

Dec. 12, 1939.

L. BAKER

2,183,128

SHEET FEEDING APPARATUS

Filed July 2, 1938

3 Sheets-Sheet 1

Fig. 1

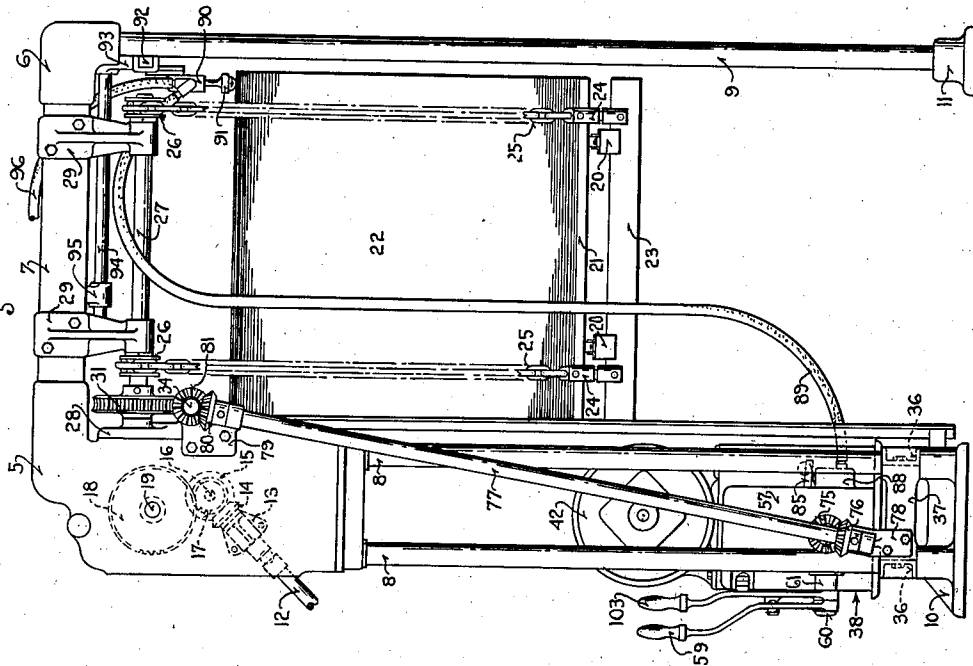
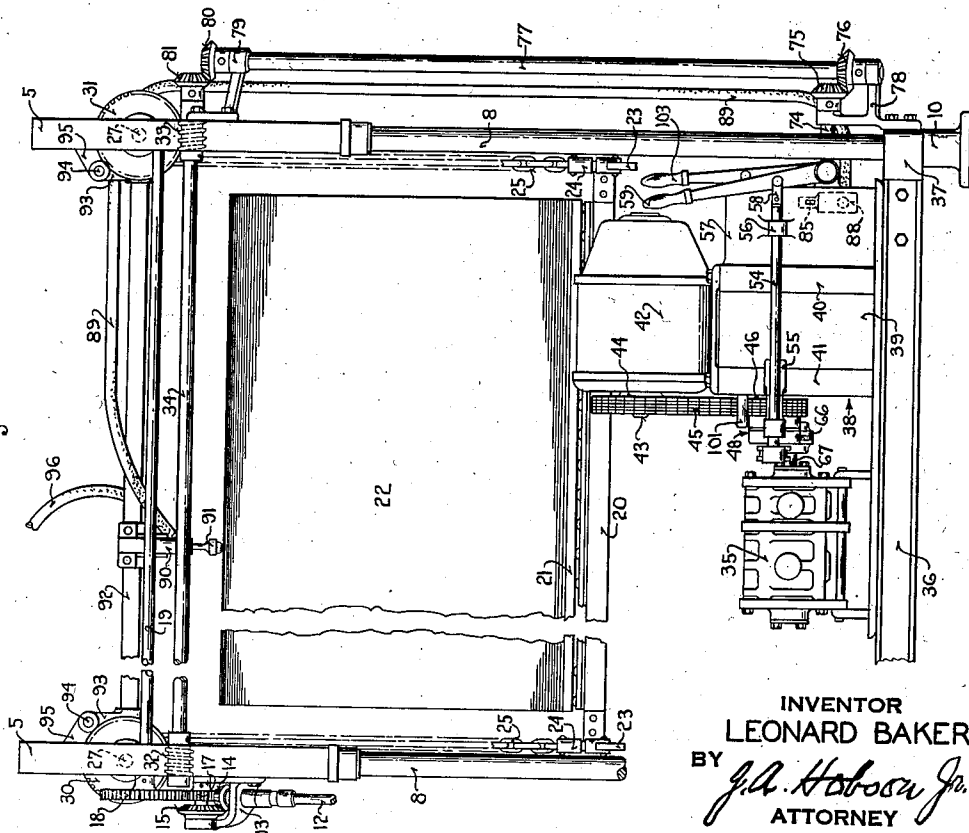


Fig. 2



INVENTOR
LEONARD BAKER
BY *J. A. Hobson Jr.*
ATTORNEY

Dec. 12, 1939.

