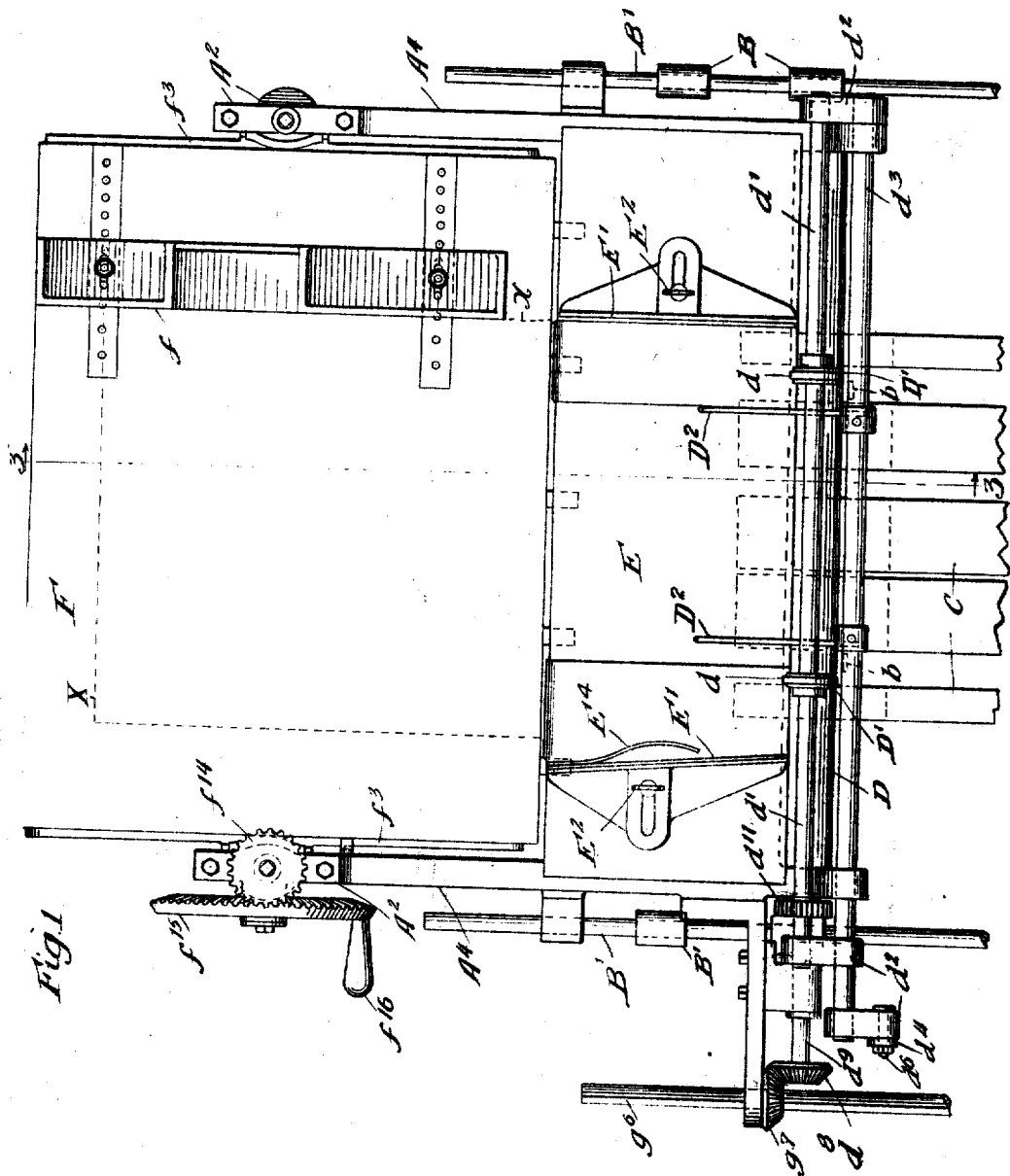


F. EBERHART.
FEED MECHANISM FOR METAL OR OTHER SHEETS,
APPLICATION FILED MAR. 3, 1910.

1,003,998.

Patented Sept. 26, 1911.

