Feb. 28, 1939. L. BAKER 2,149,130

SHEET FEEDER

Filed July 25, 1935 3 Sheets-Sheet 1

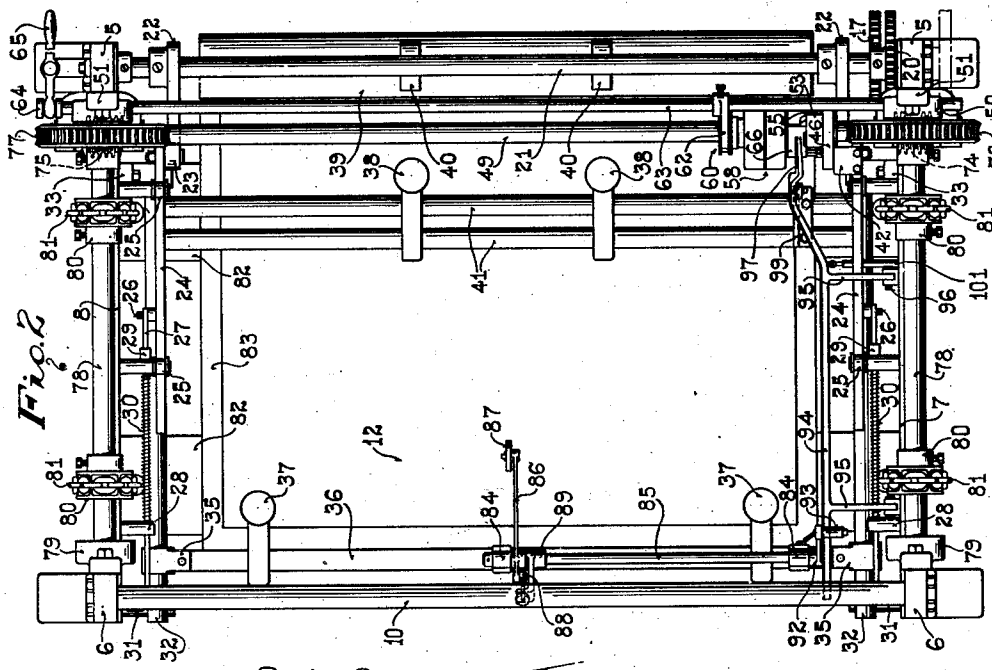

Fig. 2

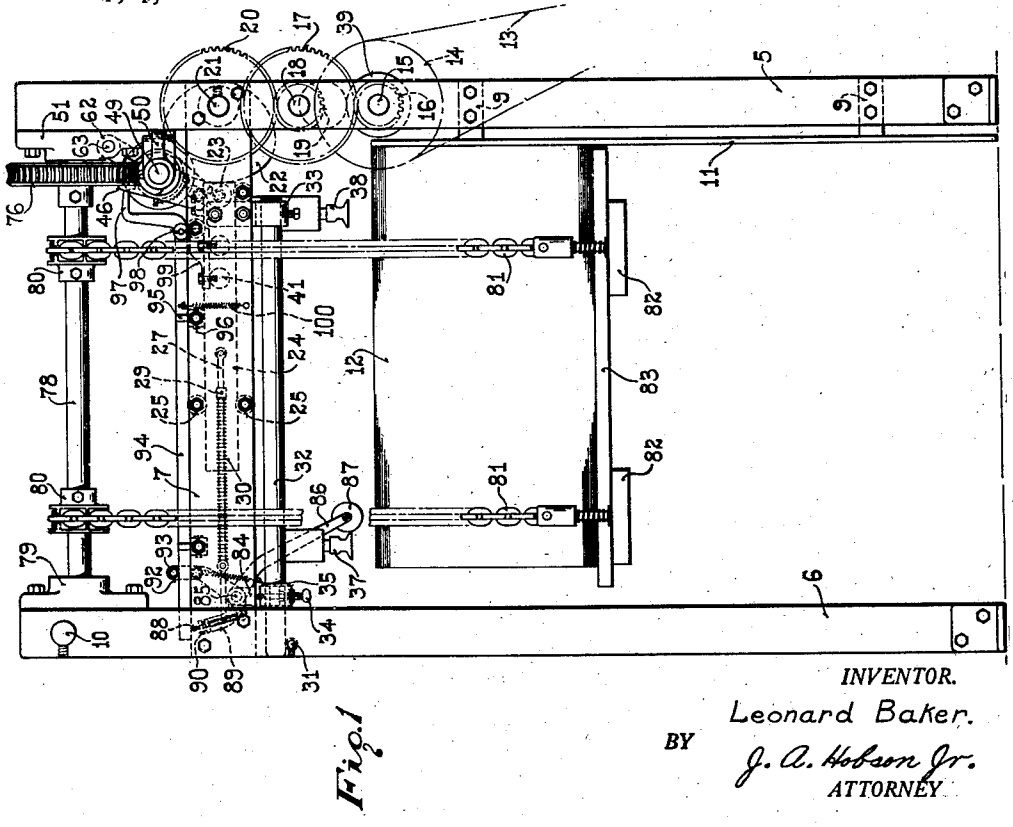

Fig. 1

INVENTOR.
Leonard Baker.
BY J. A. Hobson Jr.
ATTORNEY

