A. BACHWITZ.

DEVICE FOR THE DELIVERY OF SINGLE SHEETS OF PAPER FROM A STACK.

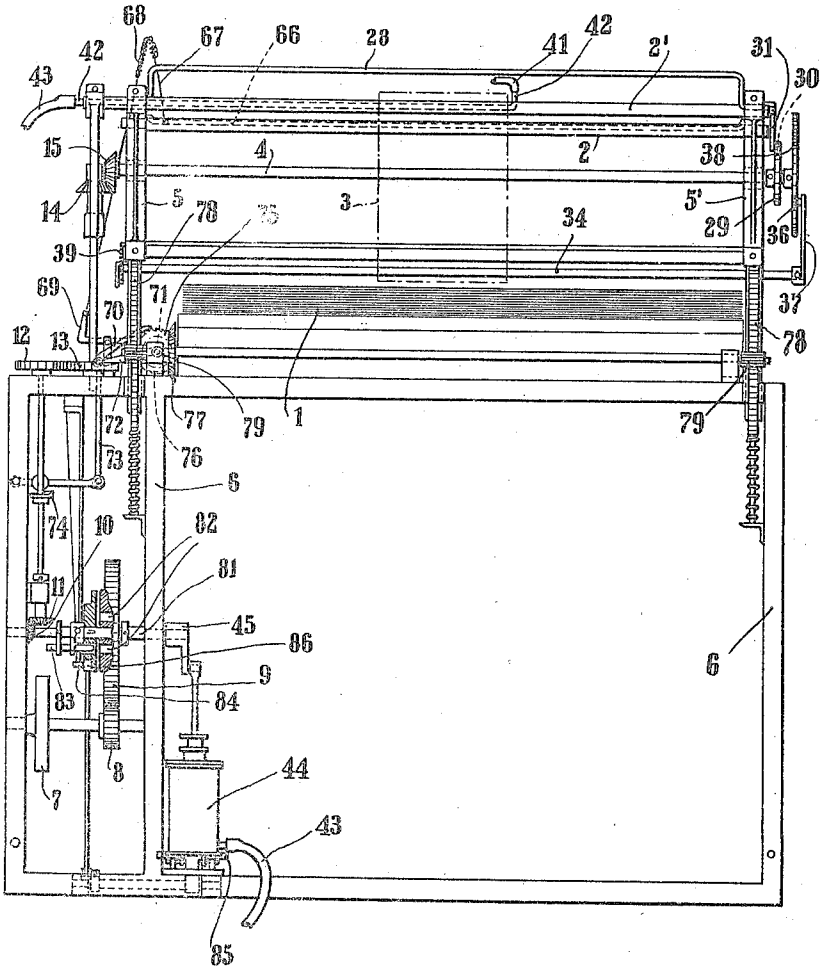
APPLICATION FILED SEPT. 4, 1914.

1,248,786.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

B. Sommers

E. Leckert

Inventor:

Arnold Bachwitz

by Henry Orth & Co

Attys

A. BACHWITZ.

DEVICE FOR THE DELIVERY OF SINGLE SHEETS OF PAPER FROM A STACK.