6 SHEETS—SHEET 1.



Witnesses:

Wm. Guiger
Fred Abrams

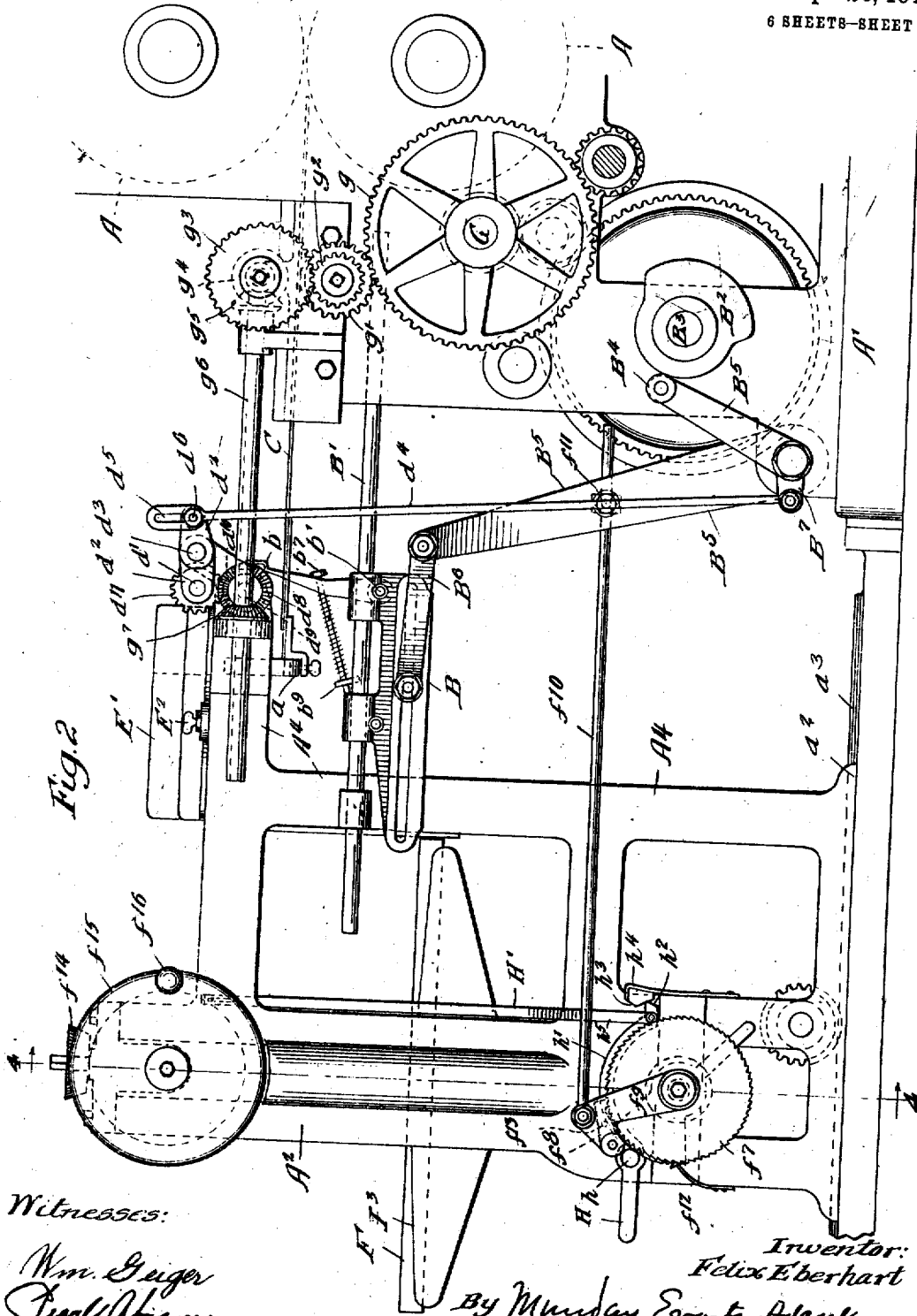
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6 SHEETS—SHEET 3.