L. BAKER

2,183,128

SHEET FEEDING APPARATUS

Filed July 2, 1938

3 Sheets-Sheet 2

Fig. 3

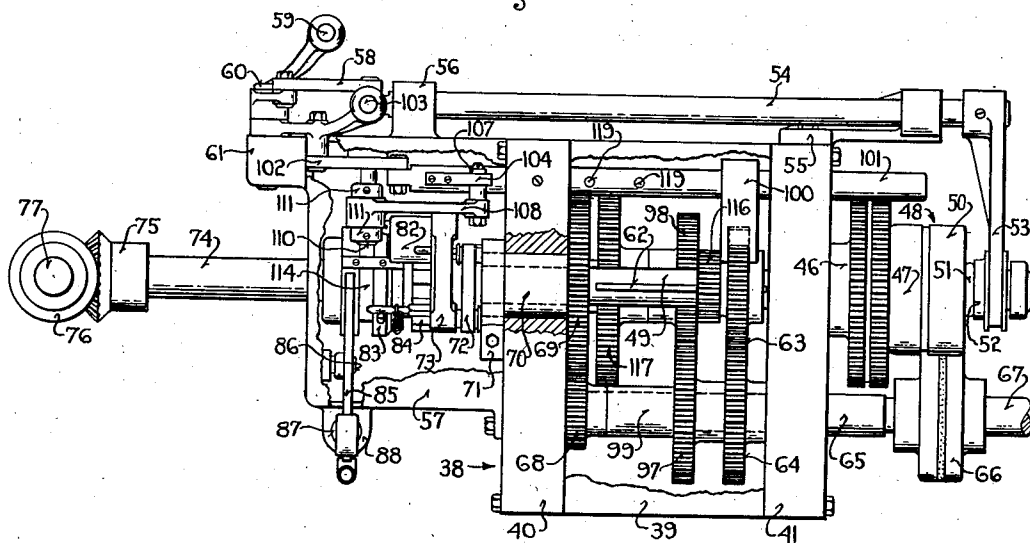
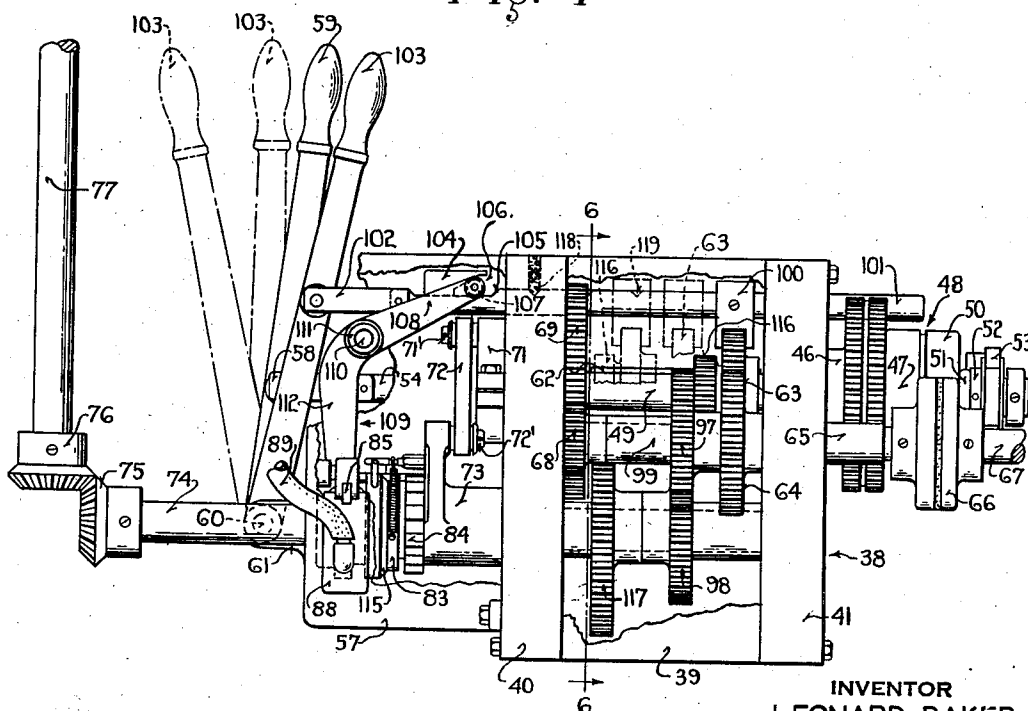


Fig. 4



INVENTOR
LEONARD BAKER
BY *J. A. Hobbs, Jr.*
ATTORNEY

Dec. 12, 1939.

