F. B. DAVIDSON.

SHEET FEEDING DEVICE.

APPLICATION FILED JULY 13, 1908.

928,637.

Patented July 20, 1909.

6 SHEETS—SHEET 1.

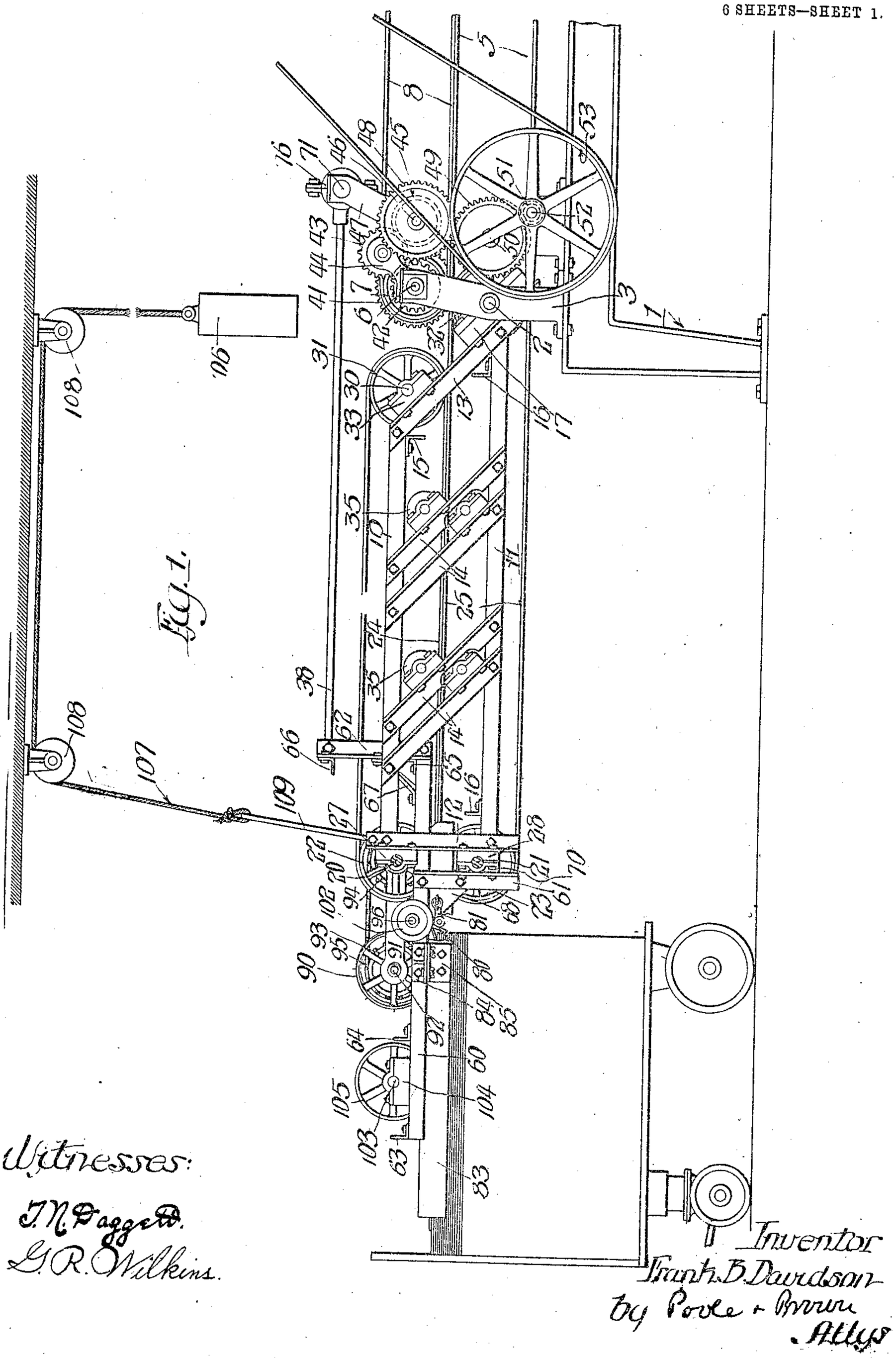

Fig. 1.

Witnesses:

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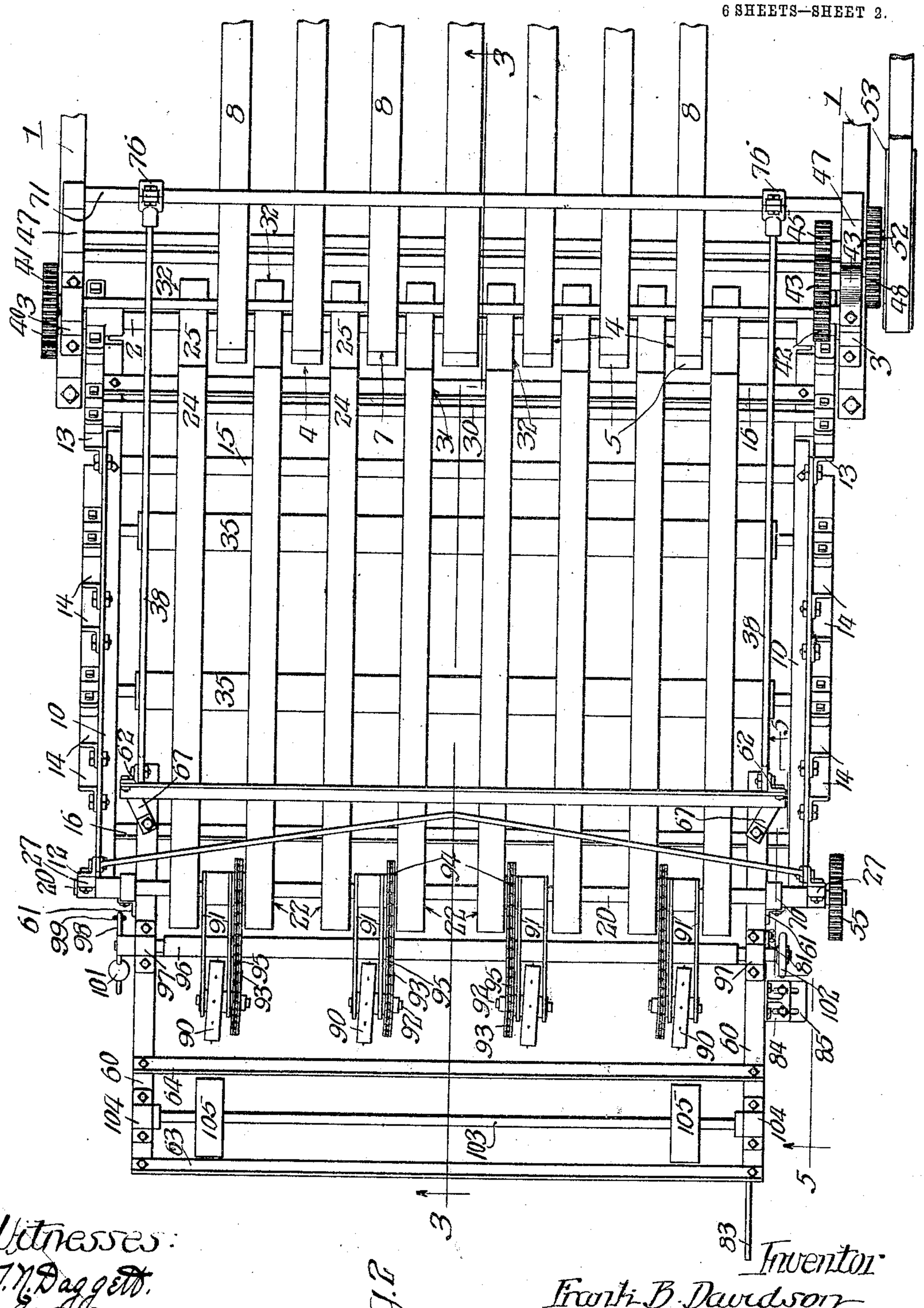