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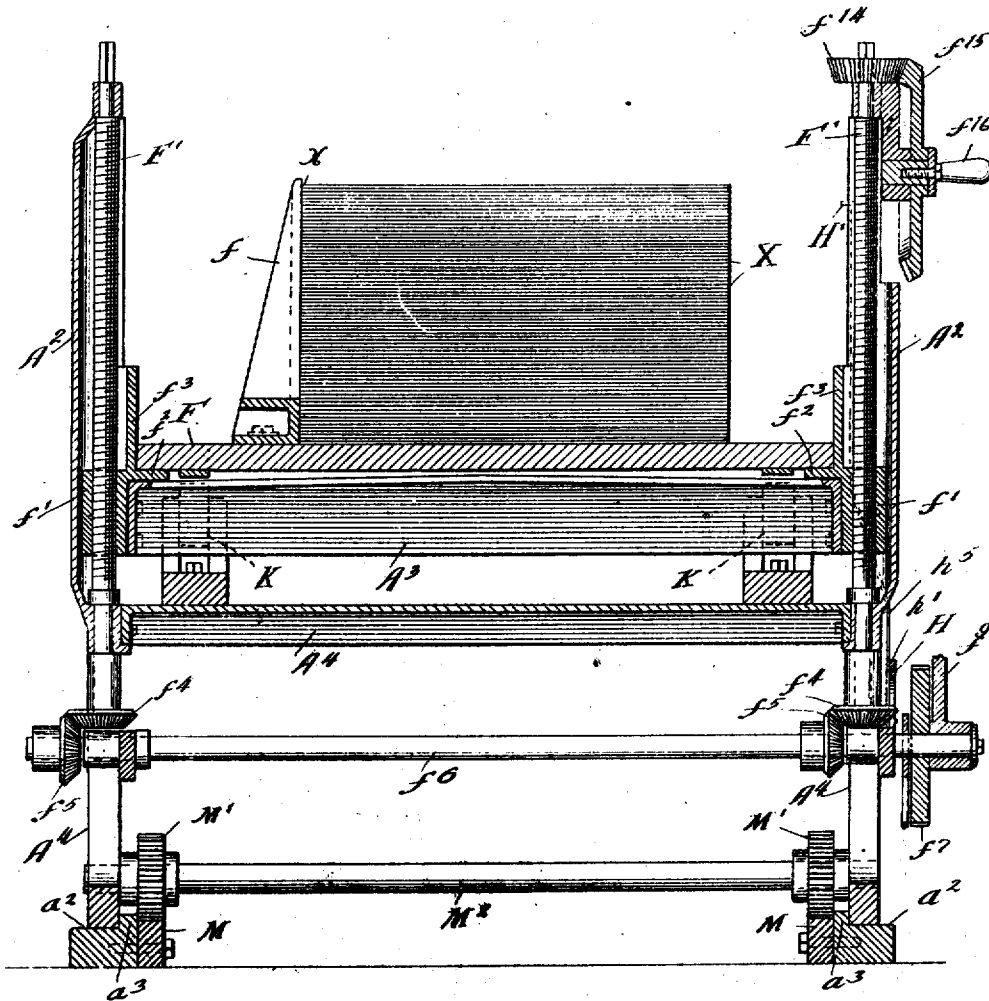
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6 SHEETS—SHEET 4.

Fig. 4



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6 SHEETS—SHEET 5.