L. BAKER

2,183,128

SHEET FEEDING APPARATUS

Filed July 2, 1938

3 Sheets-Sheet 3

Fig. 5

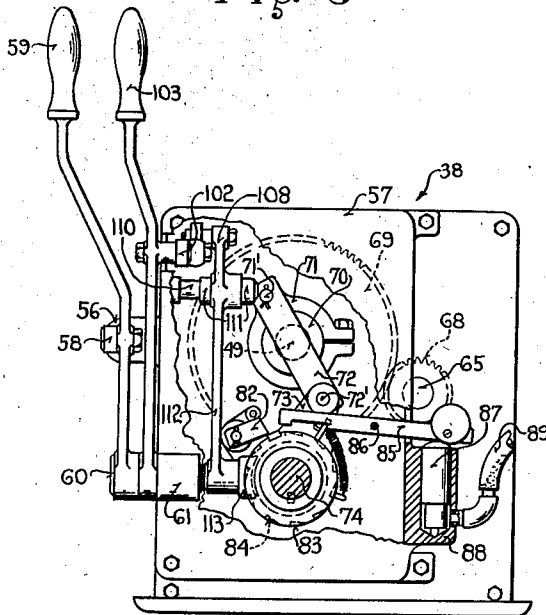


Fig. 7

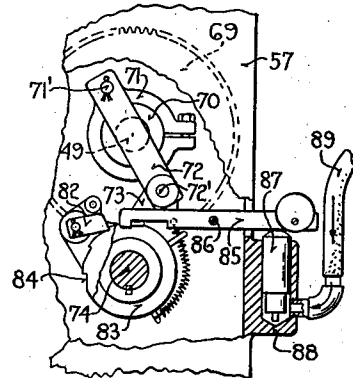


Fig. 6

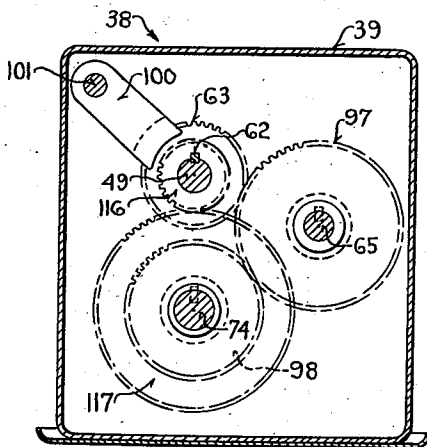
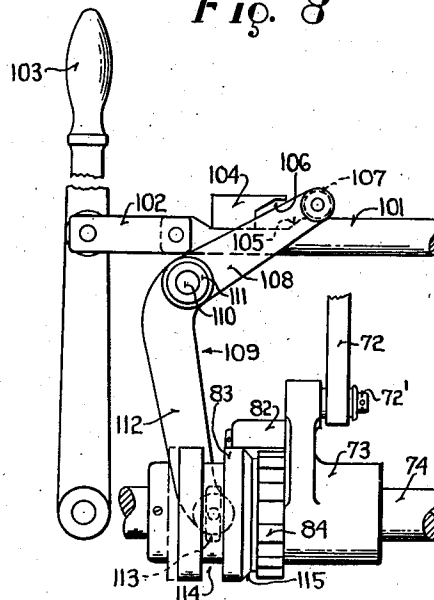


Fig. 8



INVENTOR
LEONARD BAKER
BY *J. A. Hobson Jr.*
ATTORNEY

UNITED STATES PATENT OFFICE

2,183,128

SHEET FEEDING APPARATUS

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

Application July 2, 1938, Serial No. 217,199

14 Claims. (Cl. 271—62)

This invention relates to sheet feeders and more particularly to pile elevators and mechanism for operating the same.

One object of the present invention is to provide a sheet feeder having novel and improved mechanism for imparting either intermittent or continuous motion, as desired, to a pile elevator of said feeder.

Another object of the present invention is to provide a sheet feeder wherein intermittent or continuous movement of its pile elevator and control of such movements may be effectively and conveniently obtained through the provision of a single, unitary mechanism.

Another object of the present invention is to provide a sheet feeder wherein the sheet feeding elements and usual driving means therefor are relieved from the strain of operation of the sheet supply moving means through the provision of separate and unitary operating mechanism therefor.

Another object of the present invention is to provide a sheet feeder wherein intermittent upward movement of its pile elevator, as well as continuous and rapid up and down movement thereof, may be obtained from a single selective gear transmission through the provision therein of a pawl and ratchet mechanism operated by certain gears thereof.

Another object of the present invention is to provide, generally, a selective gear transmission unit by which intermittent motion, as well as continuous motion, may be imparted to a part of a sheet feeder or any other machine or instrumentality.

These and other objects of the present invention will appear as the following description thereof proceeds and in order to more clearly understand said invention reference may be had to the accompanying drawings which illustrate one embodiment of said invention.

In said drawings:

Fig. 1 is a side elevation of a sheet feeder embodying the present invention;

Fig. 2 is a front elevation of the sheet feeder shown in Fig. 1;

Fig. 3 is an enlarged fragmentary top plan view, partly in section, of the pile elevator operating mechanism and control means therefor shown in Figs. 1 and 2;

Fig. 4 is an enlarged fragmentary rear elevation of the pile elevator operating mechanism shown in Fig. 3;

Fig. 5 is an enlarged fragmentary side view, partly in section, of the mechanism shown in

Figs. 3 and 4 looking from the left thereof and illustrating in inoperative position a pawl and ratchet device and control means therefor forming part of said mechanism;

Fig. 6 is an enlarged vertical transverse sectional view on the line 6—6 of Fig. 4;

Fig. 7 is a view similar to Fig. 5 showing the pawl and ratchet mechanism and control means therefor in operative position; and

Fig. 8 is an enlarged fragmentary rear elevation of the pawl and ratchet mechanism, showing means for disconnecting said mechanism from the pile elevator when it is continuously and rapidly raised or lowered.