Witnesses:
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Fig. 2

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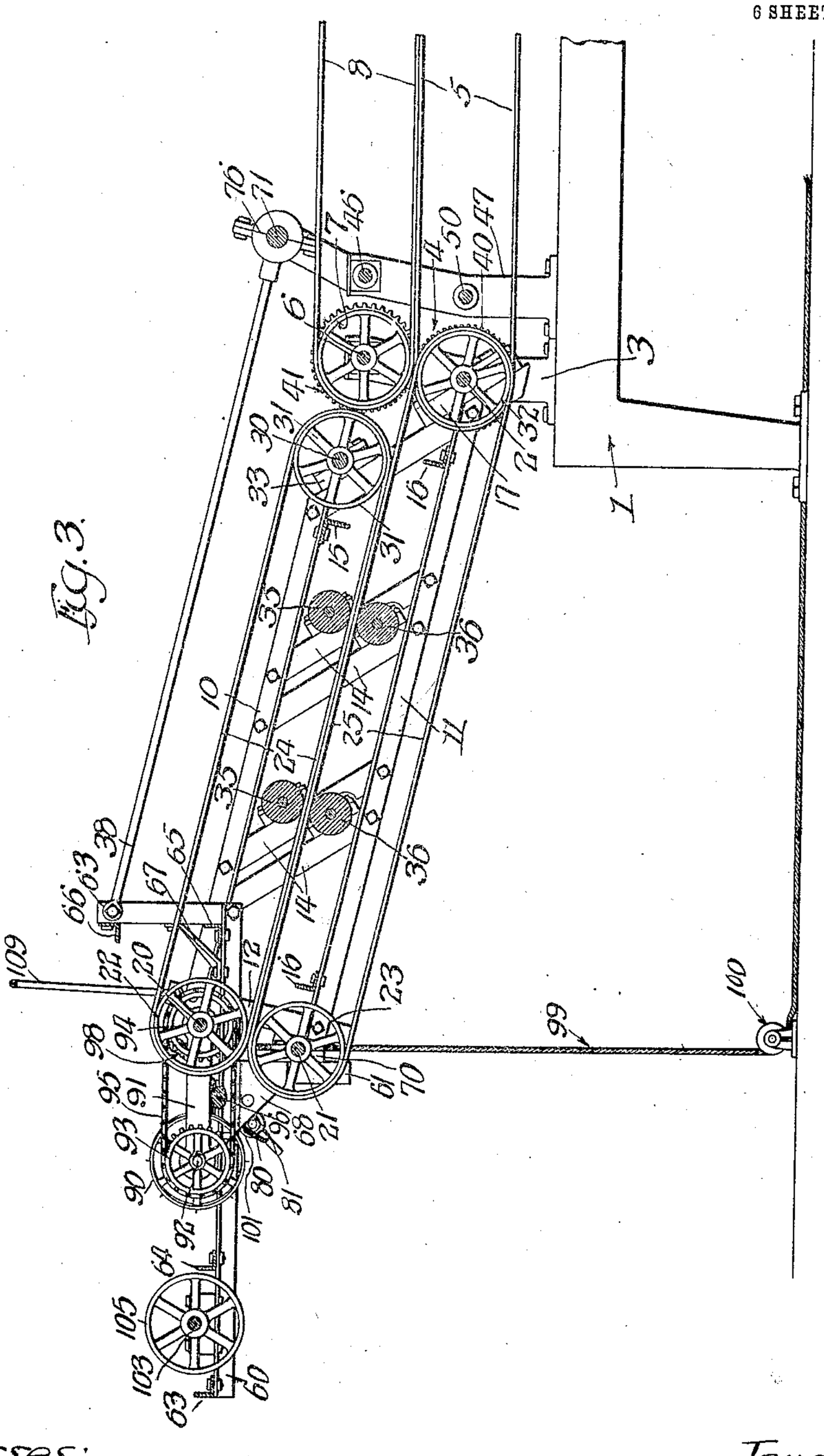
6 SHEETS—SHEET 3.

Fig. 3.



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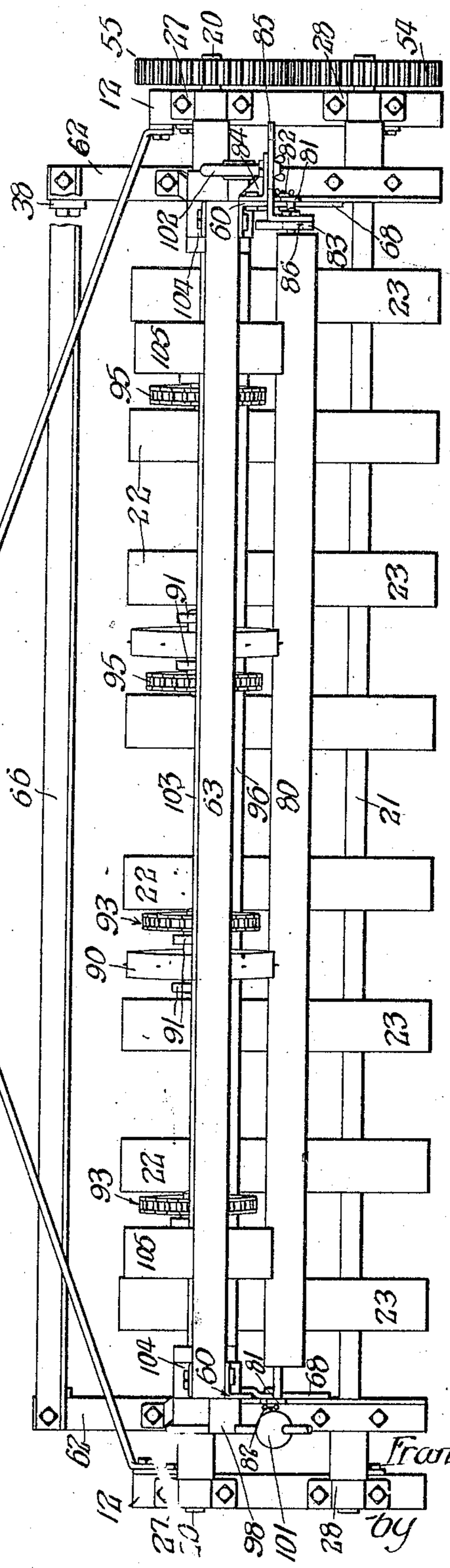

Fig. 4.

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6 SHEETS—SHEET 5.

Fig. 5.