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SHEET FEEDER

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Fig. 3

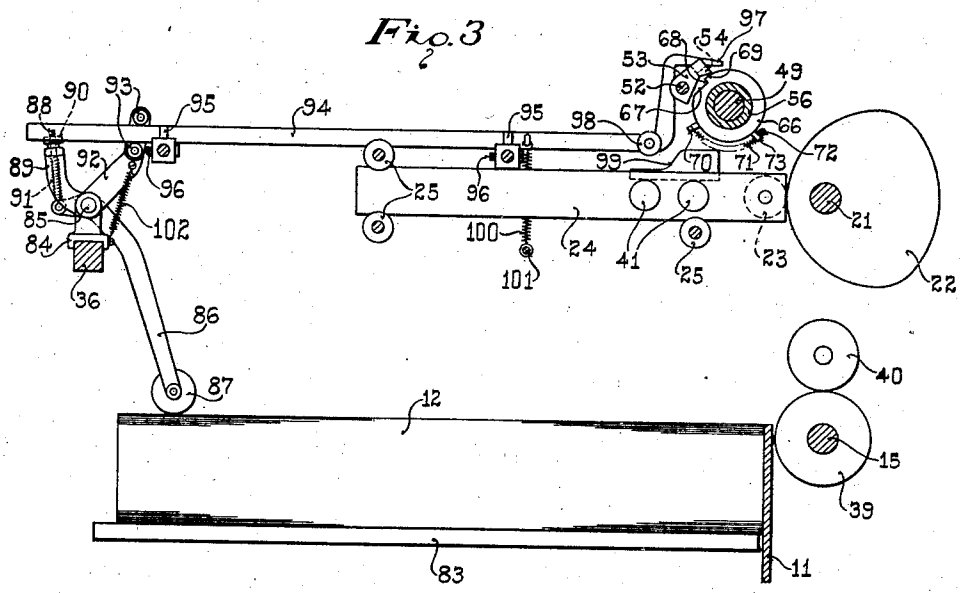
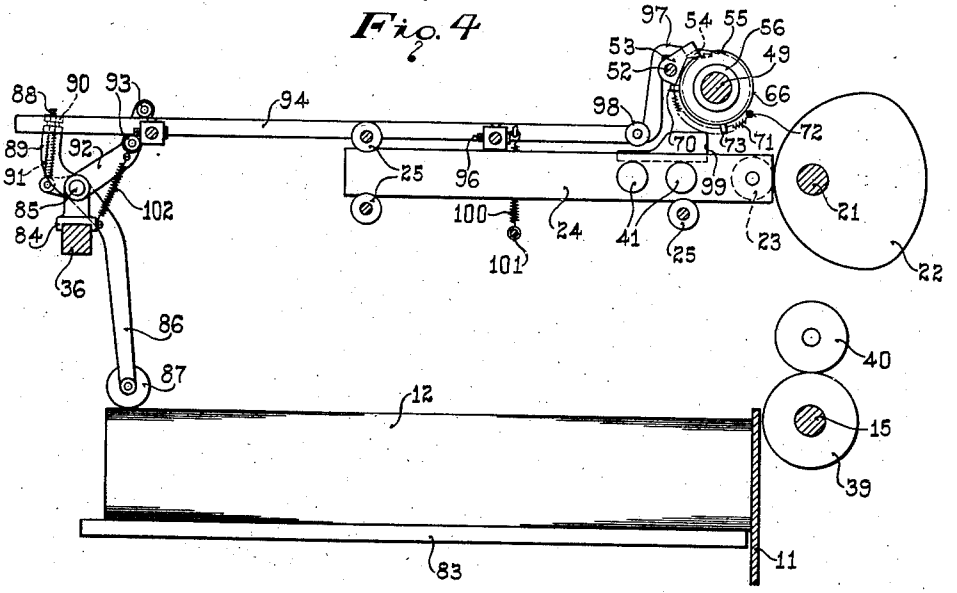


Fig. 4



INVENTOR.
Leonard Baker.

