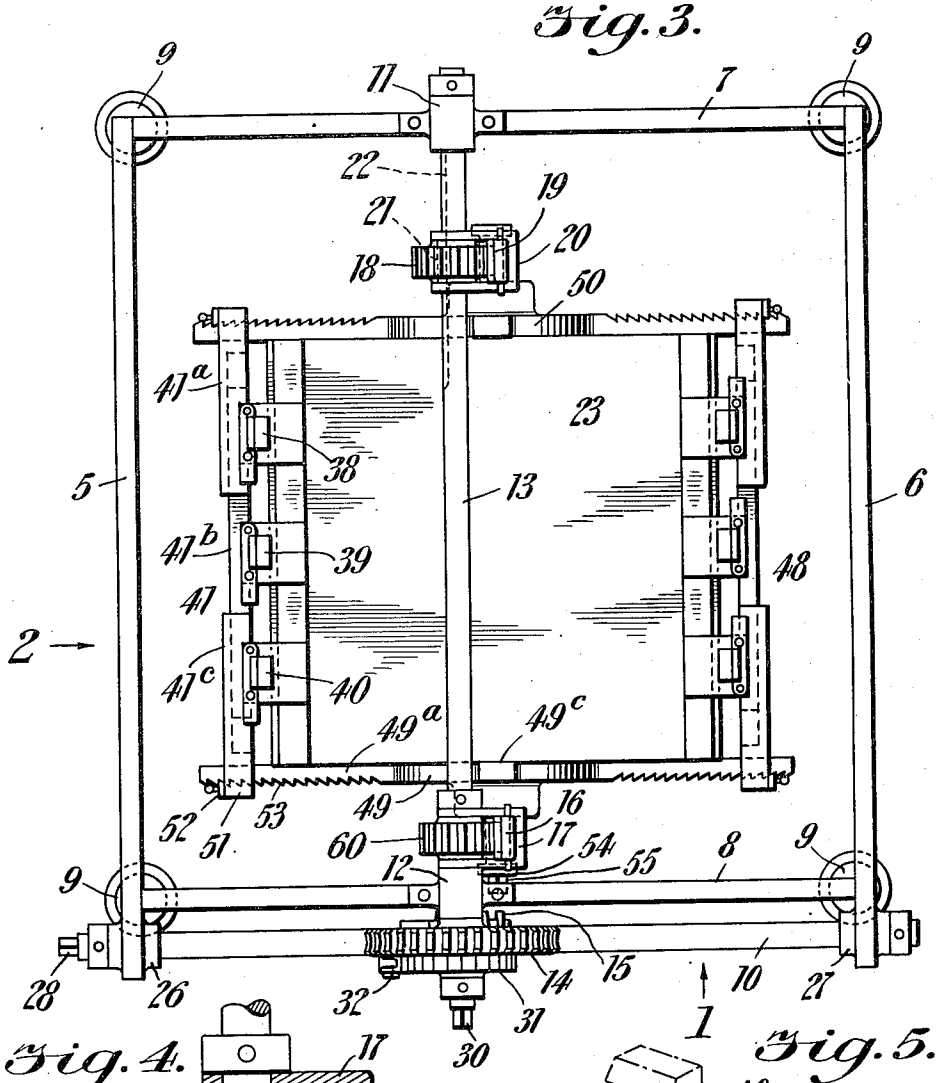


Fig. 4.

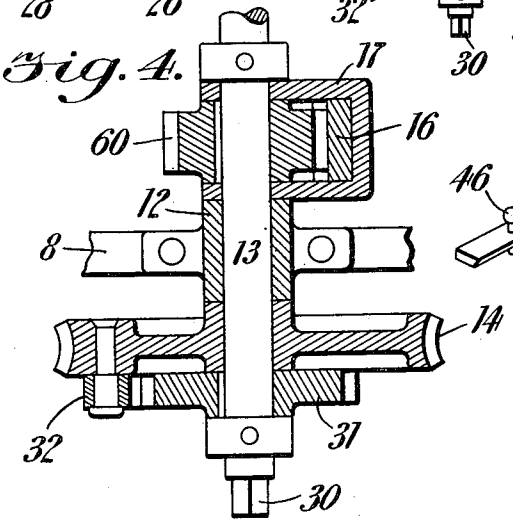
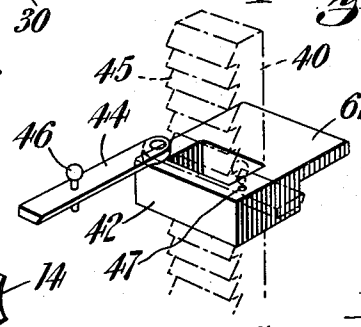


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE J. DANIELL, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO JOSEPH F. STEWART, OF NEW YORK, N. Y.

