L. MIDDLEDITCH.

SHEET FEEDING MACHINE.

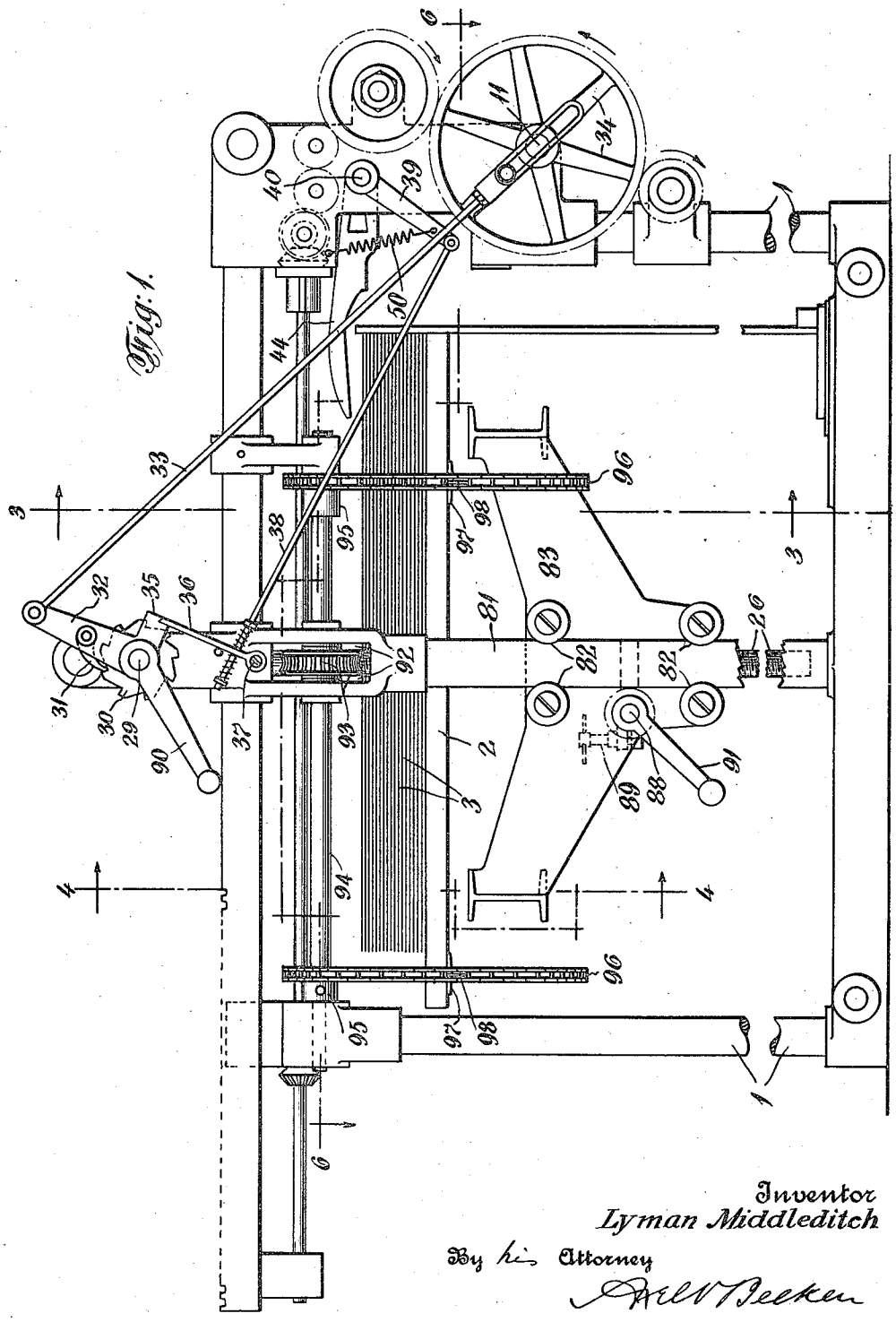
APPLICATION FILED OCT. 15, 1915.

1,244,755.

Patented Oct. 30, 1917.

8 SHEETS—SHEET 1.

Fig. 1.



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8 SHEETS—SHEET 2.