BY
J. A. Hobson Jr.
ATTORNEY

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SHEET FEEDER

Filed July 25, 1935 3 Sheets-Sheet 3

Fig. 5

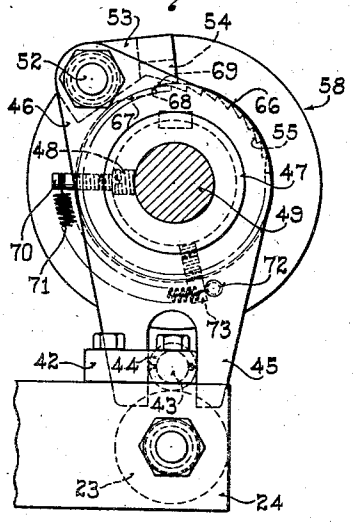


Fig. 6

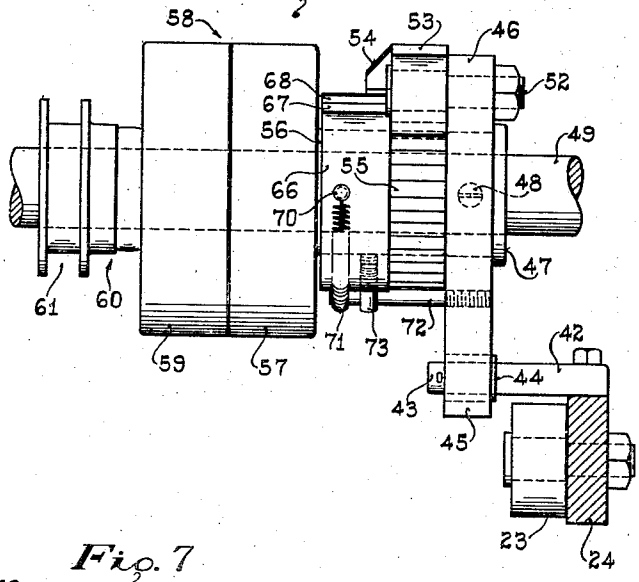


Fig. 7

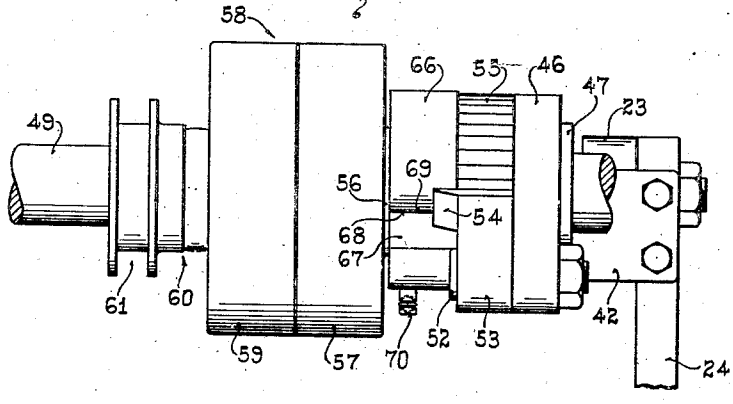
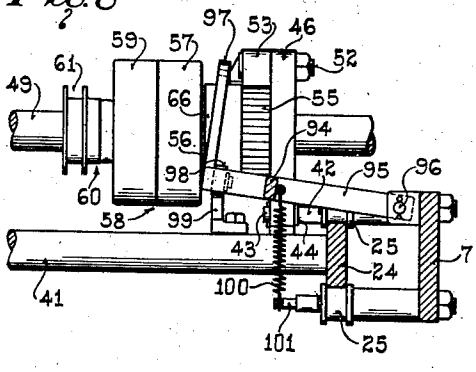


Fig. 8



INVENTOR.
Leonard Baker.
BY J. A. Hobson Jr.
ATTORNEY

Patented Feb. 28, 1939 2,149,130

UNITED STATES PATENT OFFICE

2,149,130

SHEET FEEDER

Leonard Baker, Hillsdale, N. J., assignor to Dexter Folder Company, New York, N. Y., a corporation of New York

Application July 25, 1935, Serial No. 33,002

20 Claims. (Cl. 271—62)

This invention relates to sheet feeders, and while capable of general use, is more particularly adapted for embodiment in feeders that move a supply of sheets during feeding of the latter successively from the supply to a printing press or other instrumentality to be fed.

One object of the present invention is to provide a sheet feeder having improved and simplified mechanism for operating the supply moving means.

Another object of the present invention is to provide a sheet feeder having feeding or forwarding means constructed and arranged so that it may be utilized to actuate the operating mechanism for the supply moving means.

Another object of the present invention is to provide a sheet feeder having improved mechanism for actuating the supply moving means and improved means for controlling the operation of said mechanism through movement of the sheet supply and removal of the sheets therefrom.

Another object of the present invention is to provide a sheet feeder having pawl and ratchet supply moving mechanism of improved construction and quick and positive action.

Another object of the present invention is to provide a sheet feeder having improved supply moving mechanism and improved control means therefor so arranged and constructed that it may be actuated by the operating means for said mechanism and controlled by movement of the supply and removal of sheets therefrom.

These and other objects of the present invention will appear as the following description thereof proceeds.

In order to more clearly understand this invention reference may be had to the accompanying drawings which illustrate one embodiment of the inventive idea.

In said drawings:

Fig. 1 is a side elevation of a sheet feeder having a pile elevator;

Fig. 2 is a top plan view thereof;

Fig. 3 is a side elevation, partly in section, of control means for the pile elevator, the parts being shown in the position they occupy when said elevator is at rest;

Fig. 4 is a view similar to Fig. 3, the parts being shown in the position they occupy when the pile elevator is about to be raised;

Fig. 5 is a fragmentary side elevation, partly in section, of pawl and ratchet mechanism employed to raise the pile elevator;

Fig. 6 is an end view of the mechanism shown in Fig. 5, looking from the left thereof;

Fig. 7 is a top plan view of the mechanism shown in Fig. 6; and

Fig. 8 is an end view similar to Fig. 6, showing control means for the pawl and ratchet mechanism.

Referring to the drawings, wherein like reference characters designate like parts throughout the several views, the various instrumentalities of the feeder are mounted on a frame comprised by front uprights 5 and rear uprights 6 connected together by side members 7 and 8 (Figs. 1 and 2). The uprights 5 and 6 are bolted or otherwise suitably secured to the machine foundation, the front uprights 5 being connected together by cross members 9 bolted or otherwise suitably secured thereto, and the rear uprights 6 being connected together by a cross member or stay shaft 10 bolted or otherwise suitably secured thereto. The cross members 9 have bolted or otherwise suitably secured thereto a plate 11 for guiding the front side of a supply or pile of sheets 12 that is supported on and lifted by mechanism hereinafter described.

The movable parts of the feeder are driven from any suitable source of power (not shown) by a sprocket chain 13 which passes around a sprocket 14 that is fixed on a shaft 15 extending transversely of the feeder and journalled in suitable bearings on the front uprights 5. This shaft 15 has fixed thereon a spur pinion 16 which meshes with a spur gear 17 that is journalled on a stud 18 secured in any suitable manner on one of the front uprights 5. Secured to or formed integrally with the spur gear 17 is a spur pinion 19 which meshes with a spur gear 20 that is fixed on a cam shaft 21 extending transversely of the feeder and journalled in suitable bearings on the uprights 5.

Fixed on the cam shaft 21 near opposite ends thereof are cams 22 which engage rollers 23 that are journalled in any suitable manner on the front ends of forwarder bars 24. These forwarder bars are slidably mounted on and between guide rollers 25 that engage the tops and bottoms of the bars and are journalled in any suitable manner on the side members 7 and 8. The forwarder bars 24 have secured thereto on studs 26, spring pressed rods 27 that pass through suitable openings in guide pins 28 secured to and projecting inwardly from the side members 7 and 8. The rods 27 have secured thereon collars 29 and the springs 30 for said rods are mounted thereon between said collars and the guide pins 28. It will thus appear that the forwarder bars 24 may be reciprocated forwardly and rearwardly

of the feeder and are cam operated in one direction and spring operated in the opposite direction when the cam shaft 21 is driven from the source of power through the described driving connections therebetween.