Referring to the drawings wherein like reference characters designate like parts throughout the several views, the present invention is shown as embodied in a sheet feeder having a frame comprised by front heads 5 and rear heads 6 connected together by side members 7. The front and rear heads 5, 6 are secured to, and supported by, upright posts or standards 8 and 9 which are bolted or otherwise suitably secured to the machine foundation as by brackets 10 and 11. The main and usual drive for the feeder is preferably comprised by an inclined driven jack shaft 12 which, in turn, is driven from a printing press or other machine with which the feeder is associated. The upper end of this jack shaft 12 is journaled in a suitable bearing provided by a bracket 13 that is bolted or otherwise suitably secured on one of the front heads 5. Fixed on the upper end of jack shaft 12 is a bevel gear 14 which meshes with a similar gear 15 fixed on a short shaft 16 journaled in suitable bearings in the bracket 13 and the adjacent front head 5. Fixed on the short shaft 16 is a spur pinion 17 which meshes with a spur gear 18 that is fixed on a cam shaft 19. This cam shaft 19 is journaled in suitable bearings in the front heads 5 and is utilized to operate the sheet separating, forwarding and conveying devices (not shown) of the feeder.

The sheet feeder includes a pile elevator comprising cross beams 20 adapted to support a pile board 21 and pile of sheets 22 thereon. The cross beams 20 engage over side members 23 connected, as by couplings 24, with chains 25 the links of which engage over teeth of sheaves 26 fixed on and rotated by shafts 27. Shafts 27 extend longitudinally of the feeder frame and are journaled in suitable bearings in brackets 28 and 29 which are bolted or otherwise suitably secured to the front heads 5 and side members 7, respectively. Fixed on shafts 27 are right and left hand

worm gears 30 and 31 that mesh with right and left hand worms 32 and 33 fixed on a shaft 34 which is driven in a manner hereinafter described to operate the pile elevator. Shaft 34 extends transversely of the feeder frame and is journaled in suitable bearings in the brackets 28.

The sheets are separated and forwarded one after another from the top of the pile by separating and forwardly devices of the suction type (not shown) which are suitably connected with the vacuum side of a pump 35. Preliminary to the separating and forwarding of sheets from the top of the pile, the upper portion of the pile and each sheet separated therefrom is wound by winding devices (not shown) which are suitably connected with the air side of pump 35. These devices form no part of the present invention and it is therefore unnecessary to illustrate and describe the same in detail. Pump 35 is bolted or otherwise suitably secured to a pair of cross rails 36 which are bolted or otherwise suitably secured at opposite sides of the feeder frame to brackets 37 carried by the front upright posts or standards 8 and resting on the brackets 10.

In accordance with one aspect of the present invention, the feeder is provided with novel and improved mechanism for intermittently raising the pile elevator and pile of sheets 22 thereon to maintain the top of the pile in proper feeding position, and for continuously and rapidly lowering and raising the pile elevator to load or reload it. This mechanism is preferably mounted, constructed and operated as follows. Bolted or otherwise suitably secured to the cross rails 36 at one side of pump 35 is a housing indicated broadly at 38 (Figs. 1 to 4 inclusive) and comprised by an inner shell 39, an end plate 41, an intermediate plate 40, and a cover 57 all bolted together in any suitable manner. Bolted or otherwise suitably secured to the plates 40, 41 of housing 38 at the tops thereof is an electric motor 42 (Figs. 1 and 2) connected with a suitable source of current and controlled for starting and stopping purposes by suitable switch means (not shown).

Fixed on the armature shaft 43 of motor 42 is a sprocket 44 around which passes a chain 45 that also passes around a sprocket 46. This sprocket 46 and a part 47 of a clutch indicated broadly at 48 (Figs. 3 and 4) are secured to or formed integrally with each other and loosely mounted on a short driving shaft 49 which extends through the housing 38 and is journaled in suitable bearings in the plates 40 and 41 thereof. The clutch 48 is of well known construction needing no detail description herein and includes another part 50 which is fixed on the driving shaft 49. The parts of the clutch 48 may be connected and disconnected by a device 51 (Fig. 3) loosely and slidably mounted on the driving shaft 49 and provided with a collar 52 in the groove of which extends an operating fork 53. This fork 53 is fixed on one end of a shaft 54 which is slidably mounted in suitable bearings in a bracket 55 bolted or otherwise suitably secured to plate 41 and in a lug 56 formed on the cover 57. Cover 57 of housing 38 encloses a pawl and ratchet mechanism hereinafter described for intermittently raising the elevator. Pivotaly connected with the opposite end of shaft 54 is one end of a link 58 (Figs. 3, 4 and 5) the opposite end of which is pivotally connected with a lever 59 that is pivotally mounted on a

stud 60 secured in a lug 61 formed on the cover 57. It will thus appear that the clutch parts 47 and 50 may be connected and disconnected through movement of the lever 59 in opposite directions and thus connect and disconnect the motor 42 relative to the driving shaft 49.

The driving shaft 49 is provided longitudinally thereof with a key 62 (Figs. 3 and 4) between the plates 40 and 41 of housing 38. Fixed on and slidable along the driving shaft 49 and key 62 is a spur gear 63 which, when in the full line position shown in Figs. 3 and 4, meshes with a similar gear 64 that is keyed or otherwise suitably secured on an intermediate shaft 65 (Figs. 3, 4 and 6) adjacent the plate 41 of housing 38. Shaft 65 is journaled in suitable bearings in the plates 40 and 41 of housing 38 and is connected, as by a flexible coupling 66, with the shaft 67 of pump 35 to drive the latter. Keyed or otherwise suitably secured to the intermediate shaft 65 adjacent the plate 40 is a spur pinion 68 which meshes with a spur gear 69 that is loosely mounted on the driving shaft 49. This spur gear 69 is provided with a long hub 70 (Fig. 3) which extends through the plate 40 of housing 38 into the cover 57 thereof.