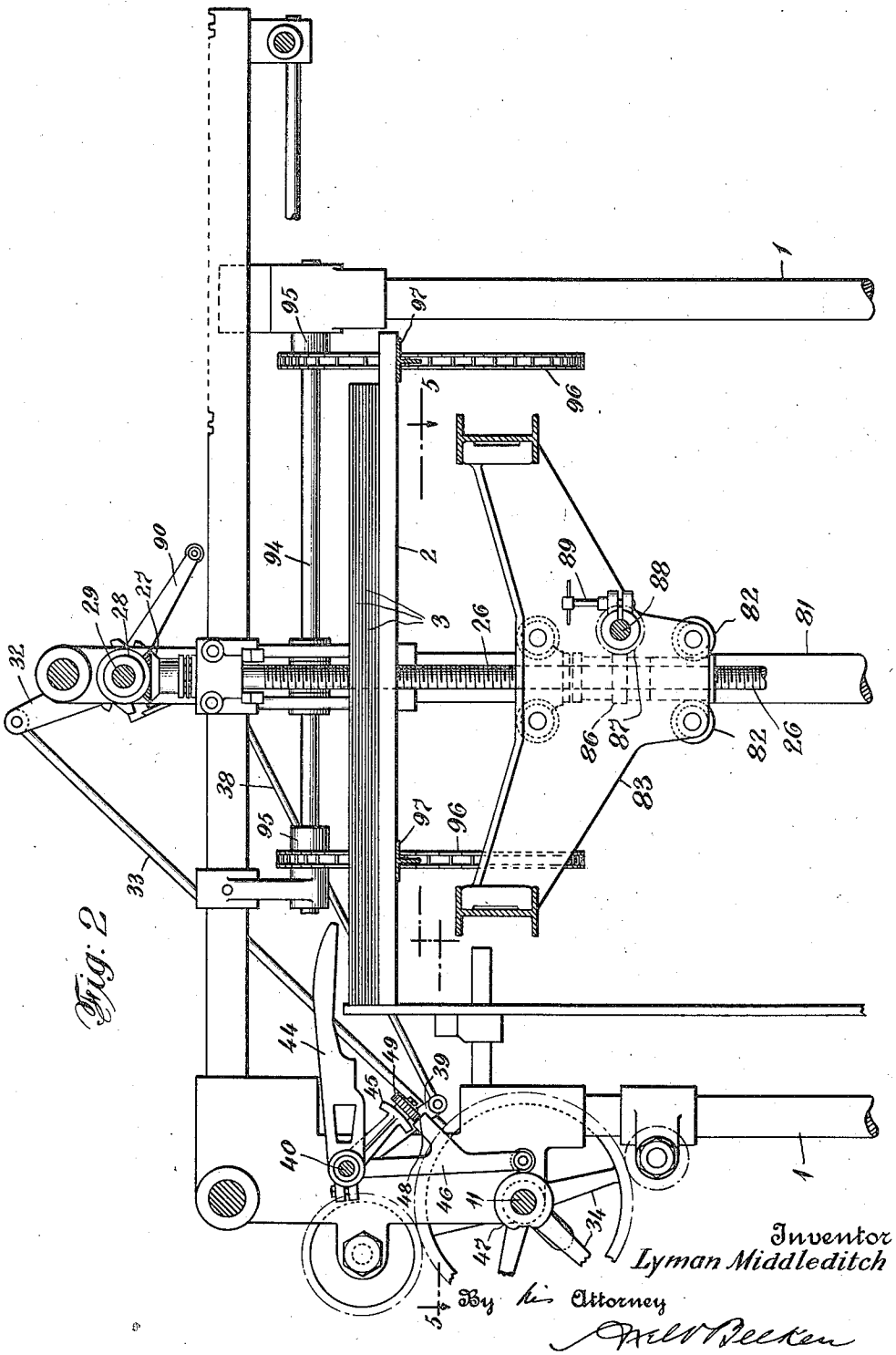


Fig. 2

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8 SHEETS—SHEET 3.