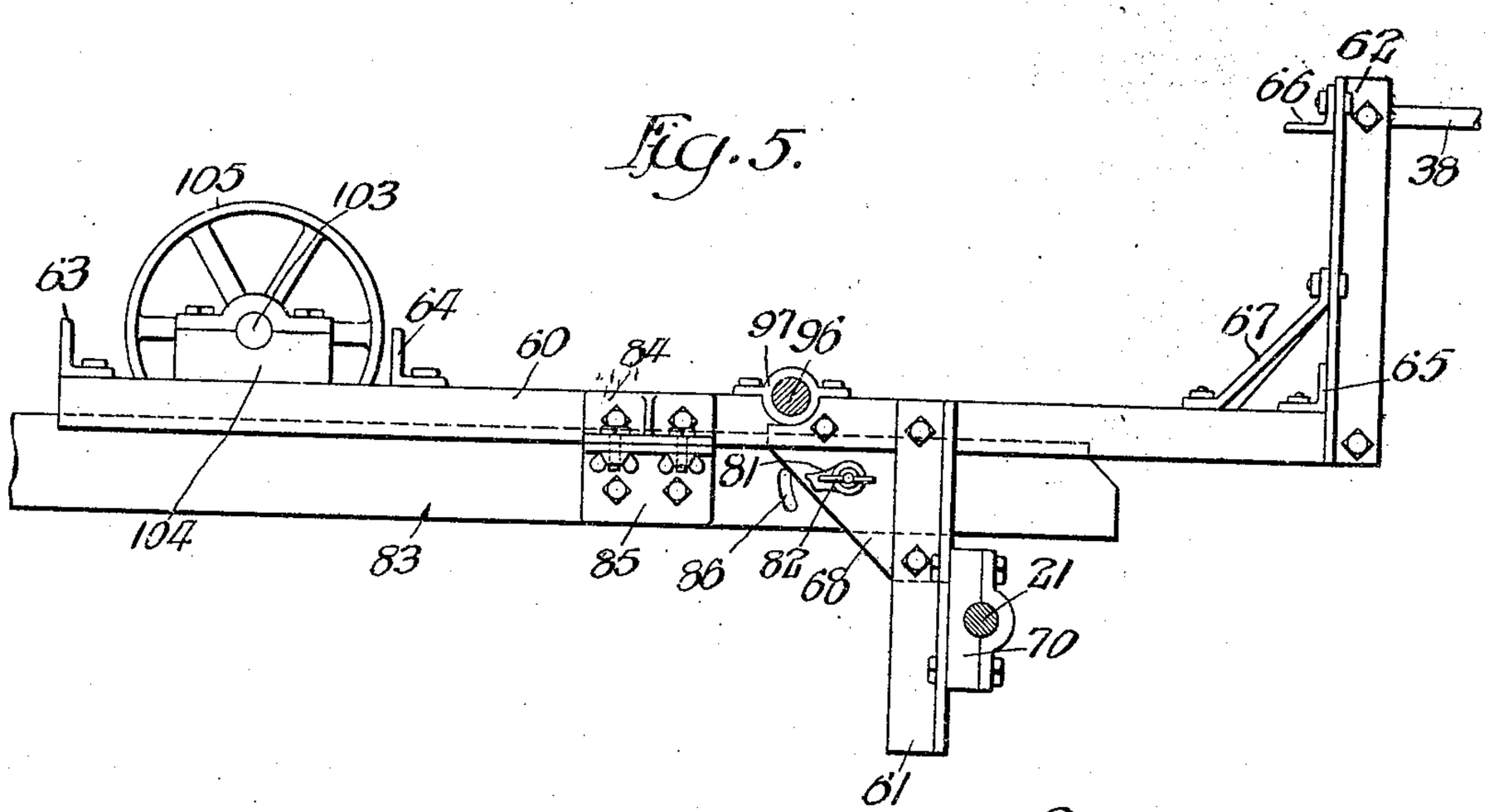


Fig. 9.

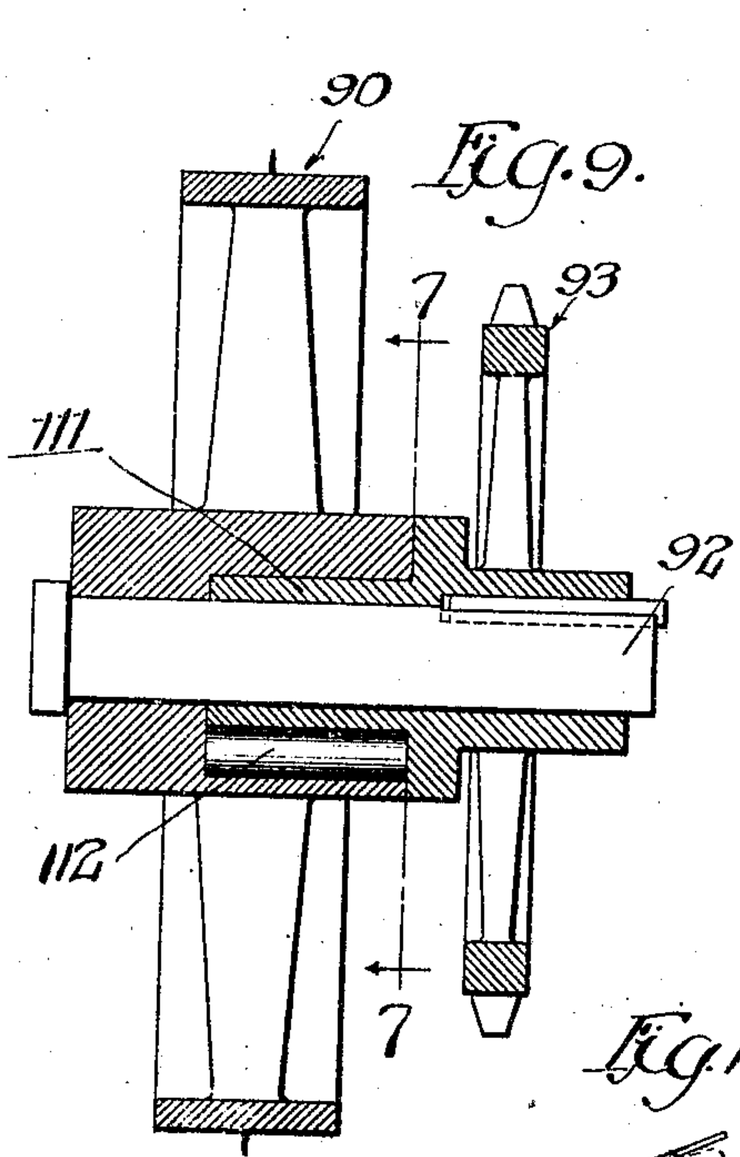


Fig. 8.