Clamped or otherwise suitably secured to the outer end of hub 70 is a crank disk 71 (Figs. 3, 4 and 5) the crank pin 71' of which is pivotally connected with one end of a link 72 the opposite end of which is pivotally connected with the pin 72' of a pawl carrier 73 that is loosely mounted on a driven shaft 74. This driven shaft 74 extends through the housing 38 and is journaled in suitable bearings in the plates 40 and 41 thereof. Fixed on the outer end of driven shaft 74 is a bevel gear 75 which meshes with a similar gear 76 that is fixed on one end of a vertically extending inclined jack shaft 77 (Figs. 1 and 2). Jack shaft 77 is journaled in suitable bearings in brackets 78 and 79 which are bolted or otherwise suitably secured to one of the brackets 37 and to one of the front heads 5, respectively. Bracket 78 also provides an additional bearing for the extended end of shaft 74. Fixed on the upper end of jack shaft 77 is a bevel gear 80 which meshes with a similar gear 81 that is fixed on the worm shaft 34. It will thus appear that movement of the pile elevator is imparted thereto by the jack shaft 77 through the described connections thereof with the driven shaft 74 and the worm shaft 34.

The driven shaft 74 may be rotated intermittently in the proper direction to impart step by step upward movement to the pile elevator and pile of sheets 22 thereon, and this intermittent rotation of shaft 74 is preferably effected and controlled by mechanism of the general type disclosed in the application Serial No. 116,692 of Leonard Baker, George A. Martin and Leo C. Williams, filed December 19, 1936. This mechanism includes the pawl carrier 73 (Figs. 3, 4 and 5) which has a pawl 82 pivoted thereon and normally resting on a pawl mask 83 out of engagement with a ratchet 84 that is fixed on the driven shaft 74. The pawl mask 83 is loosely mounted on shaft 74 adjacent the ratchet 84 and yieldably connected with the pawl carrier 73.

Stopping of the pawl mask 83 to permit pawl 82 to engage and drive the ratchet 84 is effected by an overbalanced latch 85 (Figs. 3 and 5) which is pivoted as at 86 on the cover 57 above a plunger 87 that is slidably mounted in a housing 88 formed integrally with said cover. Connected with the housing 88 at the bottom thereof

is one end of a flexible conduit 89 the opposite end of which is connected with a housing 90 (Figs. 1 and 2) which has slidably mounted therein a detector 91 that rests by gravity on the top of the pile 22 at the rear thereof. Housing 90 is bolted or otherwise suitably secured to a cross bar 92 which, in turn, is bolted or otherwise suitably secured to brackets 93 that are adjustably secured on side bars 94 supported in brackets 95 bolted or otherwise suitably secured to the side members 7 of the feeder frame. Connected with the housing 90 is one end of a flexible conduit 96 which is suitably connected with the air side of pump 35 to supply air under pressure in said housing.

When the top of the pile of sheets 22 is at the proper height, no compressed air will be delivered in the housing 88 and the latch 85 will be held in the position shown in Fig. 5 above the path of travel of mask 83 so that the latter and the carrier 73 for pawl 82 will oscillate idly. When the top of the pile 22 and detector 91 lower sufficiently so that said detector admits compressed air in the conduit 89 and the housing 88, said air will raise the plunger 87 and swing the latch 85 to the position shown in Fig. 7 into engagement with the pawl mask 83 to stop rotation of the same and enable the pawl 82 to engage and drive the ratchet 84 and shaft 74 to raise the elevator and the pile of sheets.

When the top of the pile has reached the proper height the detector 91 will cut off the supply of compressed air to conduit 89 and housing 88 whereupon the plunger 87 will drop by gravity in the housing and the latch 85 will be swung to its inoperative position. The carrier 73, the pawl 82 thereon, and the mask 83 will then oscillate idly until it is again necessary to elevate the pile 22, whereupon the above described operations of the pawl and ratchet control means are repeated so that shaft 74 may be actuated to raise the elevator. It will thus appear that through oscillation of the pawl carrier 73 by the described driving connections therefor with motor 42, and through engagement of the oscillating pawl 82 with the ratchet 84, the driven shaft 74 will be intermittently rotated and thus rotate worm shaft 34 through the described driving connections therefor with said shaft and raise the elevator and pile of sheets thereon. It will further appear that during normal operation of the feeder, the pump 35 and pawl carrier 73 through the described driving connections therefor with motor 42 will be continuously driven to create vacuum in the sheet separating and forwarding devices, supply air under pressure to the pile and sheet winding devices, and actuate the pile elevator under the control of the detector 91.

It will further appear that in accordance with another aspect of the present invention, the pawl and ratchet mechanism is driven, as by the motor 42, from a source of power independent of the source of power for driving the means that imparts motion to the sheet feeding elements of the feeder and that in this manner the severe strain of intermittently raising the elevator during the normal operation of the feeder, is eliminated from the motion imparting means for the sheet feeding elements with resulting longer life and less wear of the various parts constituting the same. Moreover, location of the pawl and ratchet mechanism and driving means therefor at a point remote from the line of sheet travel results in less spoilage of sheets due to oil dripping from said mechanism and driving means.