TURNOVER MECHANISM.

Application filed April 22, 1921. Serial No. 463,470.

To all whom it may concern:

Be it known that I, GEORGE J. DANIELL, a citizen of the United States, and a resident of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Turnover Mechanisms, of which the following is a specification.

This invention relates to turn-over mechanisms for stacks of paper or other sheet material and has for its object to provide a device of the class specified simple in construction, efficient in operation and adjustable for a variety of sizes of sheets and for a variety of heights of stacks.

With these ends in view and others which which will appear hereinafter my improved device comprises features illustrated in their preferred embodiment in the drawings accompanying this specification, wherein:—

Figure 1 is an end elevation, looking in the direction of arrow 1, Figs. 2 and 3, of a mechanism embodying my improvements. Fig. 2 is a front elevation, looking in the direction of arrow 2 of Figs. 1 and 3, and corresponding therewith. Fig. 3 is a plan view of what is shown in Figs. 1 and 2. Fig. 4 is an enlarged detail sectional plan view on line 4, 4 of Fig. 1. Fig. 5 is an enlarged perspective view of a detail of the mechanism. Fig. 6 is a fragmentary elevation similar to Fig. 1 illustrating a stack of sheets ready to be operated upon by my device. Fig. 7 is an elevation, similar to that of Fig. 1, showing a stack of sheets being turned over. All the figures, except Figs. 4 and 5, are to one scale, Figures 4 and 5 being each to a larger scale.

My improved device is particularly adapted for use in printing plants where, after the sheets have been printed on one side, it is desirable to turn the pile thereof over with the unprinted faces up for printing on the second face. The operative parts of the mechanism may be mounted on some suitable structure, such as rails 5, 6, 7, 8, arranged in rectangular form and supported at the corners by legs 9. These legs are of sufficient length to support rails 5, 6, 7, 8 at a height above the floor sufficient to admit a truck load of sheets under worm-shaft 10 without interference. Supported for rotation in bearings 11 and 12 on opposite rails 7, 8, respectively, is rack elevating shaft 13. Turning loosely on said shaft near one outboard end thereof and directly above shaft 10 is worm-gear 14 in engagement with worm 15 fixed to shaft 10. Fixed to shaft 13 is pinion 60 for engagement with rack 16, said rack being held in position relatively to pinion 60 by yoke 17 in the ears of which shaft 13 turns freely. Similarly pinion 18, rack 19 and yoke 20 are mounted upon shaft 13 near its other end, and said pinion is constrained to rotate with shaft 13 by key 21 fast in said pinion and slidable in keyseat 22 in said shaft. By this means pinion 18, rack 19 and yoke 20 may be moved endwise said shaft to accommodate various widths of sheets in pile 23. Also the peculiar mounting of yokes 17 and 20 on shaft 13 permit the swinging thereof with their respective racks about the axis of said shaft, whereby said racks may be swung as required out of the path of an incoming or outgoing truckload of sheets. Racks 16 and 19 are provided at their lower ends with hooks 24, 25, respectively, for purposes which will appear hereinafter.

Worm-shaft 10 is mounted for rotation in bearings 26 and 27 in overhanging portions of rails 5 and 6, respectively, and said shaft is squared at 28 on one end thereof for the reception of hand-crank 29. Shaft 13 is similarly squared at 30 for the same or a similar crank. For permitting shaft 13 to be rotated in anti-clockwise direction, Fig. 1, by means of crank 29 when applied to squared end 30, independently of worm-gear 14 and worm 15, ratchet 31 fixed to said shaft 13 is provided. For causing that ratchet 31 and shaft 13 to be rotated in anti-clockwise direction, Fig. 1, by a crank applied to squared end 28 of worm-shaft 10, worm-gear 14 is provided with spring-urged pawl 32 for engagement with ratchet 31. Shaft 13 may be rotated in clockwise direction to quickly lower racks 16 and 19 by throwing pawl 32 out of engagement with ratchet 31.

For securing the stack of sheets 23 in compact form suitable to be operated upon by my improved device, the following means are provided: The usual base board 33, suitable to sustain the weight of the stack, may be supported on corner posts, as 34, 35, of sufficient height from the floor to permit the delivery of said board thereover by collapsible truck 36 of known character. A similar board 37 is placed on top of the