Secured to and projecting inwardly from the uprights 6 are lugs or pins 31 that support the rear ends of longitudinally extending bars 32. The front ends of these bars 32 are supported in, and secured by any suitable means to, brackets 33 which, in turn, are bolted or otherwise suitably secured to the side members 7 and 8. The longitudinally extending bars 32 have adjustably mounted thereon near the rear ends thereof, as by set screws 34, brackets 35 which are bolted or otherwise suitably secured to a square cross bar 36 carrying sheet separating devices 37. The bar 36 and separating devices 37 are thus adjustable forwardly and rearwardly of the feeder in accordance with the length of sheets being handled therein. The separating devices 37, as shown in the drawings, are preferably of the suction type and constructed and operated in any well known manner needing no detailed explanation herein. They act to lift the rear portion of the top sheet of pile 12 at the proper time during a cycle of operation of the feeder so that air may be blown under the sheet by suitable means (not shown) and so that the lifted and winded sheet may be advanced by forwarding devices 38 to feed and drop rollers 39 and 40 respectively or other suitable means for delivering the sheets from the feeder to a printing press or other instrumentality to be fed.

The feed roller 39 is fixed on and rotated by shaft 15 and the drop rollers 40 are mounted on and operated by mechanism (not shown) that serves to move said drop rollers toward and away from the feed roller at proper intervals during the operation of the feeder. The sheet forwarding devices 38, as shown in the drawings, are preferably of the suction type and are constructed and operated in a well known manner needing no detailed explanation herein. Said sheet forwarding devices are mounted on cross bars 41 that extend transversely of the feeder in parallel relation and are bolted or otherwise suitably secured on the forwarder bars 24. The suction separating devices 37 and the suction sheet forwarding devices 38 may be adjusted toward and away from each other along the cross bars 36 and 41 respectively in accordance with the width of sheets being handled in the feeder.

Bolted or otherwise suitably secured on one of the forwarder bars 24 is a bracket 42 provided with a stud 43 on which is journalled a roller 44 engaged in the lower forked end 45 of a pawl carrier 46. This pawl carrier 46 is journalled for oscillating movement by the forwarder bar aforesaid, on a collar or bushing 47 that is fixed by a counter-sunk set screw 48, on a shaft 49. This shaft 49 extends transversely of the feeder and is journalled in extensions 50 of brackets 51 that are bolted or otherwise suitably secured to the uprights 5 at the tops thereof. The pawl carrier 46 has pivoted thereon at the top thereof, as by a stud 52, a pawl 53 having a laterally and inwardly directed projection 54 on the nose thereof. This pawl 53, through oscillation of the carrier 46 by the forwarder bar connected therewith acts, under certain conditions, to engage the teeth of a ratchet 55 and thus raise the pile of sheets 12. For this purpose, the ratchet 55 is preferably fixed on a hub 56 of a member 57 of a clutch 58 the other member of which is indicated at 59. The clutch member 57 is loose on the shaft 49 and the clutch member 59 is fixed thereon. This clutch is of well known construction having elements (not shown) on one part thereof which may be engaged with and disengaged from the other clutch part thus enabling the shaft 49 to be driven by the pawl and ratchet or to remain inactive during operation of the pawl carrier, as desired.

The clutch 58 may be rendered operative or inoperative by any suitable means such, for example, as a sleeve-like operating member 60 provided with a groove 61 in which is engaged a fork 62. The fork 62 is fixed on a rod 63 extending transversely of the feeder and slidably mounted in suitable bearings in the brackets 51. The rod 63 is provided on one end thereof with a grooved collar 64 in which is located one end of an operating handle 65 pivoted in any suitable manner on one of the uprights 5. It will thus appear, that by actuating the handle 65 the described parts connected therewith may be operated to engage or disengage the clutch parts 57, 59 to enable shaft 49 to be driven or to prevent driving of the same, as desired.

Loosely mounted on the hub 56 of clutch part 57 is a pawl mask 66 disposed between said clutch part and the ratchet 55. This mask 66, under certain conditions, acts to prevent the pawl from engaging the ratchet 55, and under other conditions enables said pawl to engage said ratchet. For this purpose, the mask 66 is provided with a notch 67 on the periphery thereof. This notch 67 terminates at one end in a shoulder or abutment 68. The mask 66, which is of slightly greater diameter than the ratchet 55, is provided adjacent the shoulder 68 with a portion 69 beveled inwardly toward the same. When the pawl carrier 46 is oscillating and the pile of sheets 12 is stationary, the projection 54 on the nose of pawl 53 rests on the mask 66 as shown in Fig. 7, and said mask is oscillated with said pawl carrier. For this purpose, the mask 66 is provided with a pin 70 to which is attached one end of a coil spring 71. The opposite end of the spring 71 is secured to a pin 72 on the pawl carrier 46. A third pin 73 is secured on the mask 66 and normally maintained in engagement with the pin 72 by the spring 71 so as to hold the parts in the positions shown in Figs. 5 to 7, inclusive, wherein it will be noted that the pawl 53 is held out of engagement with the teeth of the ratchet 55 by the mask 66. The pin 73 is so positioned on the mask 66 that when it is engaged with the pin 72 through contracting action of the spring 71, the shoulder 68 is in alinement with the back of one of the teeth of the ratchet 55. The pawl 53 is thus supported to engage the first tooth of the ratchet to the rear of the shoulder 68 when the mask 66 and carrier 46 are moved relatively as hereinafter described. During clockwise movement of the pawl carrier 46 (Fig. 5) the mask 66 is moved therewith through engagement of the pins 72, 73, this of course being the case when the pawl 53 is held out of engagement with the ratchet 55 by the mask. During counterclockwise movement of the pawl carrier 46, and with the pawl 53 held out of engagement with the ratchet 55 by mask 66, said mask moves in said direction with the pawl carrier through the action of spring 71 and is prevented from overrunning the pawl carrier by engagement of pin 72 with pin 73.

The pile of sheets 12 is raised at intervals as sheets are fed off the top of the same by the

suction separating and forwarding devices 37 and 38. Raising of the pile of sheets is effected by the described pawl and ratchet mechanism the operation of which is controlled as hereinafter described. The pile supporting and elevating mechanism may be of any suitable construction and as herein shown, is operated by and consists of the following devices.