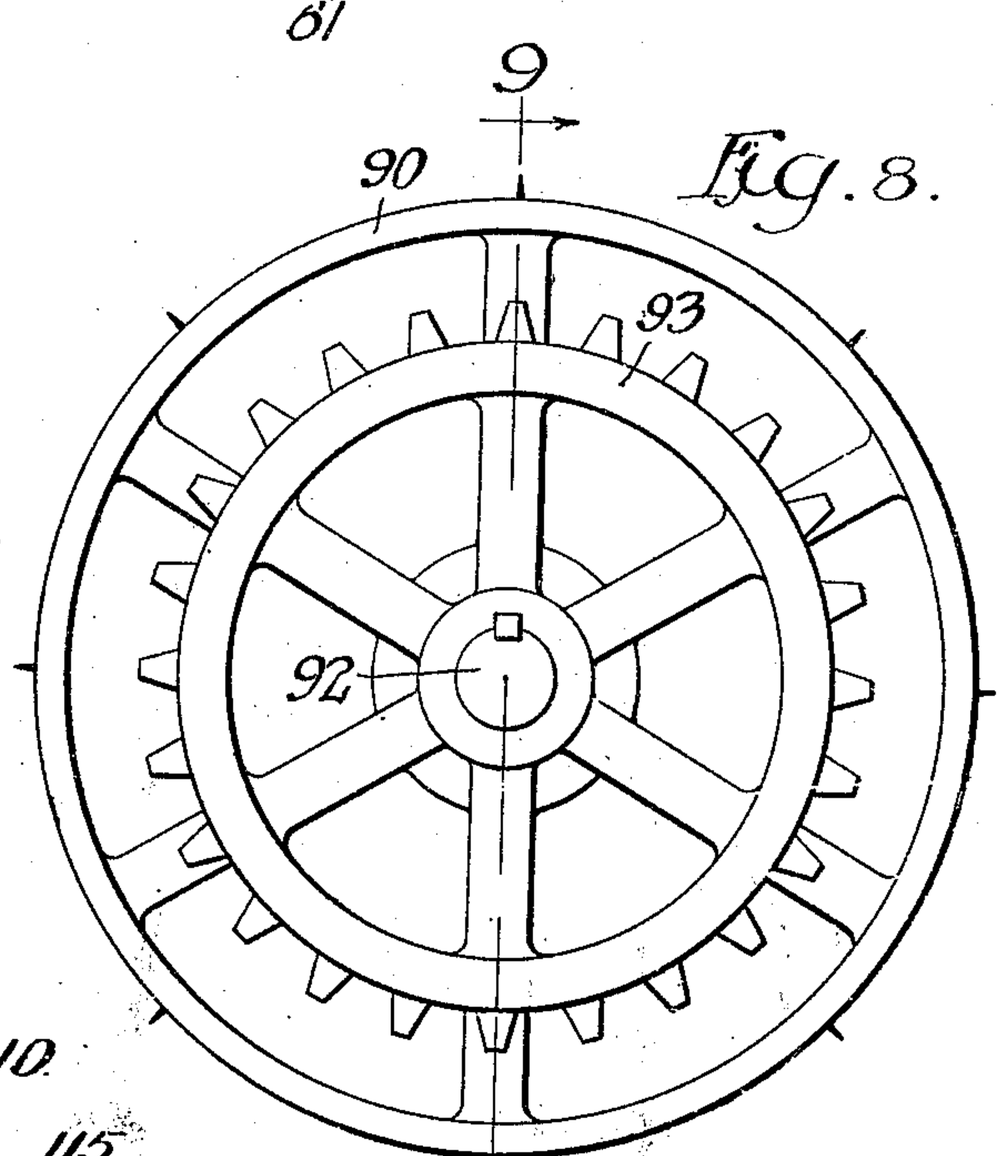
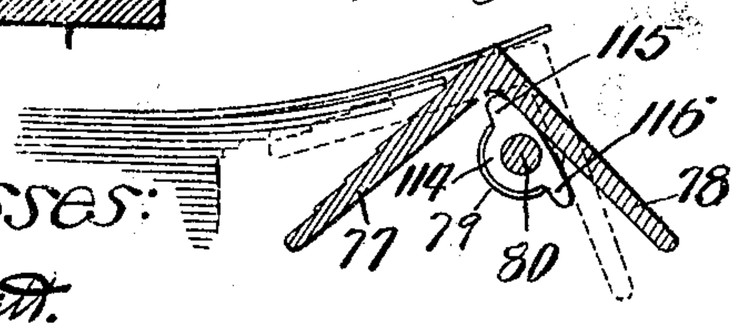


Fig. 10.



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6 SHEETS—SHEET 6.

Fig. 7.

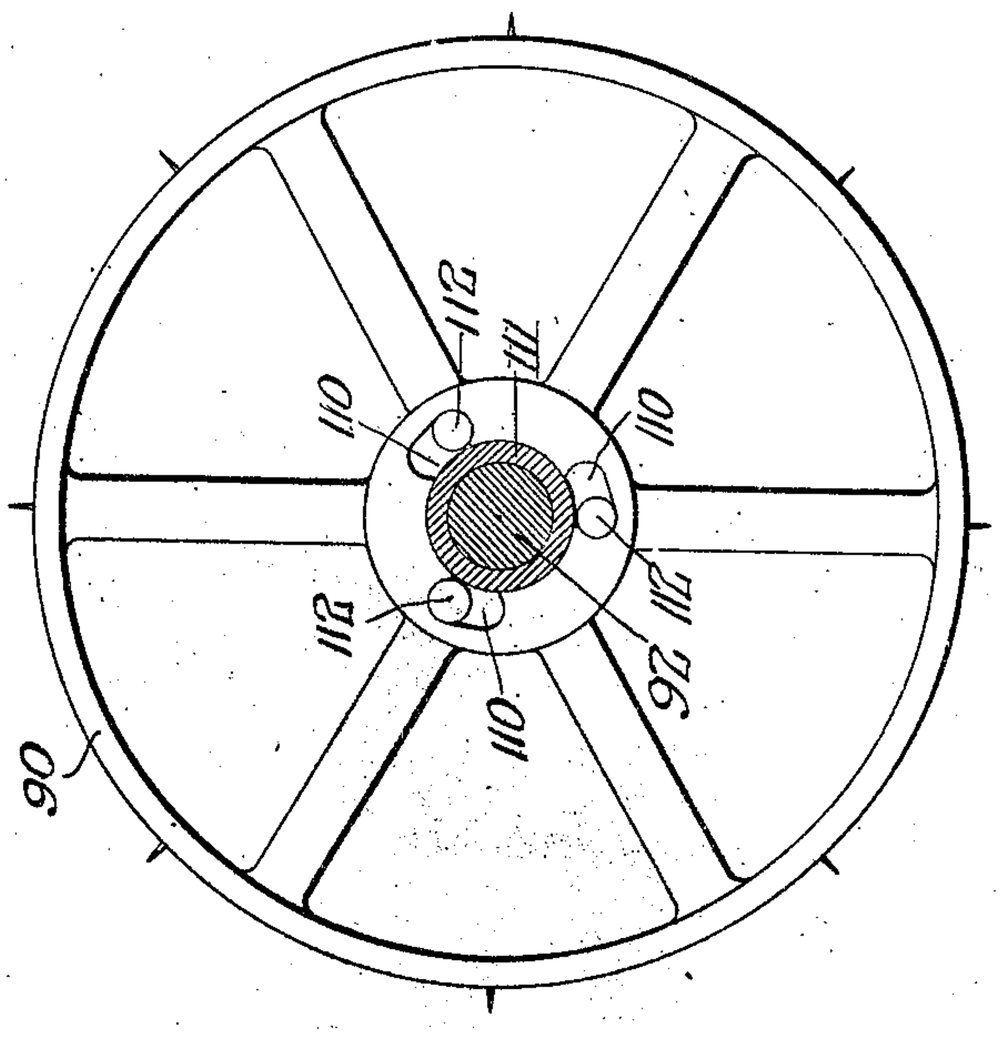
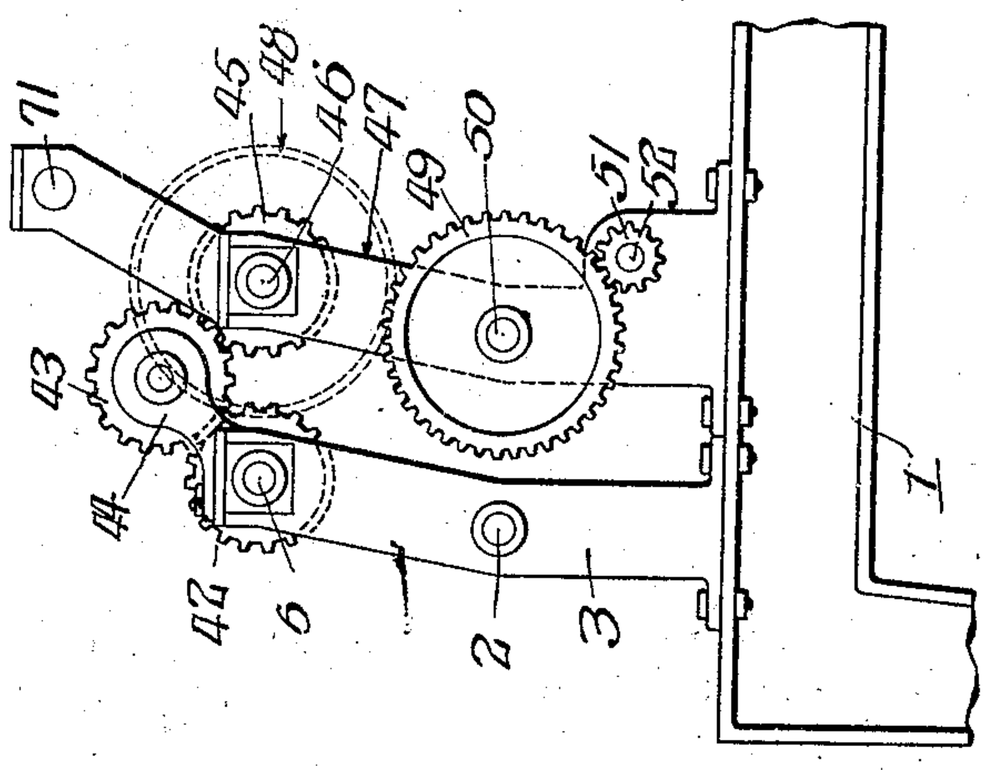