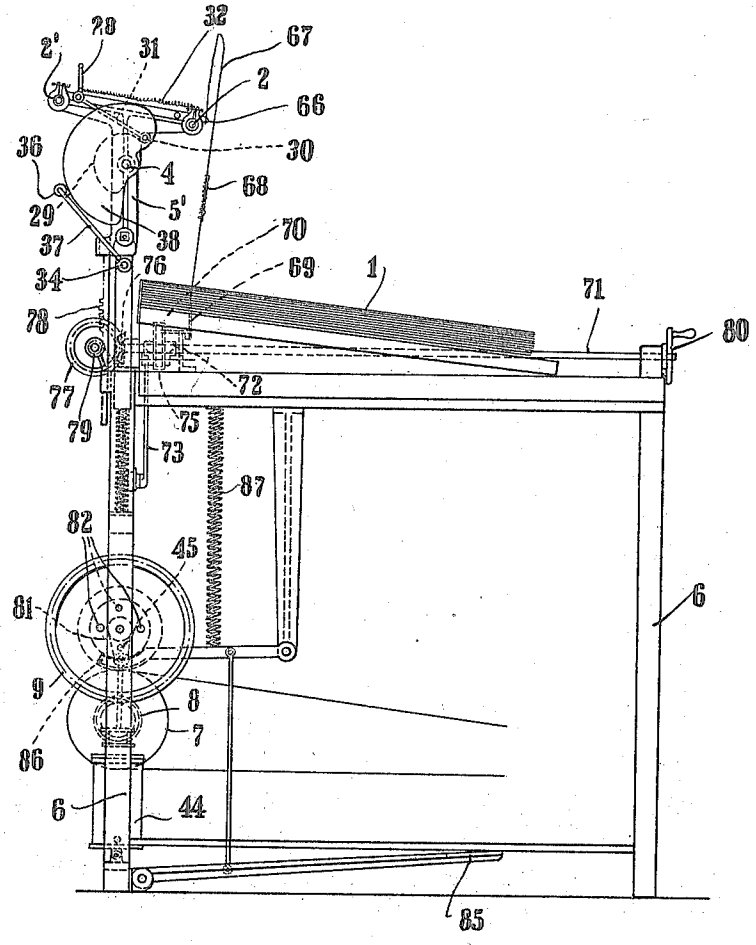
APPLICATION FILED SEPT. 4, 1914.

1,248,786.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

B. Sommers

E. Leckert

Inventor:

Arnold Bachwitz

by Henry Orth & Son Attys

A. BACHWITZ.

DEVICE FOR THE DELIVERY OF SINGLE SHEETS OF PAPER FROM A STACK.

APPLICATION FILED SEPT. 4, 1914.

1,248,786.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 3.

Fig. 3.

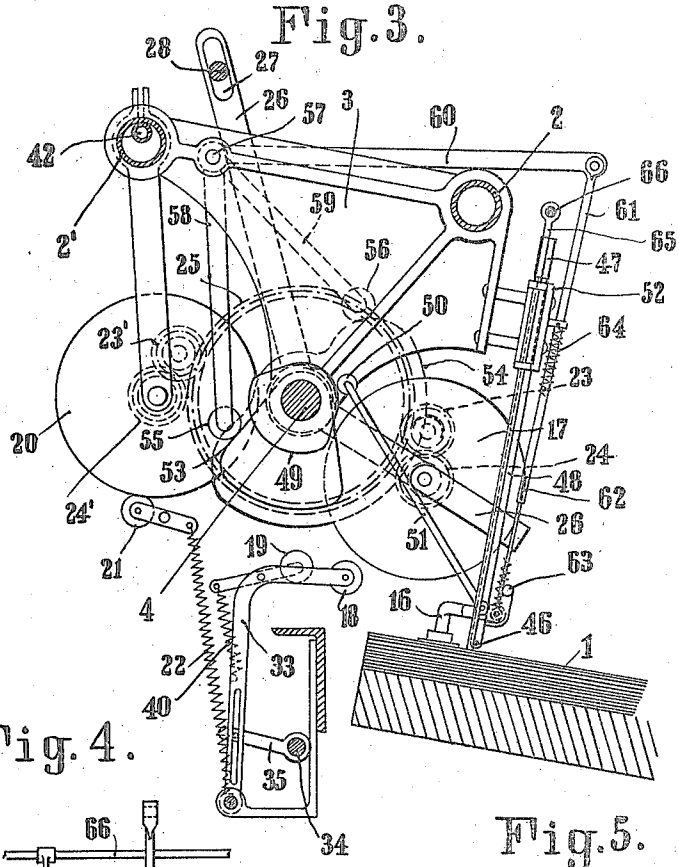


Fig. 4.

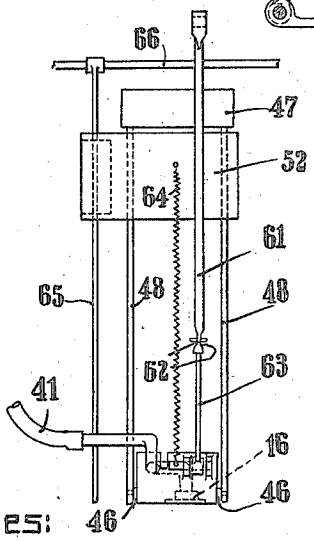
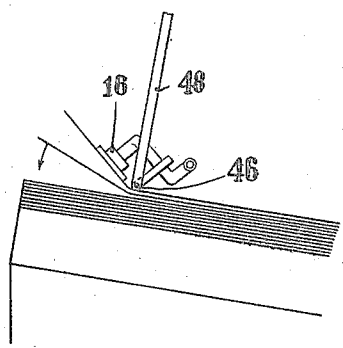


Fig. 5.