Fixed on the shaft 49 are right and left hand worms 74 and 75 which mesh with similar worm wheels 76 and 77 that are fixed on shafts 78. These shafts 78 extend longitudinally of the feeder at opposite sides thereof and are journalled in suitable bearings in the brackets 51 and brackets 79, the latter being bolted or otherwise suitably secured to the rear uprights 6. The shafts 78 have fixed thereon in spaced relation sprocket sheaves 80 around which pass chains 81 the links of which mesh with the teeth of said sheaves. The lower ends of chains 81 are suitably connected with cross beams 82 that support a platform 83 and the pile of sheets 12.

The operation of the pile elevator by the described pawl and ratchet mechanism is controlled by means constructed and arranged as follows. Bolted or otherwise suitably secured on the square cross bar 36 are brackets 84 having journalled therein a rock shaft 85. Loosely mounted on the rock shaft 85 adjacent the innermost bracket 84 is a lever 86, the lower end of which has journalled thereon a detector or feeler wheel or roller 87 for engagement with the top of the pile of sheets 12. The upper end of lever 86 has pivotally connected therewith a small spring pressed rod 88 the upper end of which is threaded and passes through a suitable opening in a small lever 89 that is fixed on the rock shaft 85. An adjusting nut 90 is threaded on rod 88 above lever 89, and a coil spring 91 is positioned on said rod between lever 86 and lever 89. By turning the nut 90 the lever 86 and feeler roller 87 may be raised or lowered slightly to adjust the operation as hereinafter described.

Fixed on the rock shaft 85 is a third lever 92 the upper end of which has journalled thereon in superposed spaced relation a pair of rollers 93. A bar 94 having a round top surface extends between the rollers 93 and is provided with arms 95 pivoted at 96 on the side member 7. The bar 94 is provided at the front thereof with a laterally, upwardly and forwardly directed detent 97 which extends over the mask 66 in such position that it may, under certain conditions, be engaged with and disengaged from the shoulder 68 of said mask. The bar 94 has journalled thereon a roller 98 which, during reciprocation of the forwarder carriage comprised by the bar 24 and cross bars 41, is engaged intermittently by a cam 99 bolted or otherwise suitably secured on cross bars 41. The bar 94 has attached thereto one end of a spring 100, the opposite end of which is attached to a pin 101 that is secured in any suitable manner on the side member 7. It will thus appear that when the forwarder carriage is reciprocated the bar 94 and detent 97 thereon will be cam operated in one direction and spring operated in the opposite direction to swing the detent toward and away from the mask 66. It will further appear that when the bar 94 and detent 97 are swung as aforesaid, the detector or feeler wheel or roller will, through the described connections therefor with said bar, be swung toward and away from the top of the pile of sheets 12. Raising and lowering of the detector may, if desired, be assisted by a spring 102 that has one end connected with the lever 92 and the opposite end connected with one of the brackets 84.

When the feeder is loaded and ready for operation the cam shaft 21 is driven from the source of power therefor and the clutch parts 57, 59 are engaged by the described means for this purpose so as to connect the ratchet 55 with the drive shaft 49. During rotation of cam shaft 21, forwarder frame 24, 41 is reciprocated by the described means for this purpose so that the detent 97 is rocked toward and away from the mask 66 and the feeler or detector wheel or roller 87 is rocked toward and away from the pile of sheets 12. As long as the top of the pile 12 is at a height where the sheet separating and forwarding devices 37, 38 can act to separate and deliver sheets from the pile, the feeler or detector wheel or roller 87 will, as shown in Fig. 3, be prevented from moving downwardly a sufficient distance to enable the detent 97 to enter the notch 67 of mask 66 and engage the shoulder 68 thereof.

The pile of sheets 12, the platform 83 and its elevating mechanism, and the driving connections for the latter will thus remain stationary because the pawl 53, through the action of spring 71 and pins 72, 73 in maintaining the mask 66 and the pawl carrier 46 in the relative positions thereof shown in Fig. 5 of the drawings, will be prevented by the mask from engaging ratchet 44 and driving shaft 49. Under these conditions the mask 66, the pawl carrier 46 and the pawl 53 will be oscillated as a unit by the forwarder frame 40, 41 with only an idling movement of the mask, carrier and pawl resulting therefrom.

When, through removal of sheets from the top of pile 12, the height thereof decreases to a certain extent the detent 97, through increased downward movement of the feeler or detector wheel or roller 87, as shown in Fig. 4, is enabled to enter the notch 67 of mask 66 back of the shoulder 68. The mask is thus prevented from completing a counter-clockwise turning movement (Fig. 4) with the pawl carrier 46. The pawl carrier, however, completes said movement during which the spring 71 is expanded, the pawl projection 53 drops into the notch 67 back of shoulder 68, and the pawl 53 drops into the ratchet 55 at the back of the first tooth thereon rearwardly of said shoulder. The pawl carrier 46 then turns in a clockwise direction (Fig. 4) during which like movement is imparted to the ratchet 55 by pawl 53 and to the mask 66 by engagement of pawl projection 54 with the shoulder 68. During this clockwise turning movement of the parts, the spring 71 remains expanded and the shaft 49 is partially rotated to raise the platform 83 and pile of sheets 12 through the described driving connections between said shaft and said platform.