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SHEET-FEEDING DEVICE.

No. 928,637. Specification of Letters Patent. Patented July 20, 1909.

Application filed July 13, 1908. Serial No. 443,314.

To all whom it may concern:

Be it known that I, FRANK B. DAVIDSON, a citizen of the United States, and a resident of Marseilles, in the county of Lasalle and State of Illinois, have invented certain new and useful Improvements in Sheet-Feeding Devices; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to a novel sheet feeding device for sheets of paper-board, straw-board or the like, designed to take separate sheets from a stack or pile of such sheets and deliver them to a machine in which they are to be operated upon,

An instance of the use of my improved feeding device is the application thereof to the receiving end of a machine for folding and pasting box blanks, or a machine for cutting, scoring, and printing blanks used in the manufacture of folding paper boxes or the like.

A feeding device made in accordance with my invention embraces a swinging sheet carrier or conveyer, which is mounted at one end on the machine to which the sheets are to be delivered, and is adapted to have rising and falling movement at the opposite or free end and a sheet feeding device mounted on said outer or rising and falling end of the swinging carrier and adapted to remove separate sheets from a pile of sheets and deliver the same to the carrier, said sheet feeding device being so connected with the carrier that it is always maintained in position to act on the uppermost sheet of the pile of sheets, which is located at the rising and falling end of the carrier. As the sheets are delivered from the pile and the height of the latter diminishes, the outer end of the carrier, with the feeding device, is lowered so that it is always in a position to receive the succeeding sheets from the pile.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a side view of a feeding device made in accordance with my invention, illustrating also the receiving end of the machine in connection with which it is used and a truck from which the sheets are received. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is a transverse section, taken on line 3—3 of Fig. 2. Fig. 4 is a view in elevation of the outer end of the feeding device. Fig. 5 is a detail view in side elevation of the frame of the sheet guiding devices with parts in section, taken on line 5—5 of Fig. 2. Fig. 6 is a detail, side elevation, illustrating the gears on the machine frame for driving the sheet feeding mechanism. Fig. 7 is a side view of one of the feed wheels illustrating the friction clutch through which the same is driven from its said shaft, the said shaft and clutch being shown in section taken on line 7—7 of Fig. 9. Fig. 8 is an end view of the feed wheel shaft, showing one of the feed wheels and the driving sprocket wheel on said shaft, in side elevation. Fig. 9 is a sectional view, taken on line 9—9 of Fig. 8. Fig. 10 is a detail sectional view of a rocker guide device used in connection with the sheet feeding mechanism.

As shown in the said drawings, 1 designates a part of the frame of a folding and pasting or like machine, to which sheets of paper are to be supplied, the part shown being the portion of the frame at the receiving end of said machine.

2 indicates a horizontal transverse shaft mounted in brackets 3, 3 on the side members of the frame 1, and provided with belt pulleys 4, 4 about which are trained the receiving ends of tapes or carrier belts 5, 5. 6 indicates a horizontal transverse shaft mounted in said bracket 3, 3 above the shaft 2 and provided with pulleys 7, 7 over which are trained tapes or carrier belts 8, 8. Said belts 8, 8 co-act with the belts 5, 5 in carrying the sheets to be operated upon to the operative parts of said machine. Mounted on said frame 1, at the receiving end of said machine, is a swinging carrier the outer end of which has rising and falling movement by means of which the sheets taken from a pile or stack of sheets located at the outer end of the carrier are conveyed to the carrier tapes or belts 5 and 8 of the said machine. The frame of said carrier is pivotally connected with the frame 1 of said machine so as to swing on an axis concentric with the lower belt-pulley shaft 2. Said frame, as shown

in the drawings, consists of two longitudinally extending, parallel side frame members each consisting of upper and lower longitudinal frame bars 10 and 11, a transverse frame bar 12, connecting the outer end of the longitudinal frame bars, an oblique bar 13, connecting the inner ends of said longitudinal frame bars, and two pairs of oblique bars 14, 14 located between the ends of said longitudinal frame bars. Said frame members, made as described, are rigidly connected with each other by cross girts, consisting of an upper girt 15, attached to the upper frame bars 10, 10 and two lower girts 16, 16, attached to the lower frame bars 11, 11, of said frame members. The frame made as described is pivotally connected with the frame 1 of the machine by means of bearing boxes 17, 17, attached to the oblique frame bars 13, 13, and through which passes the lower pulley shaft 2. Mounted on the outer end of said swinging frame are horizontal, upper and lower pulley shafts 20, 21 carrying upper and lower pulleys 23, 23 over which are trained the outer ends of the upper and lower carrier belts 24, 25. At the inner end of said swinging frame is located a transverse pulley shaft 30 provided with belt pulleys 31, 31 over which are trained the inner ends of the upper carrier belts. The inner ends of the lower carrier belts are trained over pulleys 32, 32 which are affixed to the said shaft 2 of the machine. The two outer shafts 20, 21 are mounted in bearings 27, 28 attached to the transverse frame bars 12, 12, and the shaft 30 is similarly mounted in bearings 33, 33 attached to the upper parts of the oblique inner frame bars 13, 13. The upper and lower belts are arranged with their adjacent laps in contact with each other so that sheets fed between the belts at the outer end of the carrier will be conveyed by and between the adjacent laps of the belt toward the machine and delivered to the upper and lower carrier belts 5 and 8 of the latter. At points between the ends of the carrier frame, the adjacent laps of said belts are pressed toward each other by means of upper and lower pairs of presser rollers 35, 36, the ends of which are mounted in bearing boxes attached one to each frame bar of the pairs of intermediate frame bars 14, 14.