When it is desired to reload the pile elevator, or to initially load it, said elevator may be rapidly lowered to a position to receive a pile of sheets which is placed thereon through the rear of the feeder. In accordance with the present invention this rapid lowering of the pile elevator is preferably effected as follows. The clutch parts 47 and 50 of clutch 48 are disconnected by moving lever 59 to the right (Fig. 4) thereby disconnecting the motor 42 from the driving shaft 49. At this time gear 63 on shaft 49 is disengaged from gear 64 and moved along said shaft into mesh with a spur gear 97 as shown in dotted line position in Fig. 4. This spur gear 97 is loosely mounted on the intermediate shaft 65 and meshes with a similar gear 98 that is keyed or otherwise suitably secured to the driven shaft 74. Longitudinal displacement of spur gear 97 on shaft 65 is prevented by a spacing collar 99 thereon. It will thus appear that when the parts of the clutch 48 are again engaged by moving lever 59 to the left (Fig. 4), the driven shaft 74 will be rapidly and continuously rotated in the proper direction by the motor 42 through gears 63, 97 and 98 thereby rapidly lowering the elevator to the proper position for loading. At this time the parts of the clutch 48 are disengaged by moving lever 59 to the right (Fig. 4) and the elevator is stopped. It will further appear that when the elevator is rapidly lowered as pointed out above, the intermediate shaft 65, through disengagement of gear 63 from gear 64, will be disconnected from the motor 42 thereby stopping the pump 35, crank disk 71 and pawl carrier 73.

Shifting of the gear 63 along driving shaft 49 is accomplished by a fork 100 (Figs. 3 and 4) which engages opposite sides of said gear and is bolted or otherwise suitably secured to a shaft 101. This shaft 101 extends through the housing 38 and is slidably mounted in suitable bearings in the plates 40 and 41 thereof. Pivotally connected with one end of shaft 101 is one end of a link 102 which extends through a suitable opening in the cover 57. The opposite end of link 102 is pivotally connected with a shift lever 103 that is pivotally mounted on the stud 60 adjacent the lever 59. The slidable shaft 101 has also fixed thereon a block 104 (Figs. 3, 4 and 8) which, together with a recess 105 in said shaft forms a cam track 106 engaged by a roller 107. Roller 107 is journaled on one arm 108 of a double armed lever 109 which is pivotally mounted on a pin 110 secured in the cover 57. Endwise displacement of lever 109 on pin 110 is prevented by collars 111 secured to said pin on opposite sides of said lever. The other arm 112 of lever 109 has loosely mounted therein at the lower end thereof a block 113 engaging in a groove 114 of the pawl mask 83 which is slidably as well as rotatably mounted on the driven shaft 74. It will thus appear that when the shift lever 103 and shaft 101 are moved to the left (Fig. 4) to move gear 63 along shaft 49 into mesh with gear 97, the arm 112 of lever 109 and pawl mask 83 are at the same time moved to the right so that a bevelled annular flange 115 on the mask will lift the pawl 82 out of engagement with the ratchet 84 as indicated in Fig. 8 of the drawings if said pawl is not already disengaged therefrom.

The elevator having been lowered and stopped in its proper predetermined position for loading or reloading, and the pile of sheets having been placed on the elevator, the latter and the pile of sheets are rapidly elevated until the top of the pile is brought into proper position for the normal

sheet feeding operation. For this purpose, further movement of the shift lever 103 to the left (Fig. 4) disengages gear 63 from gear 97 and moves a spur pinion 116 along shaft 49 to the dotted line position indicated in Fig. 4 of the drawings. In this position of pinion 116 it meshes with a large spur gear 117 that is also keyed or otherwise suitably secured to the driven shaft 74. The spur pinion 116 is secured to or formed integrally with the gear 63 and is slidable therewith along the driving shaft 49. It will thus appear that when the parts of the clutch 48 which have been previously disengaged, are again engaged by moving lever 59 to the left (Fig. 4), the shaft 74 will be rapidly and continuously rotated in the opposite direction by the motor 42 through pinion 116 and gear 117 and thus rapidly raise the elevator and the pile of sheets thereon until the top of the pile reaches the proper level for feeding of the sheets one after another therefrom.

At this time the lever 59 is again moved to the right (Fig. 4) to disconnect the parts of the clutch 48 and stop the elevator. Shift lever 103 is then also moved to the right (Fig. 4) to its full line position thus disengaging pinion 116 from gear 117 and again engaging gear 63 with gear 64 to drive the pump 35, crank disk 71 and pawl carrier 73. When the shift lever 103 is moved as aforesaid, the pawl mask 83 is moved back again to its normal position by the cam track 106 on shaft 101.