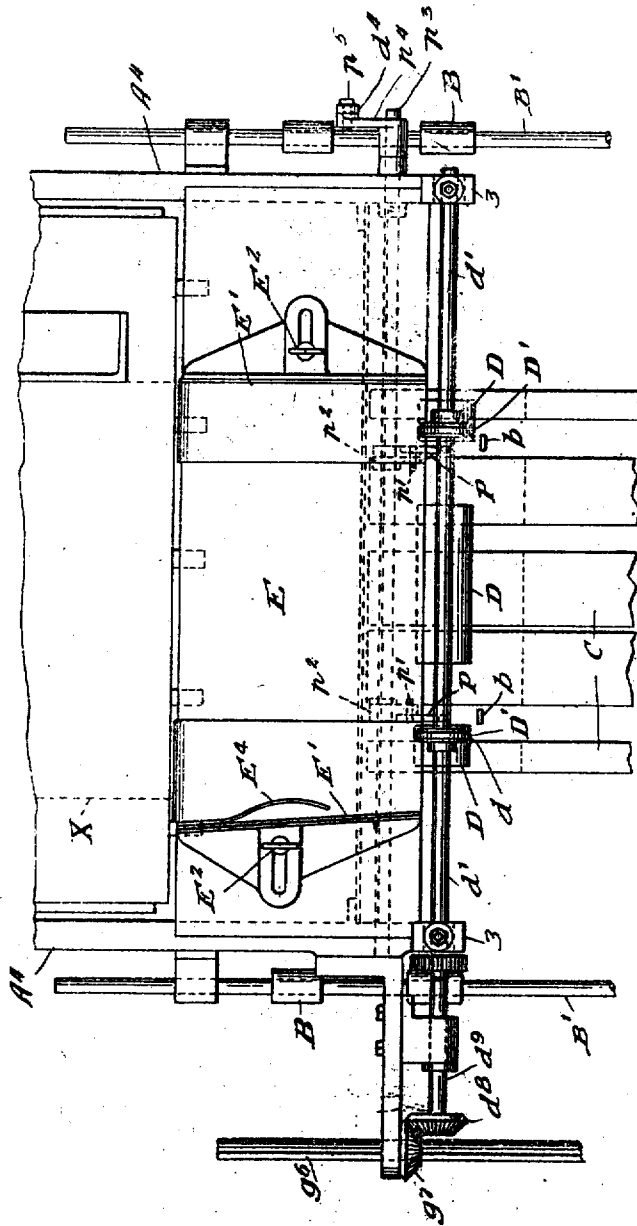


Fig. 5

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6 SHEETS—SHEET 6.

Fig. 6

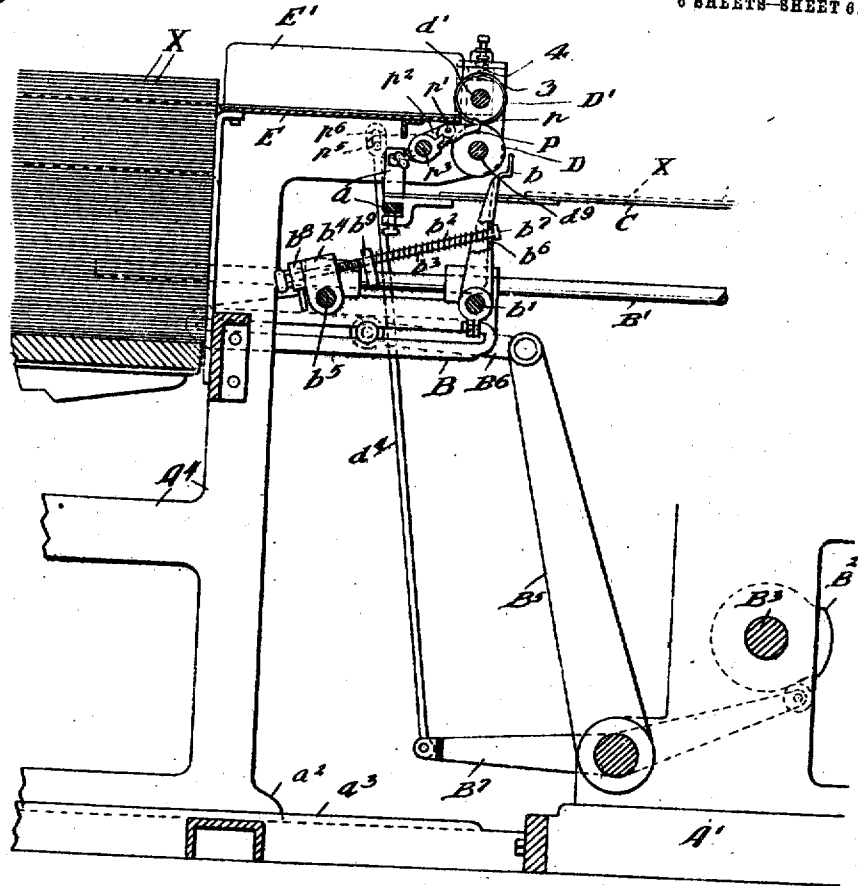
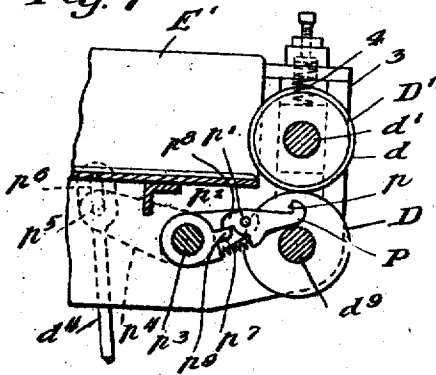


Fig. 7



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UNITED STATES PATENT OFFICE.