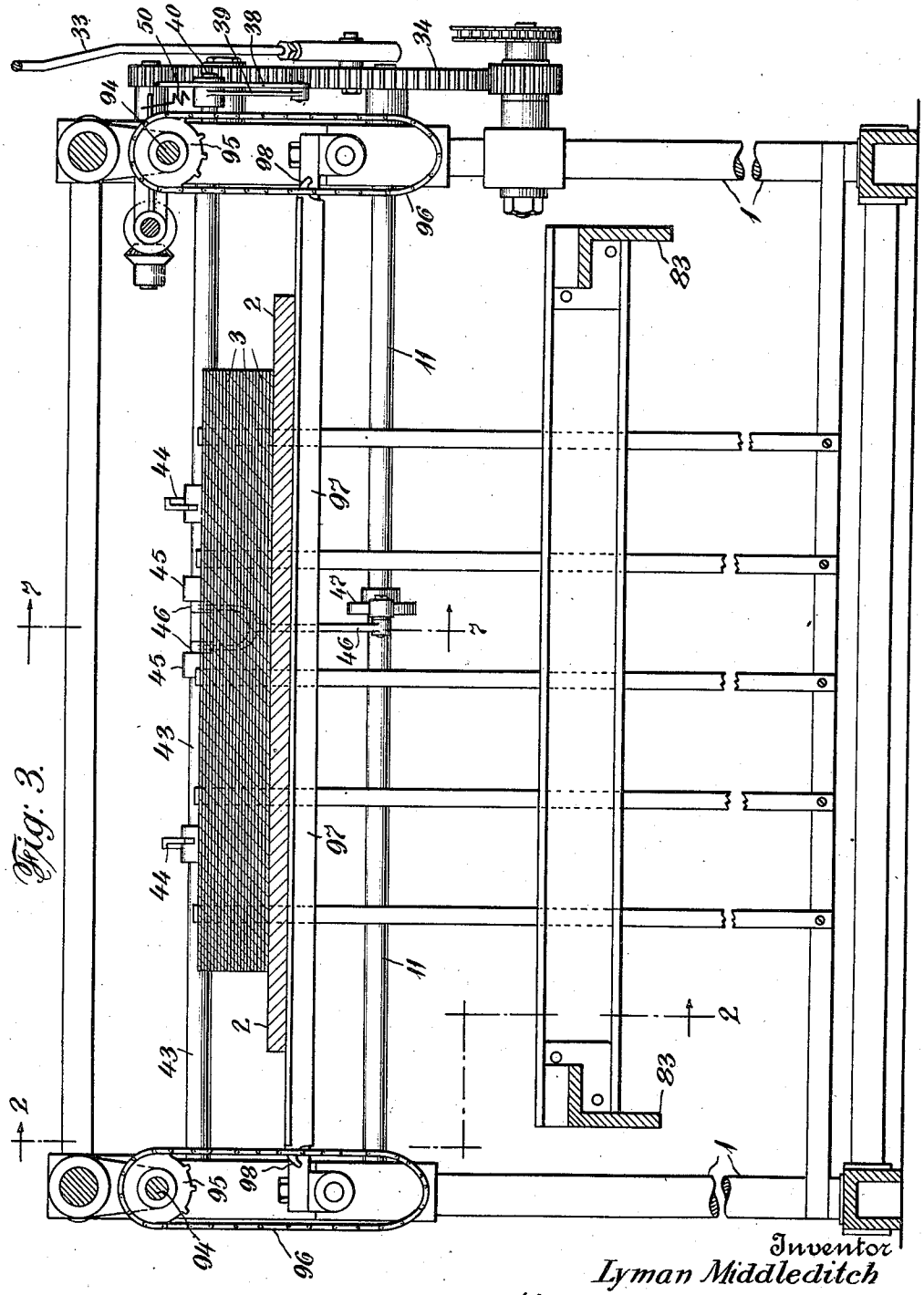


Fig. 3.

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8 SHEETS—SHEET 4.

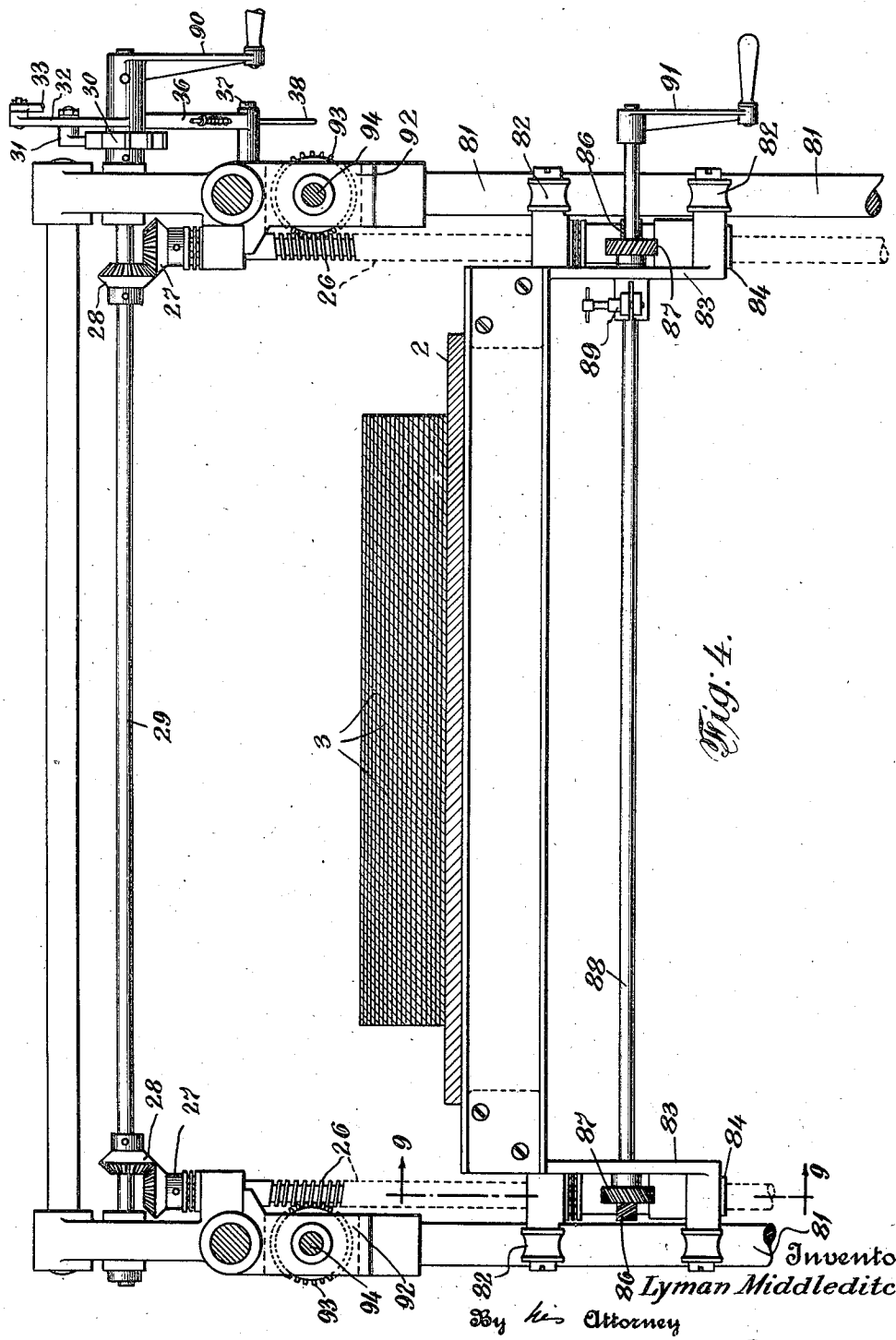


Fig. 4.

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8 SHEETS—SHEET 5.