stack and the two boards 33, 37 are clamped together, with the stack of sheets therebetween, by the following means: A plurality of side-clamps, preferably three, as 38, 39 and 40, on each side of said stack are fixed midway their height to a horizontal carrier, indicated in a general way by 41. As said side-clamps are all of the same general character a description of one will suffice for all. Clamp 40 is provided with opposite clamp-dogs 42, 43 slidably mounted thereon, and each dog is provided with means for securely engaging said side-clamp in any desired position lengthwise said side-clamp. One such means, and which may be the preferred one, comprises latch 44 pivotally mounted on dog 42 and adapted to engage one or more teeth 45 cut in side-clamp 40. Latch 44 may be secured in engaging position with side-clamp 40 by some suitable means such as lock-pin 46 thrust through a suitable hole in latch 44 and into hole 47 in dog 42. Said dogs, as 42, have lips 61 for engagement with boards 33, 37. For permitting the adjustment of the side-clamps lengthwise carrier 41 to accommodate different sized sheets, said carrier is preferably made up of telescoping sections 41^a, 41^b and 41^c, the mid-section 41^b having its opposite ends slidably mounted in end sections 41^a and 41^c, respectively.

For engagement with the opposite ends of carrier 41, and opposite carrier 48 trunnion-frames 49, 50 are provided. Said trunnion-frames are alike and a description of one will suffice for both. Carriers 41, 48 are provided at their opposite ends with sockets, as 51 to carrier 41, through which slide arms, as 49^a of trunnion-frame 49. Said socket 51 has latch 52 for engagement with teeth 53 cut in arm 49^a of frame 49, all similar to the locking means described in connection with clamp-dog 42 and side-clamp 40. This arrangement permits the adjustment of carriers 41, 48 toward and from each other so that the side-clamps as 38, 39, 40, may be brought into close contact with stacks of sheets of different sizes, and those carriers clamped securely relatively to trunnion frames 49, 50. Said trunnion-frames are each preferably made with a center disc-like portion from which extend short arms as 49^c and 49^d at right angles to arms 49^a and 49^b, respectively, of frame 49, and from the center of said disc-like portion of frame 49 projects outwardly trunnion 54 having squared end 55. Said disc-like center and arms, as 49^c and 49^d, are efficient for resting against the stack of sheets and the edges of boards 33, 37 to assist in holding the stack intact. Trunnion frame 50 is similarly provided with trunnion 56 similar to trunnion 55 of frame 49, except that the squared end may be omitted.

The operation of my improved device is as follows: One of the racks, as 16, is swung from its vertical position to approximately horizontal position, Fig. 6, and a truck load of sheets is backed in, board 33 is lowered to rest on the corner posts, as 34, 35, and the truck withdrawn. The top-board 37 is then placed on top of the pile and rack 16 swung again into vertical position. Then trunnion-frames 49 and 50 are assembled with their trunnions in hooks 24, 25 of racks 16 and 19, respectively. Arms, as 49^a and 49^b, are then arranged approximately horizontally and shaft 10 is turned to raise or lower, through worm 15, worm-gear 14, pinions 60, 18, and racks 16, 19, said trunnions 54, 56, respectively, until those trunnions are about midway vertically of stack 23. If trunnion-frame 50 is remote from the stack, pinion 18, yoke 20 and rack 19 may be moved along shaft 13, to bring said frame 50 into suitable contact with the stack.

Then one of horizontal-carriers 41, 48 is assembled on its corresponding arms of the trunnion-frames, the telescopic portions being adjusted as needed therefor, and mid-portion, as 41^b, is set midway its corresponding end portions. Side-clamp dogs, as 42, 43, are then adjusted with their lips, as 61, in engagement with boards 33, 37, and their respective latches closed to engage the teeth of the side-clamps. The opposite horizontal carrier is then assembled on its corresponding arms of the trunnion-frames, already described in connection with the first carrier. Then the latches of the horizontal carriers are locked into engagement with the corresponding teeth of the horizonal arms of the trunnion-frames, as latch 52 with the teeth of arm 49^a, whereby the whole device is locked up on the stack of sheets. Then by turning shaft 13 if the load is light, or by turning shaft 28 if the load is heavy, the stack is lifted from the posts, as 34, 35, and the posts removed. Then by applying the crank to the squared end 55 of trunnion 54, the stack may be swung on the trunnions, see Fig. 7, and the load reversed. Posts as 34, 35, are then restored to position and the reversed stack lowered onto them. The clamping devices may then me stripped off, the truck brought into position and the stack removed.

I claim:

1. In turn-over mechanism for a stack of sheets the combination of means for clamping together the stack of sheets, trunnions on said clamping-together means, means for rotatably supporting said trunnions whereby the stack may be turned over, and means for raising and lowering said trunnion supporting means.

2. In turn-over mechanism for a stack of sheets the combination of means for clamping together the stack of sheets, trun-

nions on said clamping-together means, a supporting frame, means on said supporting frame for engagement with said trunnions, and means for elevating in said supporting frame said trunnion engaging means, whereby said stack of sheets may be turned over on said trunnions.