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FEED MECHANISM FOR METAL OR OTHER SHEETS.

1,003,998.

Specification of Letters Patent.

Patented Sept. 26, 1911.

Application filed March 3, 1910. Serial No. 547,099.

To all whom it may concern:

Be it known that I, FELIX EBERHART, a citizen of the United States, residing in New York, in the county of New York and State of New York, have invented a new and useful Improvement in Feed Mechanism for Metal or other Sheets, of which the following is a specification.

My invention relates to improvements in mechanism for feeding metal or other sheets to various machines, such as rotary printing presses, sheet metal slitting machines, tin plate cleaning machines, tin plate coating machines, etc.

The object of my invention is to provide a sheet feed mechanism of a simple, efficient and durable construction, which will facilitate the feeding or delivery of metal or other sheets to such machines, and which will operate to time the feeding or delivery of the sheet with the feed slide or conveyer which delivers the sheet to the rollers or other devices of the machine.

The sheet feed mechanism embodying my invention comprises in cooperative combination, a main feed table and feeder, preferably a reciprocating feed slide with fingers for automatically feeding the sheets to the rollers or other devices of the press; slitting machine, coating machine, cleaning or other machine, a supplemental feed table and automatically operated feed rollers for automatically delivering the sheets one by one to the main feed table and main feeder and thus also timing the proper delivery thereof to the main feed table and feeder, a vertically movable feed table upon which the pile or stack of sheets to be fed is placed, and mechanism for automatically raising the same the thickness of a sheet at each stroke or feeding movement of the main feeder to automatically maintain the top of the stack or pile of sheets at the proper height or level in relation to the supplemental feed table and feed rollers to facilitate the delivery of the sheets one by one by hand to said supplemental feed table and feed rollers.

My invention also consists in the novel construction of parts and devices and in the novel combinations and sub-combinations of parts and devices herein shown and described and more particularly specified in the claims.

In the accompanying drawing forming a

part of this specification, Figure 1 is a plan view of a sheet feed mechanism or device embodying my invention. Fig. 2 is a side elevation. Fig. 3 is a vertical, longitudinal section on line 3—3 of Fig. 1 and Fig. 4 is a vertical cross section on line 4—4 of Fig. 2. Figs. 5, 6 and 7 show a modification, Fig. 5 being a partial plan similar to Fig. 1, Fig. 6 a partial vertical section similar to Fig. 3 and Fig. 7 a detail, vertical section showing certain parts of Fig. 6 in a different position.

In the drawings, A A represent, (diagrammatically), driven rollers or other devices of any suitable machine, such, for example, as a rotary printing press, a sheet slitting machine, a tin plate coating machine, a tin plate cleaning machine or other machine for performing operations upon metal or other sheets.

B is the main feeder or conveyer by which the sheets are fed or delivered one by one to the machine, having the rollers or devices A; the same preferably consisting of a reciprocating slide having fingers *b* and moving back and forth on suitable guides *B'* on the stationary frame *A'* of the machine.

C is the main feed table upon or along which the sheets are moved by the feeder B.

The feed fingers *b* are preferably yielding fingers, having a pivotal connection *b'* with the feed slide and backed up or supported by springs *b''* surrounding a rod or stem *b'''*, carried by a pivoted arm *b''''* connected with the slide B by a shaft *b'''''*. The stem *b'''* passes through a vertical slot *b''''* in the feeder finger *b* and has a nut *b''''''* at its outer end. The stem *b'''* is provided with an adjusting nut *b'''''''* and also with a nut *b''''''''* for adjusting the tension of the spring *b''*. The feeder B is preferably operated or reciprocated as required by means of a cam *B'* on the shaft *B'* engaging a roller *B''* on the bent lever *B'''* which is connected by a link *B''''* with the feeder slide B.

The feed table C preferably consists of a plurality of bars or strips having slots or openings between them for the feeder fingers *b* to project up through. The feed table C is preferably supported on cross bars *a'* of the frame through connecting brackets *C'*.