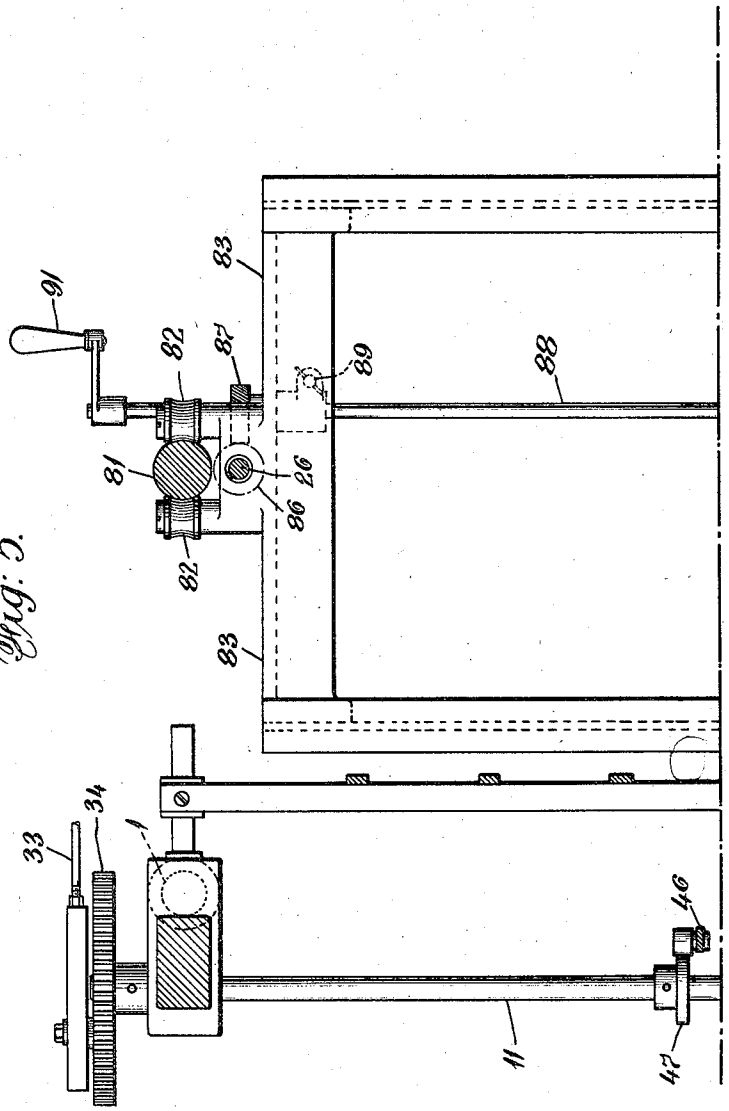


Fig. 5.

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8 SHEETS—SHEET 6.

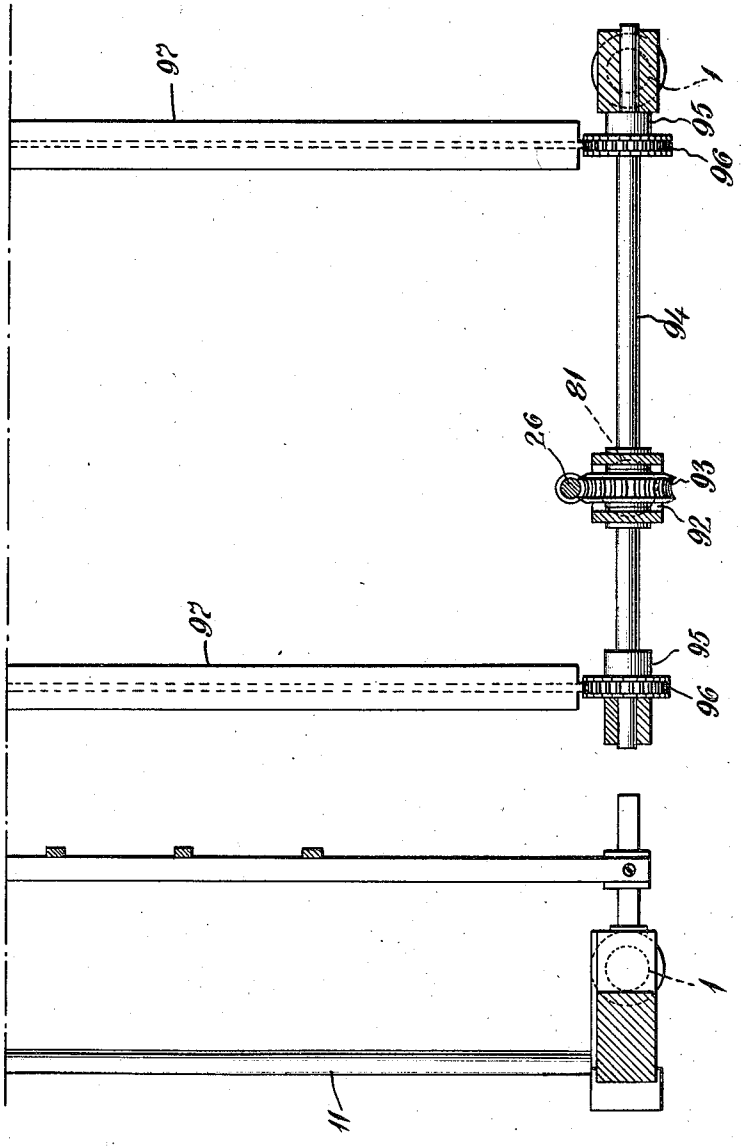


Fig. 6.

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8 SHEETS—SHEET 7.