Feeding of sheets from the top of the pile may now be begun or resumed by moving lever 59 to the left (Fig. 4) thereby connecting the clutch parts of the clutch 48 and the motor 42 with the driving shaft 49, and starting the feeder which during the loading or reloading operations may be stopped to eliminate unnecessary wear of the various parts of the feeder during such operations. It is to be noted, that should the rapid raising of the elevator and pile of sheets thereon be stopped before the top of the pile has reached the proper feeding level, the pawl and ratchet mechanism will immediately begin to operate as soon as gear 63 is moved into mesh with gear 64 and the clutch parts of clutch 48 are connected to drive the pump 35 and the pawl carrier 73. In this way, and before the feeder is started for normal operation thereof, the elevator and pile of sheets may be rapidly raised to within a certain distance of the proper feeding level and thereafter intermittently raised and automatically stopped when the proper level is reached. This eliminates any absolute requirement for attention on the part of the machine attendant when raising the pile to the proper feeding level. Locating and locking of the gear 63 and the pinion 116 in each of their positions along the driving shaft 49 is accomplished by a spring pressed ball 118 (Fig. 4) carried in the plate 40 of housing 38, and engaging in depressions or sockets 119 formed in and suitably spaced along the shaft 101.

While one embodiment of the present invention is herein illustrated and described with more or less particularity, it is to be expressly understood that said invention is not limited to said embodiment or to the specific type of equipment disclosed or otherwise than by the terms of the appended claims.

What I claim is:

1. In a sheet feeder, a pile elevator, a housing, a driving shaft in the housing, a gear loose on the driving shaft and rotatable independently thereof, a driven shaft in the housing and con-

nected with the pile elevator, a pawl and ratchet mechanism on the driven shaft, means for connecting the pawl and ratchet mechanism with and operating it from the loose gear on the driving shaft, an intermediate shaft in the housing and connected with the loose gear on the driving shaft, and means for driving the intermediate shaft from the driving shaft, whereby said driven shaft may be rotated intermittently in one direction by said loose gear and said pawl and ratchet mechanism to intermittently raise the pile elevator.

2. In a sheet feeder, a pile elevator, a housing, a driving shaft in the housing, a gear loose on the driving shaft and rotatable independently thereof, a driven shaft in the housing and connected with the pile elevator, a ratchet fixed on the driven shaft, a pawl and a carrier therefor pivotally mounted adjacent the ratchet, a crank fixed on the loose gear and connected with pawl carrier to oscillate the same, an intermediate shaft in the housing and connected with the loose gear on the driving shaft, and means for driving the intermediate shaft from the driving shaft, whereby said driven shaft may be rotated intermittently in one direction by said loose gear, the pawl on said carrier, and said ratchet to intermittently raise the pile elevator.

3. In a sheet feeder, a pile elevator, a housing, a driving shaft in the housing, a gear loose on the driving shaft and rotatable independently thereof, a driven shaft in the housing and connected with the pile elevator, a pawl and ratchet mechanism on the driven shaft, means for connecting the pawl and ratchet mechanism with and operating it from the loose gear on the driving shaft, an intermediate shaft in the housing and connected with the loose gear on the driving shaft, means for driving the intermediate shaft from the driving shaft, whereby said driven shaft may be rotated intermittently in one direction by said loose gear and said pawl and ratchet mechanism to intermittently raise the pile elevator, and pile controlled means on the housing controlling the operation of the pawl and ratchet mechanism.

4. In a sheet feeder, a pile elevator, a housing, a driving shaft in the housing, a gear loose on the driving shaft and rotatable independently thereof, a driven shaft in the housing and connected with the pile elevator, a pair of gears fixed on the driven shaft in spaced relation, an intermediate shaft in the housing having a pair of gears fixed thereon in spaced relation and an intermediate loose gear continuously meshing with one of the gears on the driven shaft, a pawl and ratchet mechanism on the driven shaft, means for connecting the pawl and ratchet mechanism with and operating it from the loose gear on the driving shaft, and means for selectively driving a fixed or the loose gear on the intermediate shaft from said driving shaft, whereby said driven shaft may be rotated intermittently in one direction to raise the pile elevator or continuously in the opposite direction to lower said pile elevator.

5. In a sheet feeder, a pile elevator, a housing, a driving shaft in the housing, a gear loose on the driving shaft and rotatable independently thereof, a driven shaft in the housing and connected with the pile elevator, a pair of gears fixed on the driven shaft in spaced relation, an intermediate shaft in the housing having a pair of gears fixed thereon in spaced relation and an intermediate loose gear continuously meshing

with one of the gears on the driven shaft, a pawl and ratchet mechanism on the driven shaft, means for connecting the pawl and ratchet mechanism with and operating it from the loose gear on the driving shaft, and means for selectively driving a fixed gear on the intermediate shaft or a fixed gear on the driven shaft from the driving shaft, whereby said driven shaft may be rotated intermittently or continuously in the same direction to raise the pile elevator.

6. In a sheet feeder, a pile elevator, a housing, a driving shaft in the housing, a gear loose on the driving shaft and rotatable independently thereof, a driven shaft in the housing and connected with the pile elevator, a pair of gears fixed on the driven shaft in spaced relation, an intermediate shaft in the housing having a pair of gears fixed thereon in spaced relation and an intermediate loose gear continuously meshing with one of the gears on the driven shaft, a pawl and ratchet mechanism on the driven shaft, means for connecting the pawl and ratchet mechanism with and operating it from the loose gear on the driving shaft, and means for selectively driving a fixed or the loose gear on the intermediate shaft or a fixed gear on the driven shaft from the driving shaft, whereby said driven shaft may be rotated intermittently in one direction to intermittently raise the pile elevator or continuously in opposite directions to continuously raise or lower said pile elevator.