Witnesses:

B. Hommers

E. Leckert

Inventor

Arnold Bachwitz

by Henry Orth & Co. Attys

UNITED STATES PATENT OFFICE.

ARNOLD BACHWITZ, OF VIENNA, AUSTRIA.

DEVICE FOR THE DELIVERY OF SINGLE SHEETS OF PAPER FROM A STACK.

1,248,786. Specification of Letters Patent. Patented Dec. 4, 1917.

Application filed September 4, 1914. Serial No. 860,198.

To all whom it may concern:

Be it known that I, ARNOLD BACHWITZ, merchant, of No. 47 Löwengasse, Vienna, III, in the Empire of Austria, and whose post-office address is No. 47 Löwengasse, Vienna, III, in the Empire of Austria, a subject of the Emperor of Austria, have invented certain new and useful Improvements in Devices for the Delivery of Single Sheets of Paper from a Stack; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In pneumatic sheet separating and feeding mechanisms in which the suction member has to perform somewhat complicated movements in order to insure efficient separation and feeding of the sheets, it is difficult to obtain uniform working of said member on account of the varying height of the pile. In arrangements hitherto used, the necessary adjustment was obtained by shifting either the pile-carrying plate or the suction member at each stroke of the same, which method, however, could only be employed in connection with sheets having a uniform and comparatively large thickness. In other arrangements, resilient members are interposed which allow an accommodation of the movement of the suction member to the varying height of the pile. This accommodation will, however, always remain imperfect and has in most cases a detrimental effect upon the efficient and uniform working of the mechanism.

It is an object of this invention to provide a sheet separating and feeding mechanism, having a suction member adapted to perform a rocking and a lifting movement, in which the defects above-mentioned are overcome and an exact and sensitive adjustment of the suction member in complete accordance with the existing height of the pile is obtained. This object is attained by arranging the suction member and its entire driving mechanism on a frame movable within guides, the said frame being shifted by a feeding mechanism under the control of a feeler influenced by the thickness of the sheets lifted by the suction member. By this means, a position of the frame and of the suction member, corresponding exactly to that of the pile, will always be maintained.

A further object of this invention is the provision of an adjusting mechanism which will be able to take into account and exactly compensate for the very slight differences in height occurring when sheets of small thickness are to be fed.

Such an exact adjustment is obtained by a feeding mechanism, the feed movement of which may be varied to any degree desired and which variation is brought about by means of a wire attached to the feed pawl. The wire in its turn is fixed to a feeler slidably mounted in the frame and resting on the pile of sheets. When this stroke of the feeler changes, then the wire is pulled more or less and will immediately alter the extent of the feed movement or stop it altogether. Even the slightest differences in height can be ascertained by this means.

Figure 1. shows a rear elevation of the device;

Fig. 2. is a side elevation of the same;

Fig. 3. is a side elevation showing the delivery members in the working position at the moment when the sheet is lifted from the stack.

Fig. 4. illustrates the arrangement of the suction member in a front elevation.

Fig. 5. shows a detail.

A supporting frame —3— serving to receive the individual delivery members is shiftably mounted on a frame —2—, —2′— disposed above and on a line parallel to the front edge of the stack —1—. The said delivery members are put into operation by means of a main shaft —4— journaled in the side supports or standards —5—, —5′— which are capable of being moved up and down. The shaft —4— is driven by a pulley —7—, mounted in the main frame —6—, and this by the aid of tooth wheels —8—, —9—, bevel wheels —10—, —11— tooth wheels —12—, —13— and bevel wheels —14—, —15—.