Upon reverse or counter-clockwise movement of the pawl carrier 46 the pawl 53 will ride up over the teeth of ratchet 55 and the spring 71 will move the mask 66 counter-clockwise faster than the pawl carrier until the bevel 69 on said mask engages under the pawl projection 54 and the pin 73 engages the pin 72. The pawl 53 is thus held out of engagement with ratchet 55 and the parts, in this position, then complete the counter-clockwise turning movement. While the ratchet 55 is being operated as above described, the detent 97 is raised by the cam 99, and when the pawl 53 moves reversely over the teeth of the ratchet 55, detent 97 is lowered by gravity and the spring 102. If the pile of sheets 12 has

not been elevated sufficiently, the detent 97 will again enter the notch 67 of mask 66 back of shoulder 68 and the described operations of the pawl and ratchet mechanism and the pile elevating mechanism will be repeated until the top of the pile reaches the proper and predetermined height. In this event, the detent 97 will be prevented from entering the notch 67 of mask 66 through failure of the feeler or detector wheel or roller 87 to lower a sufficient distance. The pawl carrier 46, pawl 53 and mask 66 then operate idly, as before described, until the height of the pile again decreases to an extent such as to require further elevation thereof.

The aforesaid operations are repeated until it is desired to stop the operation of the pile elevating mechanism or until the supply of sheets is exhausted and it is desired to stop and reload said mechanism. Stopping of the pile elevating mechanism is accomplished by disengaging the clutch members 57, 59 through the medium of the handle 65 and parts connected therewith. When the clutch 58 is thus rendered inoperative, the pawl carrier 46, pawl 53 and mask 66 may continue to move if the forwarder is operating as, in this case, the ratchet 55 is disconnected from shaft 49. The chains 81 and platform 85 may then be moved downwardly to reload the feeders by imparting reverse rotation to the shaft 49, shafts 78, the gears 74—77 by a hand crank or other suitable means for this purpose (not shown). It will thus appear that it is not necessary to stop the operation of the forwarder frame 24, 41 during reloading of the feeder although this may be done, if desired by shutting off the source of power connected therewith. After the feeder has been reloaded, the clutch is rendered effective by the described means for this purpose, the cam shaft 21 is driven from the source of power, and the operation proceeds as before.

The present invention may be embodied in various types of feeders and while a pile type embodiment of said invention is herein illustrated and described with more or less particularity it is to be expressly understood that the invention is not limited to said embodiment or otherwise than by the terms of the appended claims.

What I claim is:

1. In a sheet feeder, means for moving a supply of sheets, pawl and ratchet mechanism for operating the same, reciprocating means for feeding sheets from the supply and for operating the pawl and ratchet mechanism, a pivoted device for controlling the operation of the pawl and ratchet mechanism by the reciprocating means, a cam on the reciprocating means for oscillating the pivoted device, and supply controlled means connected with said device for rendering the same effective or ineffective.

2. In a sheet feeder, means for moving a supply of sheets, a shaft for operating said means, mechanism for driving the shaft comprising a clutch thereon, a ratchet fixed on the clutch, a carrier loosely mounted on the shaft, and a pawl pivoted on the carrier, a mask loosely mounted on the clutch for preventing engagement of the pawl with the ratchet when said mask is continuously oscillated with the carrier, means for oscillating the carrier, pawl and mask, means for stopping the mask and enabling the pawl to engage the ratchet and drive said shaft through continued oscillation of the carrier, and connections between the carrier and the mask providing for stopping of the latter and continued oscillation of said carrier.

3. In a sheet feeder, means for moving a supply of sheets, a shaft for operating said means, mechanism for driving the shaft comprising a clutch thereon, a ratchet fixed on the clutch, a carrier loosely mounted on the shaft at one side of the ratchet, and a pawl pivoted on said carrier, a mask loosely mounted on the clutch at the opposite side of the ratchet for preventing engagement of the pawl therewith when said mask is continuously oscillated with the carrier, and connections between the carrier and the mask providing for stopping of the latter and continued oscillation of said carrier.

4. In a sheet feeder, means for moving a supply of sheets, a shaft for operating said means, mechanism for driving the shaft comprising a clutch thereon, a ratchet fixed on the clutch, a carrier loosely mounted on the shaft, and a pawl pivoted on said carrier, a mask having a notch therein and loosely mounted on the clutch, said mask supporting the pawl out of the notch and away from the ratchet when the mask is continuously oscillated with the carrier, means for removing sheets from the supply and for oscillating the carrier, the pawl, and the mask, supply controlled means for engaging the notch of the mask to stop movement of the latter in one direction and enable the pawl to engage the ratchet and drive said shaft through continued oscillation of the carrier, and connections between the carrier and the mask providing for stopping of the latter and continued oscillation of said carrier.

5. In a sheet feeder, an elevator for a supply of sheets, means including a shaft for raising the elevator and the supply of sheets, mechanism for driving the shaft comprising a ratchet, means for connecting the ratchet with the shaft, a carrier loosely mounted on said shaft at one side of the ratchet, and a pawl pivoted on said carrier and having a projection, a notched mask extending under said projection and of slightly greater diameter than the ratchet, said mask being loosely mounted on the shaft at the opposite side of the ratchet and engaged by the projection of the pawl to hold the latter out of engagement with the ratchet when said mask is continuously oscillated with the carrier, suction means for forwarding sheets from the pile and for oscillating the carrier, pawl and mask, a pivoted device adapted for engagement with and disengagement from the notch of the mask to start and stop the operation of the latter and the ratchet and thereby start and stop movement of the shaft and the elevator, means for oscillating the pivoted device, and a pile controlled detector connected with said pivoted device for rendering the same effective or ineffective.

6. In a sheet feeder, an elevator for a pile of sheets, suction means for forwarding sheets successively from the top of the pile, a bar located horizontally above the pile and carrying the suction sheet forwarding means, guide means for the bar supporting it for right line reciprocating movement, means for imparting horizontal right line reciprocating movement to the bar and the suction sheet forwarding means, a shaft connected with the elevator for operating the same, means for driving the shaft including pawl and ratchet mechanism mounted thereon, and means for operating the pawl and ratchet mechanism comprising a carrier for the pawl thereof pivotally mounted on said shaft and pivotally connected with and actuated by said bar.