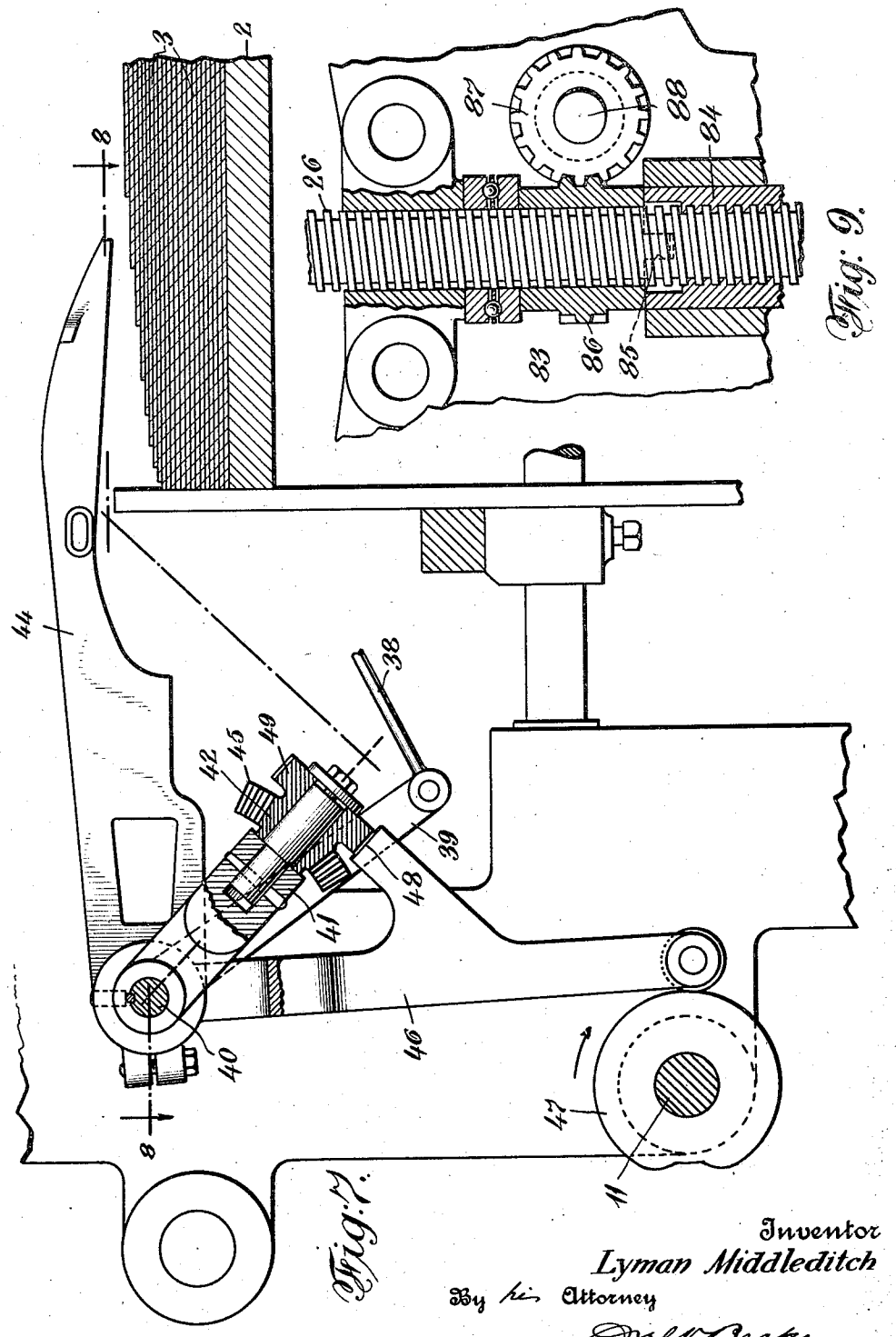


Fig. 9.

Fig. 7.

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8 SHEETS—SHEET 8.