3. In turn-over mechanism for a stack of sheets the combination of top and bottom boards for said stack, means for clamping said stack between said boards, trunnions on said stack clamping means, a supporting frame, means on said supporting frame for engagement with said trunnions, and means for elevating in said supporting frame said trunnion engaging means, whereby said stack of sheets may be turned over on said trunnions.

4. In turn-over mechanism for a stack of sheets, the combination of top and bottom boards for said stack, means for clamping said stack between said boards comprising a plurality of clamps on each of two opposite sides of said stack, a clamp carrier extending lengthwise each set of plurality of clamps for supporting said clamps, opposite trunnion frames connected with opposite ends respectively of said clamp-carriers, each trunnion frame having a trunnion thereon, a supporting frame, means on said supporting frame for engagement with said trunnions, and means for elevating in said supporting frame said trunnion engaging means, whereby said stack of sheets may be turned over on said trunnions.

5. In turn-over mechanism for a stack of sheets the combination of a pair of opposite trunnion frames, a trunnion on each trunnion frame, a pair of opposite clamp carriers supported by said trunnion frames, a plurality of clamps adjustably mounted on each clamp carrier, a pair of opposite clamp dogs adjustably mounted on each clamp, a supporting frame, means on said supporting frame for engagement with said trunnions, and means for elevating in said supporting frame said trunnion engaging means, whereby said stack of sheets may be turned over on said trunnions.

6. In turn-over mechanism for a stack of sheets the combination of a pair of opposite trunnion frames, a trunnion on each trunnion frame, a pair of opposite clamp carriers comprising a plurality of telescopic members supported by said trunnion frames, a clamp carried by each telescopic member, and a pair of opposite clamp dogs adjustably mounted on each clamp.

7. In turn-over mechanism for a stack of sheets the combination of a pair of opposite trunnion frames, a trunnion on each trunnion frame, a pair of opposite clamp carriers comprising a plurality of telescopic members supported by said trunnion frames, a clamp carried by each telescopic member, a pair of opposite clamp dogs adjustably mounted on each clamp, a supporting frame, means on said supporting frame for engagement with said trunnions, and means for elevating in said supporting frame said trunnion engaging means, whereby said stack of sheets may be turned over on said trunnions.

8. In turn-over mechanism for a stack of sheets the combination of means for clamping together a stack of sheets, trunnions on said clamping-together means, a supporting frame, a worm shaft and a rack-elevating shaft, a worm fixed to said worm shaft for engagement with a worm-gear carried by said rack-elevating shaft, means for rotating said worm gear from said rack-elevating shaft, a pair of racks having trunnion-engaging hooks thereon, and means connected with said rack-elevating shaft for elevating said racks.

9. In turn-over mechanism for a stack of sheets the combination of means for clamping together a stack of sheets, trunnions on said clamping-together means, a supporting frame, a worm shaft and a rack-elevating shaft rotatably mounted on said frame, a worm fixed to said worm shaft for engagement with a worm-gear carried by said rack-elevating shaft, a ratchet fixed to said rack-elevating shaft adjacent said worm-gear, a pawl carried by said worm-gear for engaging said ratchet, a pair of racks having trunnion engaging hooks thereon, and means connected with said rack-elevating shaft for elevating said racks.

10. In turn-over mechanism for a stack of sheets the combination of a pair of opposite trunnion frames, a trunnion on each trunnion frame, a pair of opposite clamp carriers comprising a plurality of telescopic members supported by said trunnion frames, a clamp carried by each telescopic member, a pair of opposite clamp dogs adjustably mounted on each clamp, a worm shaft and a rack-elevating shaft rotatably mounted on said frame, a worm fixed to said worm shaft for engagement with a worm-gear carried by said rack-elevating shaft, means for rotating said worm gear from said rack-elevating shaft, a ratchet fixed to said rack-elevating shaft adjacent said worm-gear, a pawl carried by said worm-gear for engaging said ratchet, a pair of racks having trunnion engaging hooks thereon, and means connected with said rack-elevating shaft for elevating said racks.

11. In turn-over mechanism for a stack of sheets the combination of a pair of opposite trunnion frames, a trunnion on each trunnion frame, a supporting frame, means carried by said trunnion frames for clamping together a stack of sheets, a worm shaft and a rack-elevating shaft rotatably mounted on said frame, a worm fixed to said worm

shaft for engagement with a worm-gear carried by said rack-elevating shaft, means for rotating said worm gear from said rack-elevating shaft, a pair of racks having trunnion engaging hooks thereon, means connected with said rack-elevating shaft for elevating said racks, a pair of rack-elevating pinions carried by said rack-elevating shaft and rotatable therewith, and means for holding said racks in engagement with said pinions while permitting said racks to be swung about the axis of said rack-elevating shaft.

In witness whereof, I hereby affix my signature this 21st day of April, 1921.

GEORGE J. DANIELL.