7. In a sheet feeder, a pile elevator, a housing, a driving shaft in the housing, a gear loose on the driving shaft and rotatable independently thereof, a driven shaft in the housing and connected with the pile elevator, a pair of gears fixed on the driven shaft in spaced relation, an intermediate shaft in the housing having a pair of gears fixed thereon in spaced relation and an intermediate loose gear continuously meshing with one of the gears on the driven shaft, a pawl and ratchet mechanism on the driven shaft, means for connecting the pawl and ratchet mechanism with and operating it from the loose gear on the driving shaft, means for selectively driving a fixed or the loose gear on the intermediate shaft from said driving shaft, whereby said driven shaft may be rotated intermittently in one direction to raise the pile elevator or continuously in the opposite direction to lower said pile elevator, and means on the housing for disconnecting the pawl and ratchet mechanism when said driven shaft is rotated continuously in the opposite direction.

8. In a sheet feeder, a pile elevator including driven elements at the top of the feeder, mechanism at the bottom of the feeder including a pawl and ratchet device connected with said elements for intermittently operating the same, and pile controlled means associated with said mechanism for controlling the operation of said pawl and ratchet device.

9. In a sheet feeder, a pile elevator, a power unit for operating the pile elevator comprising a housing, a driving shaft in the housing, a motor on the housing and connected with the driving shaft to drive the same, a driven shaft in the housing and connected with the pile elevator, a pawl and ratchet mechanism on the driven shaft for intermittently rotating said shaft in one direction to intermittently raise the pile elevator, a pair of gears fixed on the driven shaft in spaced relation for continuously and rapidly rotating said shaft in opposite directions to continuously and rapidly raise and lower the pile elevator, an

intermediate shaft in the housing and connected with the pawl and ratchet mechanism to drive the same, a fixed gear on the intermediate shaft, a loose gear on the intermediate shaft continuously meshing with one of the fixed gears on the driven shaft, a pair of gears fixed on and slidable along the driving shaft for selectively engaging the fixed gear on the intermediate shaft, the loose gear thereon or the other fixed gear on the driven shaft, whereby said driven shaft may be rotated intermittently in one direction or continuously and rapidly in opposite directions, and a lever on the housing for shifting the slidable gears along the driving shaft in opposite directions and for simultaneously connecting and disconnecting the pawl and ratchet mechanism.

10. In a sheet feeder, a pile elevator, a power unit for operating the pile elevator comprising a housing, a driving shaft in the housing, a motor on the housing and connected with the driving shaft to drive the same, a clutch on the driving shaft for connecting and disconnecting the motor relative to said shaft, a driven shaft in the housing and connected with the pile elevator, a pawl and ratchet mechanism on the driven shaft for intermittently rotating said shaft in one direction to intermittently raise the pile elevator, a pair of gears fixed on the driven shaft in spaced relation for continuously and rapidly rotating said shaft in opposite directions to continuously and rapidly raise and lower the pile elevator, an intermediate shaft in the housing and connected with the pawl and ratchet mechanism to drive the same, a fixed gear on the intermediate shaft, a loose gear on the intermediate shaft continuously meshing with one of the fixed gears on the driven shaft, a pair of gears fixed on and slidable along the driving shaft for selectively engaging the fixed gear on the intermediate shaft, the loose gear thereon or the other fixed gear on the driven shaft, whereby said driven shaft may be rotated intermittently in one direction or continuously and rapidly in opposite directions, a lever on the housing for connecting and disconnecting the clutch, and a lever on the housing for shifting the slidable gears along the driving shaft in opposite directions and for simultaneously connecting and disconnecting the pawl and ratchet mechanism.

11. In combination, a housing, a driving shaft in the housing, a driven shaft in the housing and having two gears fixed thereon in spaced relation, a pawl and ratchet mechanism on the driven shaft, an intermediate shaft in the housing, a fixed gear and a loose gear on the intermediate shaft, the loose gear continuously meshing with one of the fixed gears on the driven shaft, means for connecting the pawl and ratchet mechanism with and operating it from the intermediate shaft, and a pair of gears fixed on and slidable along the driving shaft to various positions for selectively driving the fixed gear or the loose gear on the intermediate shaft or the other fixed gear on the driven shaft from said driving shaft, whereby said driven shaft may be rotated intermittently in one direction or continuously in opposite directions.

12. In combination, a driving shaft, a driven shaft, a pawl and ratchet device on the driven shaft, and gear means interposed between the driving and driven shafts and selectively operable to drive the driven shaft continuously from the driving shaft or intermittently therefrom through said pawl and ratchet device.

13. In combination, a driving shaft, a driven

shaft, a pawl and ratchet device on the driven shaft, and slidable gear means interposed between the driving and driven shafts and selectively operable to drive the driven shaft continuously in one or the other of two directions from the driving shaft or intermittently therefrom in one of said directions through said pawl and ratchet device.

14. In combination, a driving shaft, a driven

shaft, a pawl and ratchet device on the driven shaft, gear means interposed between the driving and driven shafts and selectively operable to drive the driven shaft continuously from the driving shaft or intermittently therefrom through said pawl and ratchet device, and means for disconnecting the pawl and ratchet device when said driven shaft is continuously driven.

LEONARD BAKER.