D D' are the supplemental feed rollers and E the supplemental feed table. The

lower feed roller D is preferably a metal roller of uniform diameter from end to end. The upper feed roller D¹ preferably consists of a pair of short rollers or disks furnished with elastic or rubber tires or treads d, and the shaft thereof d¹, is preferably mounted movably on vibrating arms or levers d², fulcrumed on the frame by a pin d³, so that the feed rollers D¹ can be automatically separated from the lower roller D and brought into contact therewith at intervals as required for cooperation with the reciprocating main feeder B. The feed roller lever d² is operated as required by an arm B⁷ on the bent lever B⁵ through the connecting link d⁴ having a slot d⁵ and a pin d⁶ connecting it with the lever d². The lower feed roller D is continuously rotated from a shaft G through a gear g thereon, meshing with a gear g¹ on an intermediate shaft having a further gear g² meshing with a gear g³ on an intermediate shaft having a bevel gear g⁴ which meshes with a bevel gear g⁵ on a shaft g⁶ which has a bevel gear g⁷ meshing with a bevel gear d⁷ on the shaft d⁸ of the lower roller D. The shaft d⁸ has a spur gear d¹⁰ meshing with a spur gear d¹¹ on the shaft of the upper feed rollers D¹, thus driving the upper feed roller, when its gear is lowered into contact with the gear on the shaft of the lower feed roller.

The supplemental feed table E is provided with side guides E¹, adjustably secured by set screws E² which pass through slots E³ in these side guides or gages. One of the side guides or gages E¹ is furnished with a light spring E⁴ to press the edge of the sheet snugly against the opposite guide E¹. The side guide or gage carrying the spring E⁴ is arranged at an angle to the path of the sheets. Above the feed table E inclined guide arms D² are provided to aid in directing the sheets into the feed rollers D D¹.

The vertically movable feed table F upon which the pile or stack of sheets X to be fed is provided with a gage or guide f for one edge of the sheets x of the pile or stack X to abut against, and is preferably moved up and down as required by rotary screws F¹, mounted in suitable standards A² on the frame of the machine and engaging threaded sleeves or nuts f² with which the vertically movable feed table F is provided. The threaded sleeves or nuts f² are preferably furnished with horizontal flanges f³ and upright flanges f⁴ to receive the feed table F, the same being preferably a wooden board. The standards A² of the frame are preferably braced or connected by cross bars a² of the supplemental frame A¹. The operating screws F¹ of the vertically movable feed table F are automatically operated or turned to the extent necessary to raise the feed table F the thickness of a sheet at each

stroke or feeding movement of the main feeder B, preferably through bevel gears f⁵ on the shafts of the screws F¹, meshing with bevel gears f⁶ on the cross or connecting shaft f⁷ which is furnished with a ratchet f⁸ and is operated by a pawl f⁹ on the pawl arm or lever f¹⁰, and which is connected by a link f¹¹ with the bent operating lever B⁵ of the main feeder B by a clamp f¹² having a pivot shank fitting loosely in a round hole in the feeder lever B⁵ to give said clamp a rocking connection with said lever B⁵. The clamp f¹² affords an adjustable connection between the lever B⁵ and the link f¹¹. A spring pawl f¹³ prevents the ratchet f⁸ from turning in the wrong direction.

The handle lever H, pivoted at h to the frame by engagement with a pin f¹⁴ on the pawl f⁹ serves to raise the pawl out of engagement with the ratchet whenever the operator may desire. The lever H has a curved arm h¹ provided with a cam face h² adapted to engage the cam face h³ of a spring stop h⁴ which holds the stop lever H in its raised position. The lever H is near the base of the machine and is designed to be operated by the foot. A further stop or disengaging lever H¹ is provided in convenient reach of the operator's hand and is connected by a link h⁵ with the stop or disengaging lever H.

The supplemental frame A⁴ is preferably furnished with anti-friction rollers or wheels K with which the feed table F may engage when in its lowermost position to facilitate the slipping of the feed table F into position upon its screw operated sleeves or nuts f² with a new or full stack or pile of sheets thereon. By thus having the feed table F removably connected with its elevating devices, nuts or sleeves, the work of putting a stack or pile of sheets in place on the vertically movable feed table of the machine is materially facilitated.