The delivery mechanism consists of a suction member —16—, a fulcrumed conveying roller —17—, grip rollers —18—, —19— which are capable of a rocking motion, and a fixed conveying roller —20— with its counter roller —21—, this latter being constantly forced against the former by a spring —22—. The conveying rollers —17— and —20— are continuously driven

by a tooth wheel —25—, mounted on the main shaft —4—, by the aid of tooth wheels —23—, —24— and —23′—, —24′— respectively. The conveying roller —17— as also its driving wheels —23—, —24— are journaled in a frame —26— having a slot —27— for a rod —28— which latter is pivoted in the supports or standards —5—, —5′—. A cam —29— (Figs. 1 and 2) keyed onto the main shaft —4— serves to give a rocking motion both to the rod —28— and the frame —26— by the aid of the arm —31— carrying the roller —30—. A spring —32— constantly forces the roller against its cam.

The grip rollers —18—, —19— (Fig. 3.) acting in common with the conveying roller —17— are journaled in a pivoted frame —33—, which is actuated by an arm —35— fixed to a rod —34—. The rod —34— is turned by means of an arm —37—, having a roller —36—, engaging a cam —38— mounted on the main shaft —4—. A spring —39— constantly forces the roller —36— against the said cam. (Fig. 1.) The grip roller —19— is pivotally mounted relatively to the frame —33— and is constantly forced upward by a spring —40—. The object of the provision of two grip rollers consists in securing an improved supporting surface for the sheet which is to be delivered and thus to guide it along a straight path.

The suction member —16— is attached to a pipe —42— by means of a rubber tube —41—, said pipe —42— being mounted in the frame (Figs. 1 and 3); and connected to an air-pump —44— by means of a tube —43—, the air-pump being actuated by the shaft on which the tooth wheel —9— is mounted by means of the crank —45—.

The suction head 16 is fixed in a member 46 pivoted between the lower ends of rods 48 which are connected at their upper ends by a weight 47. Rotary motion from a cam —49— mounted on the main shaft —4— is imparted to the suction head by the aid of a rod —51— rigidly fixed to the member —46— and provided with a roller —50— which engages the cam. The rods —48— are slidable in a guide member —52— rigidly fixed to the supporting frame —3—, so that the suction member is capable of executing not only a rotatory motion but an up and down movement as well. This latter movement is a positive one, and is carried out by two cams —53— and —54— against which are placed the rollers —55—, —56— of two arms —58—, —59— rotating about the journal —57— and rigidly fixed to the arm —60—. A hollow rod —61— linked to the arm —60— contains a pressure spring the lower extremity of which acts on a rod —63— slidably disposed by means of journals in slots —62— in the rod —61—; said rod —63— being connected with the suction member —16—. The object of this arrangement is to allow the suction member to be yieldingly mounted for the purpose of preventing any interruption in the working operations or of a snapping of the parts of the device in the event of the suction member descending too deep, in spite of its movement being a positive one. At the same time a spring —64— causes the suction head to always fit close to the sheet which is to be removed even though the suction member be not always in the exact altitudinal position above the stack.

For the purpose of properly adjusting the position of the suction member above the stack of paper, the height of which gradually diminishes, there is provided a controlling device in the shape of a feeler —65— (Figs. 3 and 4) sliding in the guide member —52— and mounted on a rod —66— rotatable within the standards —5—, —5′—. The rod —66— is connected by a fine steel wire 67 with one end of a lever—69—, pivoted on the supporting frame 6, said wire —67— being displaceable along its whole length within and guided by a spiral spring —68— which is firmly secured at one of its extremities (only partially shown in the drawings). On a horizontal shaft 71, journaled on top of the supporting frame 6, is pivoted a frame 72 and in the free end of the latter is pivoted a pawl 70, which has a lug arranged to be engaged by the free end of the lever 69. The frame 72 is raised and lowered by means of articulated links 73 which are actuated by a rotating cam 74, one of said links being pivoted to the frame 6 so as to rest on the cam and the other link being connected to the free end of the frame 72. When the free end of the lever 69 is lowered, by the movement of the rod 66, the pawl 70 moves by gravity into engagement with a ratchet wheel 75 and by the movement of the frame 72 rotates said ratchet. The ratchet wheel 75 carries a bevel gear 76 which meshes with a bevel gear 77 fixed on a shaft on each end of which is fixed a pinion 79 and these pinions mesh with racks 78 formed on the standards 5, 5′, and thereby lower the latter and consequently the whole device toward the stack of paper.