Devices for driving the carrier belts 5 and 8 of the machine and the belts 24 and 25 of the carrier are provided as follows: A gear wheel 40 is affixed to one end of the shaft 2, which is located at the receiving end of the machine and carrying the pulleys over which are trained the lower set of belts 5 of the machine and the lower set of belts 25 of the carrier device, as hereinbefore described. Meshing with said gear wheel 40 is a gear wheel 41 (Fig. 3) which is affixed to the adjacent end of the shaft 6, which carries the pulleys over which are trained the upper set of belts 8 of the machine. Near the end of the shaft 6, remote from the gear wheel 41, is a second gear wheel 42 (Figs. 1 and 6) which is secured upon the said shaft and which meshes with a gear wheel 43 mounted upon a bracket arm 44 which is rigidly supported at the upper end of one of the brackets 3. Meshing with the gear wheel 43 is a gear wheel 45 which is affixed to a shaft 46, said shaft being rotatively mounted in brackets 47, 47 mounted upon the frame 1 at the rear of the brackets 3, 3 supporting the shafts 2 and 6. Upon the end of the shaft 46, which extends outwardly from the bracket 47 and in the same horizontal plane with the shaft 6, is affixed a gear wheel 48 which meshes with a gear wheel 49 carried upon the outer end of a shaft 50 which is rotatively mounted in said brackets 47, 47 and in the same horizontal plane with the shaft 2. Said gear wheel 49 is driven by means of a pinion 51, mounted upon a stub-shaft 52 located below the shaft 50 and carrying at its outer end a fixed pulley 53 which is driven by a belt from a line shaft or other driving source.

The pulley shafts 20 and 21, which are located at the outer, or rising and falling end of the carrier frame, are provided with intermeshing gear wheels 54 and 55 which act to drive the upper shaft 20 from the lower shaft 21, which is itself driven from the shaft 2 by the lower set of carrier belts.

On the outer or rising and falling end of the swinging carrier, and mounted on said carrier, so as to partake of the rising and falling movement thereof, are guiding means by which the side margins of the sheets, which are delivered one by one to the carrier, may be brought to proper position laterally with respect to the carrier belts, and also a sheet feeding device by which separate sheets of paper-board or strawboard are taken from the stack or pile thereof and automatically fed one by one to the outer ends of the carrier belts. Said sheet guiding and feeding devices are, moreover, mounted on a supporting frame which is pivotally connected with the frame of the carrier and is moved relatively to the carrier frame during the rising and falling movement of the latter so that it may be always maintained in the same position with respect to the uppermost sheet of the pile of sheets being delivered to the machine. Said frame, carrying the sheet guiding and feeding devices, is constructed as follows: Said frame embraces two side frame members each consisting of a horizontal, longitudinal frame bar 60, a depending frame bar 61 rigidly attached thereto between its ends and an upright frame bar 62 rising from the rear end of said longitudinal frame bar. Said lateral frame members are rigidly connected with each other by cross girts 63, 64 and 65 which extend horizontally between and are rigidly attached to

the horizontal frame bars 60, 60 and a cross girt 66 attached at its ends to the upper ends of the upright frame bars 62. Said upright frame bars are held rigidly at right angles to the horizontal frame bars 60 by oblique braces 67, 67, while the depending frame bars 61 are held rigidly in position at right angles to the longitudinal frame bars by means of gusset plates 68, 68. The frame made as described is pivotally connected with the outer end of the carrier frame through the medium of the lower pulley shaft 21 at the outer end of said carrier frame, on which shaft said feed mechanism frame is pivotally supported by means of bearings 70, 70 attached to the depending frame bars 61, 61, and surrounding said shaft. For the purpose of maintaining said feed mechanism frame constantly with its main frame bars 60, 60 in horizontal position a construction is provided as follows: Space rods 38, 38 are pivoted to the upper ends of the upright bars 62, 62 and extend horizontally toward the frame of the machine, to which they are pivotally connected at their inner ends; said rods being provided at said inner ends with two-part heads 76 which are apertured to receive a fixed transverse horizontal shaft 71 the ends of which are secured in the upper end of the bracket 47 on the sides of the main frame 1.

The distance between the shaft 2 upon which the guide frame is pivotally supported, and the pivoted outer ends of said space rods is equal to the distance between the shaft 2, supporting the inner end of the carrier frame, and the shaft 71 to which are connected the inner ends of the space rods. Moreover, the horizontal distance between the shafts 2 and 21 at the inner and outer ends of the carrier frame is the same as the distance between the pivots at the opposite ends of the space rods. As a result of this construction, all four of the pivotal points will maintain positions corresponding with the four angles of a parallelogram, whatever may be the position of the outer end of the carrier frame, and the horizontal member of said feed mechanism frame will always be maintained in a horizontal position, parallel with the sheets of paper on the truck.

In order that the sheets may be placed and held in a position with their side margins parallel with the carrier belts, and in desired lateral position with respect to said belts, there is provided a guide board 83 which extends along one side margin of the sheet pile and is supported upon one of the horizontally extending members 60 of the guide frame. Bolted to the said horizontal extending member 60 is an angle iron bracket 84, the outwardly extending portion of which lies along the outwardly extending portion of an angle iron bracket 85 which is bolted to the guide board. The outwardly extending portion of the bracket 85 is provided with slots and is held against the corresponding portion of the bracket 84 by means of bolts having wing nuts, the slots being provided in the bracket 85 in order that the guide board may be adjusted laterally for sheets of different widths. If the sheets be fed by hand from the pile, as may be done, the said sheets will be thrust laterally against the guide board and at the same time are advanced until gripped by the carrier belts. If the automatic sheet feeding device illustrated is employed, the sheets will be carried thereby laterally against said guide board, as they are advanced, in the manner hereinafter described.

The sheet feeding devices embrace features of construction as follows: 90, 90, 90 indicate a plurality of feed wheels, each of which is provided with outwardly projecting spurs or points for engagement with the sheets of paper. Each of said feed wheels is separately mounted in the free ends of two horizontal links 91, 91 which project outwardly from and are mounted at their inner ends upon the upper pulley shaft 20 of the carrier. Each feed wheel thus mounted is adapted for rising and falling movement through the swinging of its supporting links about said shaft 20. As illustrated, each of said feed wheels 90 is secured to a horizontal spindle 92 which extends through bearing apertures in the links 91, 91. Mounted on the end of each of said spindles is a driven sprocket wheel 93 having driving connection with the feed wheel. On said shaft 20 are secured sprocket wheels 94, 94 arranged in the same horizontal planes with the sprocket wheels 93, 93. Sprocket chains 95, 95 are trained over each pair of sprocket wheels 93 and 94 by means of which the feed wheels are driven from the pulley shaft 20 and turn in the same direction as the belt pulleys upon said shaft.

The links 91, 91 are supported in a substantially horizontal position by a cam shaft 96 which extends transversely beneath the central parts of said links, and is flattened or elliptical in cross-sectional shape. Said cam shaft 96 is rotatively supported at each end by means of journal boxes 97, 97 which are mounted upon the horizontally extending members 60, 60 of the guide frame. Upon one end of the said shaft and outside of the frame member is a lever arm 98 (Figs. 2 and 4). One end of the lever is provided with an eye for attachment thereto of a cable 99 which is trained under a pulley 100 fastened to the floor and runs backward from said pulley to the delivery end of the machine. The other end of said lever 98 is provided with a counterweight 101 which normally holds the cam shaft in a position with its long diameter horizontal, in which position the supporting links 91, 91 are lowered to bring the feed wheels into opera-

tive position. The feed wheels may be rendered inoperative, by an operator stationed at the delivery end of the machine, by means of the cable 99 which operates the lever arm 98 to turn the cam shaft a quarter of a revolution thus bringing the said cam shaft into a position with the long diameter thereof into a vertical position, thereby raising the bracket members 91, 91 and causing the feed wheels to be lifted out of engagement with the top sheet of the pile. To the end of the shaft remote from the lever 98 there is attached a hand wheel 102 by means of which the said shaft may be turned to either of its two positions, by the operator at the feeding end of the machine.