One of the screws F¹ is preferably furnished with bevel gear f¹⁵ at its upper end, meshing with a bevel gear f¹⁶ having a handle or crank arm f¹⁷ so that the vertically movable table or support F may be raised by hand when desired, and also to facilitate the lowering of the table or support F when all the sheets of the stack or pile have been fed therefrom.

The supplemental frame A⁴ upon which the vertically movable feed table or sheet support F and the supplemental feed table E and supplemental feeder D are mounted, is preferably in a separate piece from the main frame A¹, and adjustably supported thereon by means of suitable guides or ways a³. The supplemental frame A⁴ is preferably adjusted to and from the main frame A¹ by means of a rack M and gear M¹ on the shaft M², which may be turned by a suitable lever or wrench to adjust the supplemental

frame in respect to the main frame, as may be required for operation upon sheets of different sizes.

In the modification shown in Figs. 5, 6 and 7 which is the construction I prefer to employ instead of raising and lowering the upper one of the feed rollers D D¹ in time with the main feeder B as hereinbefore described, through the action of the cam B² and the connections for raising and lowering said roller, I mount the upper roller D¹ in movable bearings 3 backed up by springs 4, and I employ a movable stop device or sheet feed controller P in front of the feed rollers D D¹ and which is automatically moved in and out of the path of the sheets in coöperation with the movement of the feeder B. The sheet stop device or feed controller P preferably consists of a pair of vibrating fingers each having a shoulder *p* to engage the front edge of the sheet and each secured by a pivot pin *p*¹ to an operating arm *p*² on rock shaft *p*³, the arm *p*⁴ of which is connected by a pin and slot *p*⁵, *p*⁶ with the link *z*⁴ which is connected to the arm B⁷ of the lever B⁵ which is actuated by the cam B². A spring *p*⁷ is interposed between the feeder finger P and its operative arm *p*² and the finger and arm have interengaging dogs or shoulders *p*⁸, *p*⁹ to cause the arm to retract the pivoted finger P from the path of the sheets and compress the spring. At the proper time the cam B² through the connections above mentioned raises the arm *p*² and retracts the sheet device or controller P so as to allow the sheet to pass into the feed rollers D D¹. As the sheet passes between the feed rollers D D¹ the sheet itself will hold the spring fingers P in their retracted position and as soon as the sheet passes, the spring *p*⁷ will restore the fingers P to their original position in front of the feed rollers shown in Fig. 6 and thus prevent any possible insertion of a second sheet in the rollers until the proper time when the final feed fingers *b* have receded in position to take up the next sheet. The automatically movable spring-held feed controller fingers P thus perform the same function as the vertically movable or drop roller D¹ in the construction shown in Figs. 1 to 4. The use of the feed controller fingers P renders it impossible for the operator to shove the sheet in too far which is liable to cause buckling of the sheet.

I claim:—

1. In a sheet feed mechanism, the combination of a main feed table and feeder, of a supplemental feed table and feeder, and a vertically movable feed table, said supplemental feed table and feeder being between said vertically movable feed table, and said main feed table and feeder, substantially as specified.

2. In a sheet feed mechanism, the combination of a main feed table and feeder, of a supplemental feed table and feeder, a vertically movable feed table, and means for automatically raising said last mentioned feed table the thickness of a sheet at each feed-movement of said main feeder, said supplemental feed table and feeder being between said vertically movable feed table, and said main feed table and feeder, substantially as specified.

3. In a sheet feed mechanism, the combination of a main feed table and feeder, of a supplemental feed table and feeder, a vertically movable feed table, and means for controlling the feed action of said supplemental feeder in coöperation with said main feeder, said supplemental feed table and feeder being between said vertically movable feed table, and said main feed table and feeder, substantially as specified.

4. In a sheet feed mechanism, the combination of a main feed table and feeder, of a supplemental feed table and feeder, a vertically movable feed table, means for automatically raising said last mentioned feed table the thickness of a sheet at each feed movement of said main feeder, said supplemental feed table and feeder being between said vertically movable feed table, and said main feed table and feeder, and a device for throwing said raising means out of operation, substantially as specified.

5. In a sheet feed mechanism, the combination of a main feed table and feeder, of a supplemental feed table and feeder, a vertically movable feed table, means for automatically raising said last mentioned feed table the thickness of a sheet at each feed-movement of said main feeder, said supplemental feed table and feeder being between said vertically movable feed table, and said main feed table and feeder, and means for controlling the feed action of said supplemental feeder in coöperation with said main feeder, substantially as specified.