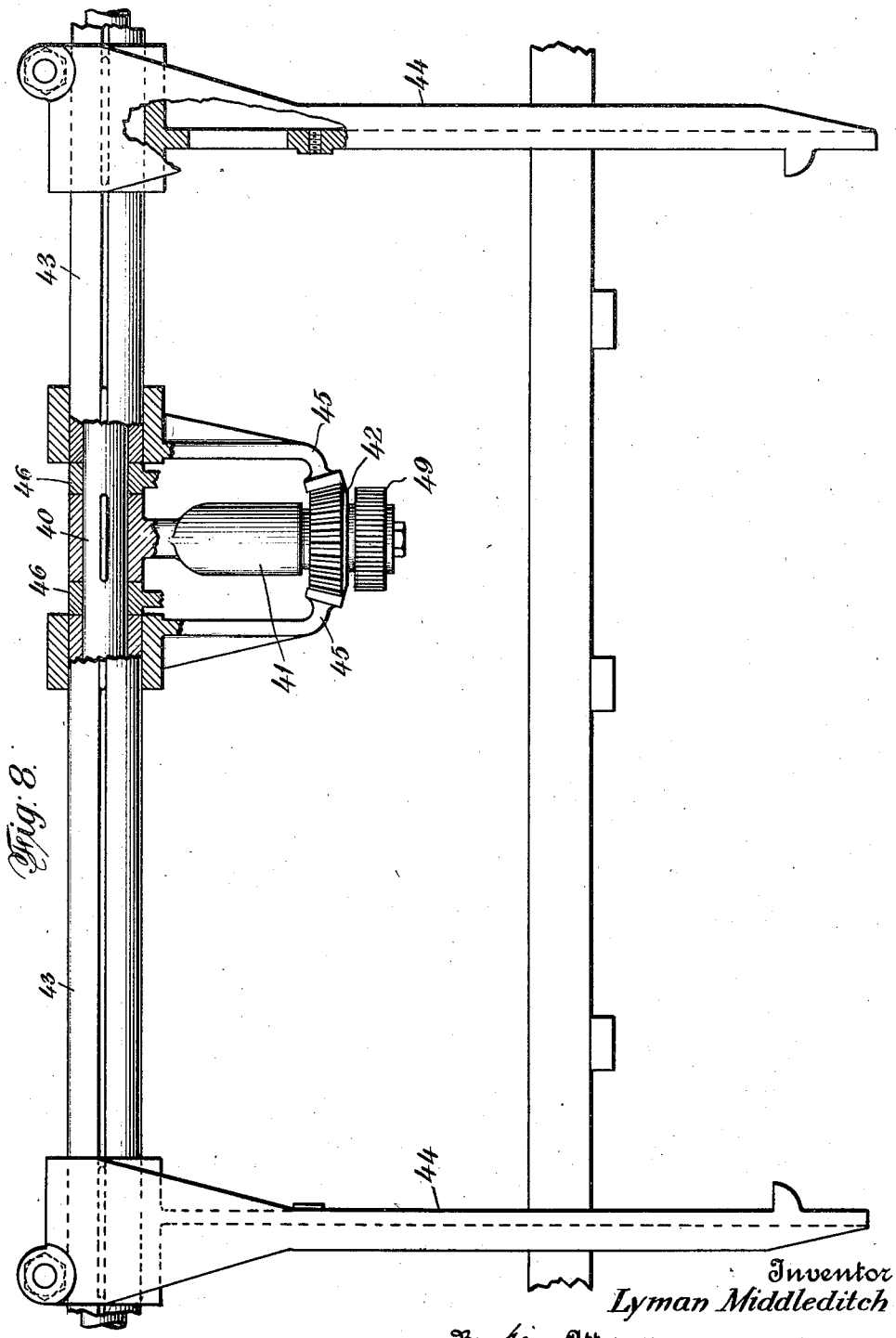


Fig. 8.

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UNITED STATES PATENT OFFICE.

LYMAN MIDDLEDITCH, OF SCARSDALE, NEW YORK.

SHEET-FEEDING MACHINE.

1,244,755. Specification of Letters Patent. Patented Oct. 30, 1917.

Original application filed July 6, 1914, Serial No. 849,285. Divided and this application filed October 15, 1915. Serial No. 55,923.

To all whom it may concern:

Be it known that I, LYMAN MIDDLEDITCH, a citizen of the United States, and a resident of Scarsdale, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Sheet-Feeding Machines, of which the following is a specification.

The present invention relates to sheet feeding machines, and has more particularly reference to pile elevating and pile replenishing mechanism.

The present application is a division of one filed July 6, 1914, Serial No. 849,285.

It is a common expedient in the art to provide automatic means for elevating the sheet support carrying the pile and to control such elevating means by the height of the pile, the object being to maintain the height substantially uniform. It frequently occurs, however, that there is variation in the thickness of the sheets at a particular point in the pile and that therefore the top of the pile will not be level but will be considerably higher on one side with respect to the other side. If the controlling means happens to engage the pile on the low side the elevating means will be raised too fast, while if the controlling member happens to engage with the high side of the pile the elevating means will be operated too slowly and will not raise the sheet support fast enough.

One object of my invention is to obviate this trouble. This is effectually accomplished by providing means controlled by the mean height of the pile for rendering the elevating means active or inactive as the case may be. In carrying out this feature a plurality of pile engaging members are utilized which engage the pile at different points, and equalizing means are provided whereby the member that controls the elevating means is positioned in accordance with the mean height of the pile or the mean height of the pile engaging members.

When the pile of paper to be separated becomes exhausted it is necessary to introduce a new pile of paper into the machine. A still further object of the invention is to provide a pile replenishing mechanism whereby a new pile may be introduced substantially without interrupting the feeding operation. In carrying out this object of the invention I provide two interchangeable elevating means for the sheet support, together with actuating means for the same, and means for permitting one of said elevating means to be lowered while the other elevating means is being raised. In the more particular form here disclosed one of said elevating means is a carrier operated by the usual feed screws while the other carrier is mounted upon endless members which derive their motion from said screws, means being provided, however, for permitting the first carrier to be lowered independently of the rotation of the screws.

Other features of construction, combination of parts and arrangement of elements will appear as the specification proceeds.

In the accompanying drawings the invention is embodied in a concrete and preferred form but changes of construction may be made without departing from the scope of the invention as expressed in the appended claims.

In the said drawings:

Figure 1 is a side elevation of a machine embodying the invention showing the sheet support carried by the endless members.

Fig. 2 is a side elevation looking at the other side of the machine from that shown in Fig. 1, with parts in section, to the extent that the inner framework and adjacent elements have been removed.

Fig. 3 is a transverse vertical sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a transverse vertical sectional view on the line 4—4 of Fig. 1, showing more particularly the pile elevating means, the sheet support being shown sustained by the main carrier operated by the screws.

Fig. 5 is a horizontal sectional view of the far side of the machine substantially on the irregular line 5—5 of Fig. 2, with the auxiliary carrier of the elevating device omitted.

Fig. 6 is a horizontal sectional view of the far side of the machine substantially on the irregular line 6—6 of Fig. 1 with the main carrier of the elevating device omitted.

Fig. 7 is a sectional view on the line 7—7 of Fig. 3.

Fig. 8 is a view on the line 8—8 of Fig. 7, with parts broken away.

Fig. 9 is a sectional view on the line 9—9 of Fig. 4.

Similar characters of reference indicate corresponding parts in the different views.

1 indicates a framework of any suitable construction consisting mainly of uprights

and longitudinal and transverse connecting bars. 2 indicates a sheet support sustaining a pile of sheets 3.