In order to justify the sheets against the guide board 83, the feed wheels 90 are supported at such an angle with respect to the said guide board that the sheets engaged by said feed wheel are carried laterally toward or justified against said guide board and are given proper lateral position as they are moved to position for engagement with the belts of the carrying device; the axis of each of the feed wheels and its supporting spindle being slightly inclined in a horizontal plane, relatively to the pulley shaft 20, as clearly seen in Fig. 2.

For preventing the outwardly projecting spurs of the feed wheels engaging more than one sheet of paper at a time there is provided an idler shaft 103 which is rotatably mounted in journal boxes 104, 104 secured to the horizontally extending members 60, 60 of the guide frame and located near the outer ends thereof. Mounted upon the said shaft are two pulleys 105, 105 which rest upon the upper surface of the sheet pile and support the frame at such elevation that the spurs on the feed wheels will engage only the top sheet of said pile.

In order that the spurs on the feed wheels will not tear the paper or retard the motion thereof, after the forward portion of the sheet has become engaged with the carrier belts of the carrying device, the said feed wheels are connected with their driving sprocket wheels by means of a roller clutch mechanism, which permits the belts to pull the sheet from underneath said feed wheels by allowing the said feed wheels to turn faster than the driven sprocket wheels, but lock them to the said sprocket wheels during the period the sheet is being carried to position for engagement with the belts. Said roller clutch mechanism is illustrated in Figs. 7 and 9 of the drawings and is made as follows: The bore of the hub of the feed wheel 90 is enlarged at the end thereof adjacent to the driven sprocket wheel 93, so that it is larger in diameter than the spindle 92, and the said hub is provided with a plurality of recesses 110, 110, 110 exterior to the enlarged part of the bore. The hub of the driven sprocket 93 is provided with a laterally extending cylindric portion 111 which fits and turns in the concentric, cylindric recess in the enlarged hub of the feed wheel 90. Within the recesses 110, 110, 110 so formed in the hub of said wheel, are located three cylindric rollers 112, 112, 112 which bear upon the extending portion 11 of the said sprocket wheel hub and also against the outer walls of the recesses 110, 110, 110. The said outer walls of the recesses 110, 110, 110 are eccentrically arranged making the advance ends of the said recesses, referring to the direction of motion of the feed wheel, narrower radially than the opposite ends thereof, so that when the rollers approach the said advance ends of said recesses, the rollers will be gripped between the said outer walls and the cylindric surface of the extension 11, and the feed wheel will be thereby locked to the hub of the driven sprocket wheel. Should the feed wheel be caused to rotate in the same direction but at a higher rate of speed than the driven sprocket wheel 93 the said cylindric rollers will be carried to the opposite or wider ends of the recesses 110, 110, 110, thus permitting the said feed wheel to turn independently of the said driven sprocket.

The sheet feeding device is preferably counterweighted to permit it to be swung from one position to another with the exertion of little power. The counterbalancing device herein shown consists of a weight 106 which is connected with the carrier frame by means of a cable 107 trained over pulleys 108, 108, and attached to a bail 109 which is hinged to the transverse frame members 12, 12 at the outer end of the swinging carrier.

To provide means for separating or spreading apart the advance edges of the top sheets on the sheet stack in case one or more sheets are dragged forward with the top sheet engaged by the feed wheels, and for lifting the top sheet into position for entering between the carrier belts, I employ a pivotally supported rocking guide plate 77 (Fig. 10) located in the path of said sheets, in an upwardly and forwardly inclined position, and which extends across the end of the carrier frame between the same and the upper portion of the sheet stack. The guide plate 77 has at its upper edge a stiffening flange 78 at right angles thereto. Said guide plate acts to deflect upwardly the advancing top sheet which passes over the top edge of the same and is provided on its outer face with broad shallow corrugations which are adapted to severally engage the forward edges of the advancing sheets and spread the same apart in order that not more than one of them will pass at the same time over the top edge of the guide plate, the corrugations having inclined, as distinguished from abrupt, shoulders so that said shoulders will retard the movement of

the lower sheets, as their advance edges come into contact with the plate, but will permit the edge of the top sheet to slide forward over the plate when said top sheet is positively forced forward by the feed wheels and the plate is turned or rocked backward, as hereinafter described.

The flange 78, which is made integral with the plate 77, extends obliquely downward and forward from the upper edge of the plate 77 and is provided with journal bearings 79, 79 on its inner face. By means of the said journal bearings the guide plate 77 is eccentrically mounted upon a supporting rod 80. The said supporting rod 80 is supported at each end by arms 81, 81 which are adjustably secured upon the gusset plates 68, 68 by means of bolts and wing nuts 82, 82. Midway upon the supporting rod 80 there is adjustably secured a collar 114 which is provided with two arms 115 and 116 which are adapted to limit the rocking movement of the guide plate 77. The arm 115 is adapted to bear against the portion of the inner face of the plate 78 which is above the rod 80 to limit the backward movement of the rocker guide while the arm 116 is adapted to bear against the portion of the inner face of the plate 78 which is below the rod 80 to limit the forward movement of the said rocker guide. The guide board 83 is provided with a curved slot 86 through which extends the end of the supporting rod 80 adjacent to said guide board.

As the plate 77 is inclined upwardly and inwardly from its lower to its upper margin, the sheets as they advance will engage the corrugations upon the face of the said plate and the top sheet will rock or oscillate said guide plate, so as to bring the same in position to permit said top sheet to slide over the top edge of the guide plate and into engagement with the carrier belts, the latter, being heavier on its side toward the sheet stack, will drop to position to catch the succeeding sheets as they are advanced toward it.

The truck carrying the stack of sheets which are to be operated upon is moved to position at the receiving end of the feeding device and the said device is lowered until it rests with the pulleys 105, 105 upon the top surface of the sheet stack. The cam shaft 96 supporting the brackets 91, 91 is turned into a position permitting the feed wheels to engage the top sheet of the said sheet stack. The rotation of said feed wheels moves the uppermost sheet toward the carrier belts of the carrying device and the front margin of the said sheet, coming in contact with the guide plate 77, is guided to and fed between the upper and lower sets of carrier belts or tapes 24 and 25. After becoming engaged with the said carrier belts, the said sheets are conveyed therebetween and delivered between the upper and lower sets of belts 5 and 8 of the machine 1 which in turn delivers the said sheets to the part of the machine in which they are to be operated upon. When the top sheet has been withdrawn from the pile gravity causes the feeding device to drop down into position for engagement with the succeeding sheet of paper of the sheet stack upon the truck, and so on for each succeeding sheet until the stack is exhausted.

An apparatus embodying my invention may be embodied in a form differing in its details from the specific structure illustrated in the accompanying drawings, and I do not desire to be limited to the particular features shown and hereinbefore described, except so far as the same may be set forth in the appended claims.

I claim as my invention:—

1. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame, a guide mechanism frame pivoted to the rising and falling end of the said carrier frame, and means for maintaining the said guide mechanism frame in a horizontal position in the rising and falling movement of the carrier frame.

2. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame, a guide-mechanism frame pivoted to the outer or rising and falling end of the carrier frame and provided with upwardly extending rigid frame members, and space rods maintaining said guide-mechanism frame in a horizontal position, said space rods being pivotally secured at their outer ends to the said upwardly extending frame members and at their inner ends to the machine frame at points above the level of the pivotal axis of the carrier frame.

3. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, sheet conveying means on said carrier frame, a horizontally maintained guide-mechanism frame pivoted to the rising and falling end of the carrier frame and an upright guide board attached to said guide-mechanism frame and extending along one side of the same.

4. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, sheet conveying means on said carrier frame, a horizontally maintained guide-mechanism frame pivoted to the rising and falling end of the carrier frame,

and an upright guide board attached to said guide-mechanism frame and extending along one side of the same, said guide board being transversely adjustable upon said guide-mechanism frame.

5. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame embracing upper and lower sets of carrier belts, and a lower pulley shaft provided with pulleys for the outer ends of the lowermost sets of carrier belts, a horizontally maintained guide-mechanism frame pivotally connected with the rising and falling end of the carrier frame and an obliquely arranged guide plate extending transversely of the outer end of the carrier frame and supported upon the said guide-mechanism frame.

6. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame, embracing upper and lower sets of carrier belts, a horizontally maintained guide-mechanism frame pivotally connected with the rising and falling end of the carrier frame, and an obliquely arranged guide plate extending transversely of the outer end of the carrier frame, said guide plate being mounted and having angular adjustment upon the said guide-mechanism frame.

7. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said frame embracing upper and lower sets of carrier belts, a horizontally maintained guide-mechanism frame pivotally mounted on the rising and falling end of the carrier frame, an obliquely arranged guide plate adjustably supported upon said guide-mechanism frame and extending across the front margin of the carrier frame, and an upright guide board extending along one side of said guide-mechanism frame.

8. The combination with a machine for operating on sheets of carboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame, an upright guide board for the side edges of the sheets, mounted on the rising and falling end of said carrier frame, and sheet feeding means mounted on said rising and falling end of the carrier frame comprising rotative feed wheels, said feed wheels being mounted at a slight angle with respect to the guide board and operating to remove sheets one by one from a pile of sheets and justify the same laterally against said guide board.

9. The combination with a machine for operating upon sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame, a horizontally maintained guide-mechanism frame mounted on the rising and falling end of said carrier frame, an upright guide board for the lateral edges of the sheets attached to said guide mechanism frame, and rotative feed wheels arranged at a slight inclination to said guide board, said feed wheels acting to remove sheets one by one from a pile and to justify them laterally against the guide board.

10. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame embracing upper and lower sets of carrier belts, an upper pulley shaft on the outer end of said frame provided with pulleys for the outer end of the uppermost carrier belts, a plurality of feed wheels, means for supporting said feed wheels separately on the outer end of said carrier frame affording bodily rising and falling movement of each feed wheel in a path concentric with said shaft, and means for driving said feed wheels from said shaft.

11. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame embracing upper and lower sets of carrier belts, and an upper pulley shaft at the outer end of said frame provided with pulleys for the outer ends of the uppermost belts, a plurality of feed wheels, horizontally arranged vertically swinging links in the outer ends of which the said feed wheels are mounted and which are pivotally connected at their inner ends with the carrier frame concentrically with the said upper pulley shaft, and means for driving said feed wheels from said shaft.

12. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame embracing upper and lower sets of carrier belts, and upper and lower pulley shafts at the outer end of said frame provided with pulleys for the outer ends of the upper and lower carrier belts, a plurality of feed wheels, horizontally arranged vertically swinging links in the outer ends of which the said feed wheels are mounted and which are pivoted at their inner ends to the carrier frame concentrically with the

said upper pulley shaft, a horizontally maintained guide-mechanism frame pivoted to the rising and falling end of the carrier frame and means on the guide-mechanism frame for adjustably supporting said links.

13. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame, a plurality of feed wheels, horizontally arranged vertically swinging links in the outer ends of which the said feed wheels are mounted and which are pivotally supported at their inner ends upon the carrier frame, a horizontally maintained guide-mechanism frame pivoted to the rising and falling end of the carrier frame, and a cam shaft rotatively mounted upon the said guide-mechanism frame and supporting said links.

14. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine, conveying means on said carrier frame, a plurality of feed wheels, vertically swinging links in the outer ends of which the said feed wheels are mounted and which are pivotally supported at their inner ends upon the carrier frame, a horizontally maintained guide-mechanism frame pivoted to the carrier frame, means on the said guide-mechanism frame for adjustably supporting said links, and means mounted on said guide-mechanism frame for maintaining the said feed wheels in position to engage only one sheet of paper at a time.

15. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame, feed wheels carried by the outer end of said carrier frame, a horizontally maintained guide-mechanism frame pivoted to the rising and falling end of the carrier frame, an idler shaft rotatively mounted upon the said guide mechanism frame, and pulleys on said shaft adapted to rest upon the top of the sheet stack and maintain the said guide-mechanism fr[illegible] in position for the action of the feed wheels on one sheet of paper at a time.

16. The combination with a machine for operating on sheets of cardboard or the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame embracing upper and lower sets of carrier belts and an upper pulley shaft at the outer end of said carrier frame, provided with pulleys for the outer ends of the upper carrier belts, sheet feeding means embracing a plurality of feed wheels, and vertically swinging links in the outer ends of which said feed wheels are mounted and which are pivotally supported at their inner ends on said upper pulley shaft, and means for driving said feed wheels from the said pulley shaft.

17. The combination with a machine for operating on sheets of cardboard and the like, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame, conveying means on said carrier frame embracing upper and lower sets of carrier belts, and an upper pulley shaft located at the outer end of the carrier frame and provided with pulleys for the outer ends of the said upper carrier belts, vertically swinging links mounted at their inner ends upon the carrier frame concentrically with said upper pulley shaft, a plurality of feed wheels mounted in the outer ends of the said links, sprocket wheels and chains by means of which said feed wheels are driven from the said upper pulley shaft, and a clutch mechanism connecting the said feed wheels with the driven sprockets, said clutch mechanism permitting the said feed wheels to turn faster than the driven sprockets.

18. The combination with a machine for operating on sheets of cardboard and the like and provided with sheet conveying means, of a vertically swinging carrier frame pivotally connected with the receiving end of the machine frame and provided with sheet conveying means, feeding means supported at the outer end of said carrier frame a counterbalancing weight connected with said carrier frame, and idler pulleys carried on the rising and falling end of said carrier frame and adapted to rest on the uppermost sheet of a stack of sheets.

19. The combination with a machine for operating on sheets of cardboard and the like, of a carrier frame at the receiving end of the machine frame, conveying means on the said carrier frame embracing upper and lower sets of carrier belts, and a freely oscillating rocking guide plate pivotally mounted on the carrier frame and provided with longitudinal shoulders or corrugations.

20. The combination with a machine for operating on sheets of cardboard and the like, of a carrier frame at the receiving end of the machine frame, conveying means on the said carrier frame embracing upper and lower sets of carrier belts, and a freely oscillating rocking guide plate mounted on the carrier frame and provided with longitudinal shoulders or corrugations, and a supporting rod mounted upon the carrier frame and on which the guide plate is supported.

21. The combination with a machine for operating on sheets of cardboard and the like, of a carrier frame at the receiving end of the machine frame, conveying means on said carrier frame embracing upper and lower sets of carrier belts, a rocking guide plate pivot-

ally mounted on the carrier frame and provided with longitudinally extending shoulders or corrugations, and a stop device adapted to limit the swinging movement of the said guide plate.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 8th day of July A. D. 1908.

FRANK B. DAVIDSON.

Witnesses:
H. R. SHOTTS,
F. W. KENDALL.