If, on the other hand, the suction member is in the proper altitudinal position, the feeler —65— will cause the rod —66— to execute a rotary movement and the lever —69— will then be so turned by the steel wire —67— as to disengage the pawl from the ratchet wheel. A hand wheel —80— mounted on the shaft —71— will permit of the device being raised or lowered by hand.

Accordingly, to deliver a sheet all that is required is a single revolution of the shaft —81— on which the tooth wheel —9— is loosely mounted. To this end there is also provided a clutch device. The continuously

driven tooth wheel loosely mounted on the shaft —81— is provided with bores —82— into which a spring controlled bolt —83— carrying a roller —84— may slide when on depressing the foot board —85—, the disengaging key —86— has released the roller —84— in the known manner, this latter roller being constantly forced upward by the action of the spring —87—.

The device operates as follows:—

The working position of the delivery members in the moment of the removal of a sheet of paper is shown in Fig. 3. The suction member has been pressed down till it has come in contact with the stack. For a moment it remains in this position, whereupon it is once again forced down upon the top sheet (this being effected by the peculiar shape of the cam 54). At the same time, the suction member is rotated about its journal without however causing the rods —48— to alter their position, and as a result of which the top sheet, shown by Fig. 5, is slightly bent. After a short stop for the purpose of allowing the second sheet, which has been taken along, to resume its position again on the stack, the suction member moves upward in its rocked position carrying the top sheet along as a result of the suction action. On the suction member attaining its uppermost position, the frame —33— along with the grip rollers —18—, —19— is moved below the front edge of the sheet, the conveying roller —17— swings downward (the suction action of the suction member ceasing at this very instant) and the sheet is conveyed with great rapidity on to a conveying or delivery device of the known kind. After this the suction member commences to return to its initial position, the conveying roller is removed from the grip rollers, and the latter swing back again to the left. By means of the feeler the whole device is adjusted in its altitudinal position above the stack of paper in the manner above described.

I claim—

1. In a machine for feeding sheets from a stack, a main frame, a movable supporting frame mounted therein, a sheet feeding mechanism carried by the supporting frame, a continuously operating mechanism for actuating the feeding mechanism, a feeler supported by the stack, a reciprocating member actuated by the continuously operating mechanism, mechanism for moving the supporting frame operable by said member, and a feeler supported by the stack for moving said member into and out of operation with said moving mechanism.

2. In a machine for feeding sheets from a stack, a main frame, a movable supporting frame mounted therein, a sheet feeding mechanism carried by the supporting frame, a continuously operating mechanism for actuating the feeding mechanism, a feeler supported by the stack, a reciprocating pawl actuated by the continuously operating mechanism, a ratchet, mechanism operable by the latter for moving the supporting frame, and a feeler supported by the stack for raising and lowering the pawl into and out of contact with the ratchet.

3. In a machine for feeding sheets from a stack, a main frame, a movable supporting frame mounted therein, a sheet feeding mechanism carried by the supporting frame, a continuously operating mechanism for actuating the feeding mechanism, a feeler supported by the stack, a reciprocating pawl actuated by the continuously operating mechanism, a ratchet, mechanism operable by the latter for lowering the supporting frame, a pivoted lever supporting the pawl, a feeler supported by the stack, and a flexible connection between the feeler and lever adapted to raise the latter when the feeler drops.

4. In a machine for feeding sheets from a stack, a main frame, standards mounted therein, a supporting frame carried by the standards, a sheet-feeding device mounted in the supporting frame, a rack and pinion for raising and lowering the standards, a pawl and ratchet mechanism for operating said pinion, a lever for controlling the pawl, a feeler adapted to engage the stack, and a wire connected with the feeler adapted to actuate the lever to move the pawl into and out of engagement with the ratchet.

5. In a machine for feeding sheets from a stack, a main frame, standards mounted therein, pinions journaled in the frame engaging racks on the standards, a continuously operating cam, gearing for rotating the pinions, a ratchet connected with the gearing, a pawl adapted to move the ratchet, means operated by the cam for actuating said pawl, a lever for moving the pawl into and out of engagement with the ratchet, a sheet feeding mechanism, a feeler adapted to engage the stack, and a wire connecting the feeler and lever adapted to raise and lower the latter to move the pawl into and out of engagement with the ratchet.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

ARNOLD BACHWITZ.

Witnesses:

JOSEF RUBRARCH,

ARTHUR LINDENSLEAD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."