6. In a sheet feed mechanism, the combination with an automatically operated sheet feeder and a feed table in front thereof, of a vertically movable support for a pile of sheets in front of said feed table, and means for automatically raising said support to maintain the top of the pile of sheets at proper height in respect to said feeder, substantially as specified.

7. The combination with a feed table and feeder, of a vertically movable support for a pile of sheets in front of said feed table, substantially as specified.

8. The combination with a feed table and feeder, of a vertically movable support for a pile of sheets in front of said feed table, and means for automatically raising said support to maintain the top of the pile of

sheets at proper height in respect to said feed table and feeder, substantially as specified.

9. The combination with a feed table and feeder, of a vertically movable support for a pile of sheets in front of said feed table, and means for automatically raising said support to maintain the top of the pile of sheets at proper height in respect to said feed table and feeder, and a further feed table and feeder to which the sheets are delivered one by one by said first mentioned feeder, substantially as specified.

10. In a sheet feed mechanism, the combination with an automatically operated sheet feeder and a feed table in front thereof, of a vertically movable support for a pile of sheets, and means for automatically raising said support to maintain the top of the pile of sheets at proper height in respect to said feeder, and a further feed table and feeder to which the sheets are delivered one by one by said first mentioned feeder, substantially as specified.

11. In a sheet feed mechanism, the combination with an automatically operated sheet feeder and a feed table in front thereof, of a vertically movable support for a pile of sheets, means for automatically raising said support to maintain the top of the pile of sheets at proper height in respect to said feeder, a further feed table and feeder to which the sheets are delivered one by one by said first mentioned feeder, and means for controlling the feed action of said first mentioned feeder in cooperation with said second mentioned feeder, substantially as specified.

12. The combination with a sheet feed table and feeder, of a movable support for a pile of sheets in front of said feed table, and screws and threaded members for raising said support, substantially as specified.

13. The combination with a sheet feed table and feeder, of a movable support for a pile of sheets in front of said feed table, screws and threaded members for raising said support, said support being removably applied to said threaded members, substantially as specified.

14. The combination with a sheet feed table and feeder, of a movable support for a pile of sheets in front of said feed table, screws and threaded members for raising said support, and a frame having rollers to facilitate the insertion of said removable support with the pile of sheets thereon, substantially as specified.

15. In a sheet feed mechanism, the combination of a main feed table and feeder with a supplemental feed table and feed

rollers, a vertically movable feed table, said supplemental feed table and feed rollers being between said vertically movable feed table and said main feed table and feeder, and a movable sheet stop device in front of said feed rollers to control the feed action thereof in cooperation with said main feeder, substantially as specified.

16. In a sheet feed mechanism, the combination of a main feed table and feeder with a supplemental feed table and feed rollers, a vertically movable feed table, said supplemental feed table and feed rollers being between said vertically movable feed table and said main feed table and feeder, and a movable sheet stop device in front of said feed rollers to control the feed action thereof in cooperation with said main feeder, and a spring for said stop device, substantially as specified.

17. In a sheet feed mechanism, the combination of a main feed table and feeder with a supplemental feed table and feed rollers, a vertically movable feed table, said supplemental feed table and feed rollers being between said vertically movable feed table and said main feed table and feeder, and a movable sheet stop device in front of said feed rollers to control the feed action thereof in cooperation with said main feeder, and means for automatically operating said stop device in time with said main feeder, substantially as specified.

18. In a sheet feed mechanism, the combination with a main feed table and feeder, of a supplemental feed table and feeder, a vertically movable feed table, said supplemental feed table and feeder being between said vertically movable feed table and said main feed table and feeder, and movable spring held stop fingers in the path of the sheets to control the feed action of said supplemental feeder, substantially as specified.

19. In a sheet feed mechanism, the combination with a main feed table and feeder, of a supplemental feed table and feeder, a vertically movable feed table, said supplemental feed table and feeder being between said vertically movable feed table and said main feed table and feeder, and movable spring held stop fingers in the path of the sheets to control the feed action of said supplemental feeder, and means for operating said stop fingers in cooperation with said main feeder, substantially as specified.

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