7. In a sheet feeder, an elevator for a pile of sheets, suction means for forwarding sheets successively from the top of the pile, a bar located horizontally above the pile and carrying the suction sheet forwarding means, guide means for the bar supporting it for right line reciprocating movement, means for imparting horizontal right line reciprocating movement to the bar and said suction sheet forwarding means, pawl and ratchet mechanism for operating said elevator, means for operating the pawl and ratchet mechanism connected with and actuated by said bar, and pile controlled means controlling the operation of the pawl and ratchet mechanism and pivoted independently of the bar on an axis extending transversely of the axis of rotation of said mechanism.

8. In a sheet feeder, an elevator for a pile of sheets, suction means for forwarding sheets successively from the top of the pile, a bar located horizontally above the pile and carrying the suction sheet forwarding means, guide means for the bar supporting it for right line reciprocating movement, a driven cam and spring means both operatively engaged with the bar for imparting horizontal right line reciprocating movement to the same and said suction sheet forwarding means, a shaft connected with the elevator for operating the same, means for driving the shaft including a pawl and ratchet mechanism mounted thereon, means for operating the pawl and ratchet mechanism comprising a carrier for the pawl thereof mounted on said shaft and connected with and actuated by said bar, and pile controlled means controlling the operation of the pawl and ratchet mechanism and pivoted independently of the bar on an axis extending transversely of the axis of rotation of said mechanism.

9. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier mounted at one side of the ratchet independently thereof, a cylindrical member mounted at the opposite side of the ratchet independently thereof and having a cut-out portion and a shoulder in its periphery, connections between the cylindrical member and the pawl carrier enabling the latter to be continuously oscillated with or without corresponding oscillation of said member, a pawl on the pawl carrier extending therefrom over the ratchet and the cylindrical member and normally resting on the latter adjacent its shoulder and removed from said cut-out portion and the ratchet, and pile controlled means for engaging the shoulder of the cylindrical member to stop it during movement of the same and the pawl carrier in one direction and enable the pawl to engage the ratchet and shoulder and drive said ratchet, said cylindrical member, and said driving element during movement of said pawl carrier in the opposite direction.

10. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier pivotally mounted adjacent the ratchet independently thereof, a cylindrical member rotatably mounted adjacent the ratchet independently thereof and having a cut-out portion and a shoulder in its periphery, a pawl on the carrier projecting over the ratchet and the cylindrical member, a yieldable connection between the carrier and the cylindrical member normally holding the latter relative to the carrier so that the pawl rests on said member adjacent said shoulder and removed from said cut-out portion and the ratchet, said connection providing for continuous oscillation of the pawl carrier with or without corresponding oscillation of the cylindrical member, and pile controlled means for engaging the shoulder of the cylindrical member to stop it and enable the pawl to drop into engagement with the ratchet through said cut-out portion and drive said ratchet and said driving element during continued oscillation of said pawl carrier.

11. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier mounted at one side of the ratchet, independently thereof, a cylindrical member of slightly greater diameter than the ratchet mounted at its opposite side independently thereof and having a cut-out portion and a shoulder in its periphery, a yieldable connection between the cylindrical member and the pawl carrier enabling the latter to be continuously oscillated with or without corresponding oscillation of said member, a pawl on the carrier extending therefrom across the ratchet over the cylindrical member and held thereon adjacent its shoulder out of the cut-out portion and ratchet by action of said yieldable connection, and pile controlled means for engaging the shoulder of the cylindrical member to stop it during movement of the same and the carrier in one direction and enable the pawl to engage the ratchet and said shoulder through said cut-out portion and drive the ratchet, the cylindrical member, and said driving element during movement of the pawl carrier in the opposite direction, said pawl being raised out of engagement with the ratchet and over said shoulder through movement of the pawl carrier and cylindrical member in the first named direction and overrunning action of said member relative to said carrier produced by the yieldable connection therebetween.

12. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier pivoted at one side of the ratchet independently thereof, a cylindrical member rotatably mounted on the opposite side of the ratchet independently thereof and having a cut-out portion and a shoulder in its periphery, a pawl on the carrier having a nose extending therefrom across the ratchet and over the cylindrical member, connections between the pawl carrier and the cylindrical member normally holding the latter relative to the pawl carrier so that the nose of the pawl rests on said shoulder above the cut-out portion and the ratchet, said connections providing for oscillation of the pawl carrier with or without corresponding oscillation of the cylindrical member, and pile controlled means for engaging the shoulder on the cylindrical member to stop it on movement of the same in one direction with the pawl carrier and enable the nose of the pawl to engage the ratchet and said shoulder through said cut-out portion and drive said ratchet, said member, and said driving element during movement of the pawl carrier in the opposite direction.

13. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier and a rotatable cylindrical member both arranged co-axially with re-

spect to the ratchet and movable independently thereof, said cylindrical member having a cut-out portion and a shoulder in its periphery, a pawl on the carrier extending therefrom over the ratchet and the cylindrical member, a pin on the pawl carrier projecting laterally therefrom across the ratchet and the cylindrical member, a spring connecting the pin with the cylindrical member enabling the pawl carrier to be oscillated with or without corresponding oscillation of the cylindrical member and normally holding the cylindrical member relative to the pawl carrier so that the pawl rests on said shoulder and is removed from said cut-out portion and the ratchet, and pile controlled means for engaging the shoulder of the cylindrical member to stop it on movement of the same and the pawl carrier in one direction and enable the pawl to engage said shoulder and the ratchet through said cut-out portion and drive said ratchet, said cylindrical member and said driving element on movement of said pawl carrier in the opposite direction.

14. In a sheet feeder, a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier mounted at one side of the ratchet independently thereof, a cylindrical member rotatably mounted on the opposite side of the ratchet independently thereof and having a cut-out portion and a shoulder in its periphery, a pawl on the carrier extending therefrom across the ratchet and over the shoulder on the cylindrical member, a pin on the pawl carrier extending laterally therefrom across the ratchet and the cylindrical member, a spring connecting said pin and the cylindrical member providing for continuous oscillation of the pawl carrier with or without corresponding oscillation of the cylindrical member, a pin on the cylindrical member normally engaged with said first named pin by said spring and acting therewith to normally hold the cylindrical member relative to the pawl carrier so that said member supports the pawl on said shoulder and removed from said cut-out portion and the ratchet, and pile controlled means for engaging the shoulder on the cylindrical member to stop it on movement of the same in one direction with the pawl carrier and enable the pawl to engage said shoulder and the ratchet through said cut-out portion and drive said ratchet, said cylindrical member and said driving element on movement of said pawl carrier in the opposite direction.

15. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, a cylindrical member of slightly greater diameter than the ratchet rotatably and independently mounted adjacent the same at one side thereof and having a cut-out portion and a shoulder in its periphery, an oscillating pawl carrier adjacent the opposite side of the ratchet pivoted independently thereof and having a pawl extending thereacross over the shoulder on the cylindrical member to drop into the ratchet through said cut-out portion when said member is stopped on idle movement thereof with the pawl carrier in one direction, means adapted, when the pawl has engaged the ratchet, to move the cylindrical member relative to the pawl carrier on idle movement thereof so that the shoulder on said member removes the pawl from the ratchet and prevents it from riding thereon, said means comprising a yieldable connection between the cylindrical member and the pawl carrier enabling continuous oscillation of the latter with or without corresponding oscillation of the cylindrical member and normally holding the cylindrical member relative to the pawl carrier so that said shoulder supports the pawl above said cut-out portion and removed from the ratchet, and pile controlled means for engaging the shoulder of the cylindrical member on idle movement of the same and the pawl carrier in one direction, whereby said pawl may drop through the cut-out portion of the cylindrical member, engage the shoulder thereon and the ratchet, and turn said ratchet, said cylindrical member and said driving element on following movement of the pawl carrier in the opposite direction.

16. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier mounted at one side of the ratchet independently thereof, a member mounted at the opposite side of the ratchet independently thereof and having a shoulder or abutment thereon, connections between the member and the pawl carrier enabling the latter to be continuously oscillated with or without corresponding oscillation of said member, a pawl on the pawl carrier extending therefrom across the ratchet and the member and normally maintained out of engagement with said ratchet by said connections, and pile controlled means for engaging the shoulder or abutment of the member to stop it during movement of the pawl carrier in one direction, allow the pawl to engage the ratchet when the member is stopped and during movement of the pawl carrier in said direction, and enable the pawl to drive said ratchet and said driving element during movement of said pawl carrier in the opposite direction.

17. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier pivotally mounted adjacent the ratchet independently thereof, a member rotatably mounted adjacent the ratchet independently thereof and having a shoulder or abutment thereon, a pawl on the carrier projecting over the ratchet and the member, connections between the carrier and the member normally holding the latter relative to the carrier so that the pawl rests on said shoulder or abutment and is removed from the ratchet, said connections providing for continuous oscillation of the pawl carrier with or without corresponding oscillation of the member, and pile controlled means for engaging the shoulder or abutment of the member to stop it and enable the pawl to drop over the shoulder or abutment into engagement with the ratchet and drive said ratchet, said member and said driving element during continued oscillation of said pawl carrier.

18. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier mounted at one side of the ratchet independently thereof, a member mounted at the opposite side of the ratchet independently thereof and having a shoulder or abutment thereon, a yieldable connection between the member and the pawl carrier enabling the latter to be continuously oscillated with or without corresponding oscillation of said member, a pawl on the carrier extending therefrom across the ratchet over the member and held

adjacent its shoulder or abutment out of engagement with the ratchet by action of said yieldable connection, and pile controlled means for engaging the shoulder or abutment of the member to stop it during movement of the same and the carrier in one direction and enable the pawl to engage the ratchet and said shoulder or abutment and drive the ratchet, the member, and said driving element during movement of the pawl carrier in the opposite direction, said pawl being raised out of engagement with the ratchet and over said shoulder or abutment through movement of the pawl carrier and member in the first named direction and over-running action of said member relative to said carrier produced by the yieldable connection therebetween.

19. In a sheet feeder having a pile elevator and means for operating it including a driving element, a ratchet fixed on the driving element, an oscillating pawl carrier pivoted at one side of the ratchet independently thereof, a member rotatably mounted on the opposite side of the ratchet independently thereof, said member having a cut-out portion and a shoulder thereon, a pawl on the carrier having a nose extending therefrom across the ratchet and the member, connections between the pawl carrier and the member normally holding the latter relative to the pawl carrier so that the nose of the pawl rests on said shoulder above the cut-out portion and the ratchet, said connections providing for oscillation of the pawl carrier with or without corresponding oscillation of the member, and pile controlled means for engaging the shoulder of the member to stop it on movement of the same in one direction with the pawl carrier and enable the nose of the pawl to engage the ratchet through said cut-out portion and drive said ratchet and said driving element during movement of the pawl carrier in the opposite direction.

20. In a sheet feeder, a pile elevator and means for operating it including a driving element, a ratchet fixed on the dirving element, an oscillating pawl carrier mounted at one side of the ratchet independently thereof, a member rotatably mounted on the opposite side of the ratchet independently thereof and having a shoulder or aubtment thereon, a pawl on the carrier extending therefrom across the ratchet and the member, a pin on the pawl carrier extending laterally therefrom across the ratchet and the member, a spring connecting said pin and the member providing for continuous oscillation of the pawl carrier with or without corresponding oscillation of the member, a pin on the member normally engaged with said first named pin by said spring and acting therewith to normally hold the member relative to the pawl carrier so that said shoulder or abutment supports the pawl out of engagement with the ratchet, and pile controlled means for engaging the shoulder or abutment of the member to stop it on movement of the same in one direction with the pawl carrier, allow the pawl to engage the ratchet when the member is stopped and during movement of the pawl carrier in said direction, and enable the pawl to drive said ratchet and said driving element on moyement of said pawl carrier in the opposite direction.

LEONARD BAKER.