26 denote upright feed screws of the usual type which act in a known manner by their rotation to elevate a sheet support. These screws are provided with miter gears 27 at their upper ends with which mesh the corresponding miter gears 28 on the horizontal and transversely extending shaft 29. The shaft 29 carries a ratchet 30 with which engages a pawl 31, said pawl being mounted on a lever 32 loosely supported on the shaft 29 and being connected by means of the rod 33 to the crank 34 mounted on the shaft 11. This construction by itself will cause the pawl 31 to engage a new tooth in the ratchet 30 once to each revolution of the shaft 11, thereby imparting a rotating motion to the elevating screws 26. Carried by the arm 32 is an abutment 35 with which engages a stop 36 to prevent the pawl 31 from turning the ratchet 30. This stop member 36 is pivoted on the framework at 37 and has passing through it a rod 38 which is connected by means of the arm 39 to a controlling member or shaft 40, which shaft is suitably mounted in bearings in the framework and adapted to be oscillated in a manner to be hereinafter set forth. The controlling member or shaft 40 carries an arm 41 rigidly attached thereto and provided with a rotatable member 42, here shown as a gear. Mounted loosely on said shaft 40 are two sleeves 43 to which are rigidly attached pile engaging members 44. Also connected to the said loosely supported sleeves 43 are the two racks 45 which together with the gear 42 serve as equalizing means as will presently appear. 46 indicates a rocker arm mounted loosely on the shaft 40 and receiving its motion from the cam 47 on the cam shaft 11. This arm 46 carries an abutment 48 which engages the gear 42 or rather a knurled extension 49 thereof. Once to each cycle of the machine the cam 47 will cause the abutment 48 to engage the knurled portion 49, thereby carrying the gear 42 with it and rocking the shaft 40 in an upward direction. It will be observed that during this movement the gear 42 is unable to rotate on account of the engagement of the knurled portion 49 with the abutment 48. Consequently it constitutes a lock with respect to the racks 45 and will carry the latter and thus the loose sleeves 43 and the pile engaging members 44 with it. This occurs during the period that the combing means are acting on the pile. When the abutment member 48 begins to lower, the shaft 40, as well as the sleeves 43, pile engaging members 44, gear 42 and racks 45 will descend. The descent of these parts will, however, be checked when the pile engaging members reach the pile, the cam 47 imparting a sufficient stroke to permit the abutment 48 to descend below the point at which the pile engaging members engage the pile, and thus check the downward movement of the gear 42. If the pile should be higher on one side than on the other, one pile engaging member will come in contact with the pile before the other one, but the continued descent of the other pile engaging member will cause a rotation of the gear 42 which will be imparted to the pile engaging member already in engagement with the pile and thus cause through the racks 45 and gear 42 a turning movement of the shaft 40 the limit of which is governed by the mean height of the pile or of the two pile engaging members. When a certain number of sheets have been removed from the pile the descent of the pile engaging members will eventually turn the shaft 40 sufficiently to cause it to move the stop 36 out of engagement with the abutment 35 thereby permitting the crank 34 to rotate the elevating screws. When the sheet support has been raised sufficiently to compensate for the sheets removed the next downward descent of the pile engaging members will not be sufficient to permit the shaft 40 to disengage the stop 36 from the abutment 35 but the parts will be restored, this action being facilitated by the spring 50.

The pile elevating mechanism is in the present instance particularly designed to facilitate the replenishing of the pile. As here shown the machine is provided with centrally disposed upright columns 81 one on each side of the machine, with which engage the friction rollers 82 suitably supported on the main carrier 83. The elevating screws 26 pass through the main carrier 83 and into the threaded bushing 84 thereof. This threaded bushing 84 is connected by a clutch portion 85 to a spiral gear 86 loosely surrounding the screw 26. Engaging with the spiral gear 86 is another spiral gear 87 mounted on a shaft 88 suitably supported on the carrier 83. Suitable means such as the clamp 89 are provided for preventing the shaft 88 and consequently the spiral gears 87 and 86 from rotating. When this occurs the sleeve 84 will likewise be held against rotation and consequently the rotation of the screw 26 will cause the carrier 83 to rise or descend, depending upon the direction of rotation given to the screws 26. It will be observed that a handle 90 is provided on the shaft 29 whereby the screws 26 may be rotated manually in either direction. If, however, the clamping device 89 is adjusted to permit the shaft 88 to rotate, the rotation of the screw 26 will have no effect upon the carrier 83. The shaft 88 is provided with a handle 91 which when actuated, the shaft 88 being free to rotate, will permit the carrier 83 to be moved up or

down irrespective of the rotation of the screws 26, since the rotation of the shaft 88 will be transmitted through the spiral gears 87 and 86 to the freely rotatable sleeve 84.

The upright column 81 is provided with a recess 92 in which is located a gear 93 mounted on the shaft 94 carried in suitable bearings on the framework, which gear 93 is in engagement with the upright screws 26. Carried by the shaft 94 are the sprockets 95 having the endless chains or members 96. Removable bars 97 running from one side of the machine to the other and having hooks 98 at their outer ends are placed upon oppositely disposed chains and thus act as an auxiliary carrier for sustaining the sheet support 2. It will be noted that these chains are driven from the screws 26. After the sheet support 2 is sustained by the auxiliary carrier the main carrier 83 may be returned to its lowermost position and another pile placed thereon ready to take the place of the one which is being acted upon by the sheet separating devices.

What is claimed is:

1. Pile elevating mechanism comprising: a sheet support for a pile of superimposed sheets, automatic elevating means for the sheet support, a plurality of pile engaging members, and controlling mechanism positioned by the mean height of the pile engaging members for rendering the elevating means active or inactive as the case may be.

2. Pile elevating mechanism comprising: a sheet support for a pile of superimposed sheets, automatic elevating means for the sheet support, a plurality of pile engaging members, a controlling member for rendering the elevating mechanism active or inactive as the case may be, and equalizing means between the controlling member and the pile engaging members for transmitting the mean position of the pile engaging members to the controlling member.

3. Pile elevating mechanism comprising: a sheet support for a pile of superimposed sheets, automatic elevating means for the sheet support, a plurality of pile engaging members, a controlling member for rendering the elevating mechanism active or inactive as the case may be, and equalizing gearing between the controlling member and the pile engaging members for transmitting the mean position of the pile engaging members to the controlling member.

4. Pile elevating mechanism comprising: a sheet support for a pile of superimposed sheets, automatic elevating means for the sheet support, a plurality of pile engaging members, a controlling member for rendering the elevating mechanism active or inactive as the case may be, a pinion connected to the controlling member, and racks connected to the pile engaging members and in mesh with said pinion.

5. Pile elevating mechanism comprising: a sheet support for a pile of superimposed sheets, automatic elevating means for the sheet support, a controlling shaft for rendering the elevating means active or inactive as the case may be, a pinion connected to said shaft, sleeves loosely mounted on said shaft, racks connected to said sleeves and engaging with said pinion, and pile engaging members connected to said sleeves.

6. Pile elevating mechanism comprising a sheet support for a pile of superimposed sheets, automatic elevating means for the sheet support, a controlling member for rendering the elevating means active or inactive as the case may be, means for imparting a back and forth movement to said controlling member once to each cycle of operations to render the elevating means active, pile engaging members, and connections between the pile engaging members and the controlling member for preventing the latter from completing its stroke to render the elevating means active until a determined number of sheets have been removed from the pile.

7. Pile elevating mechanism comprising: a sheet support for a pile of superimposed sheets, automatic elevating means for the sheet support, a controlling member for rendering the elevating means active or inactive as the case may be, means for imparting a back and forth movement to said controlling member once to each cycle of operations to render the elevating means active, pile engaging members, and equalizing means between the pile engaging members and the controlling member for preventing the latter from completing its stroke to render the elevating means active until the mean height of the pile has decreased a determined distance.

8. Pile elevating means comprising: a sheet support for a pile of superimposed sheets, automatic elevating means for the sheet support, an oscillating controlling member for rendering the elevating means active or inactive as the case may be, a rotatable member carried by said oscillating member, pivotally supported pile engaging members, equalizing connections between the rotatable member and the pile engaging members, and means engaging the rotatable member to lift the oscillating member and at the same time to prevent the rotatable member from turning, whereby the oscillating member and the pile engaging members are lifted in unison, the downward movement of the oscillating member being limited by the mean height of the pile engaging members.

9. Pile elevating mechanism comprising: a support for a pile of superimposed sheets, automatic elevating means for the sheet support, an oscillating controlling member

for rendering the elevating means active or inactive as the case may be, a gear mounted on an arm carried by said oscillating member, pivoted pile engaging members, racks connected to said pile engaging members and meshing with said gear, means for lifting and lowering said gear and for keeping it from rotating during the lifting movement, whereby the oscillating member is turned in one direction and the pile engaging members are lifted and whereby when the pile engaging members are lowered the gear will be rotated and the oscillating member lowered in accordance with the mean height of the pile engaging members.

10. Pile elevating mechanism comprising: a sheet support for a pile of superimposed sheets, means for automatically elevating the pile, a controlling shaft for rendering the elevating means operative or inoperative as the case may be, an arm carried by said shaft, a rotatable member carried by said arm, sleeves loosely mounted on said shaft, pile engaging members mounted on said sleeves, equalizing connections carried by said sleeves and engaging said rotatable member, and means engaging said rotatable member to lift and lower the same.

11. Pile replenishing mechanism comprising: a sheet support, a carrier for said support, rotatable screws for elevating said carrier, means for automatically rotating said screws in one direction and manually in the other direction, another carrier for said support, endless members for moving said other carrier, means for operating said endless members from said screws, and means for lowering the first carrier independently of the rotation of the screws.

12. Pile replenishing mechanism comprising: a sheet support, a carrier for said support, rotatable screws for elevating said carrier, means for automatically rotating said screws in one direction, another carrier for said support, endless members for moving said other carrier, means for operating said endless members from said screws, and means for lowering the first carrier independently of the rotation of the screws.

13. Pile replenishing mechanism comprising: a carrier, a rotatable feeding screw, a threaded bushing on said carrier, means for holding said bushing against rotation to permit the carrier to be elevated by the rotation of the screw or to permit it to rotate with the screw thereby imparting no movement to the carrier, and means for rotating the bushing independently of the screw so as to permit the carrier to be lowered.

14. Pile elevating means comprising: feed screws, a carrier for a sheet support, an internally threaded bushing loosely mounted to rotate in said carrier and in engagement with the feed screw, and means for preventing the rotation of said bushing with respect to the carrier.

15. Pile elevating means comprising: feed screws, a carrier for a sheet support, an internally threaded bushing loosely mounted in said carrier and in engagement with the feed screw, means for preventing the rotation of said bushing with respect to the carrier, and means for rotating said bushing independently of the movement of the screw, whereby said carrier may be moved with respect to the screw irrespective of the motion of the latter.

16. Pile elevating mechanism comprising: a main carrier, feed screws passing through said carrier, auxiliary carrier means, and means for driving said auxiliary carrier means directly from said feed screws.

Signed at New York city in the county of New York and State of New York this 14th day of October A. D. 1915.

LYMAN MIDDLEDITCH.