Dec. 28, 1926. 1,612,260

C. A. H. BULLOCK

FEEDING OF PAPER TO A PRINTING OR OTHER MACHINE

Filed Feb. 10, 1925 4 Sheets-Sheet 1

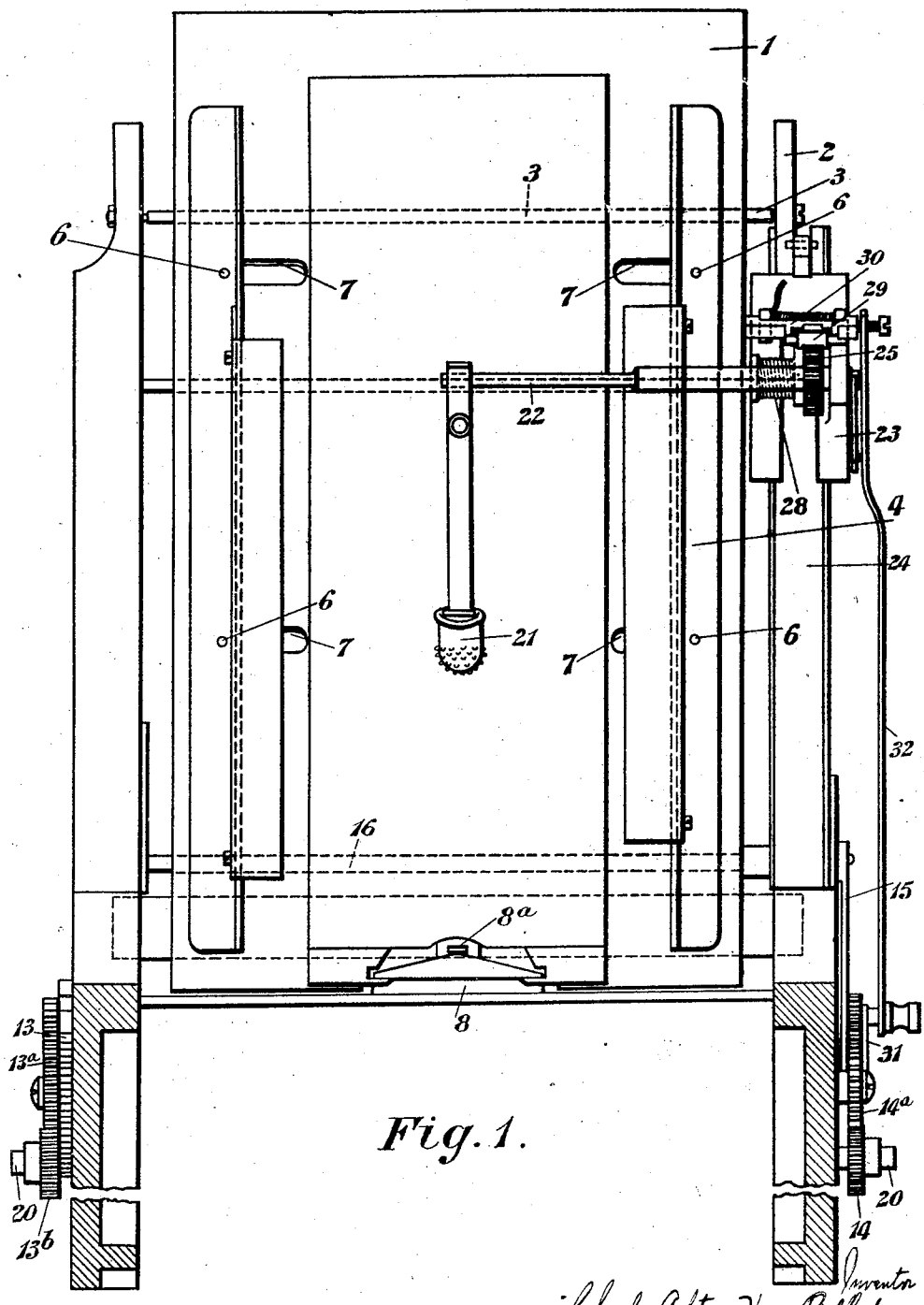


Fig. 1.

Inventor
Charles Ashton Henry Bullock
By B. Singer, Atty.

Dec. 28, 1926. 1,612,260

C. A. H. BULLOCK.

FEEDING OF PAPER TO A PRINTING OR OTHER MACHINE

Filed Feb. 10, 1925 4 Sheets-Sheet 2

Fig. 2.

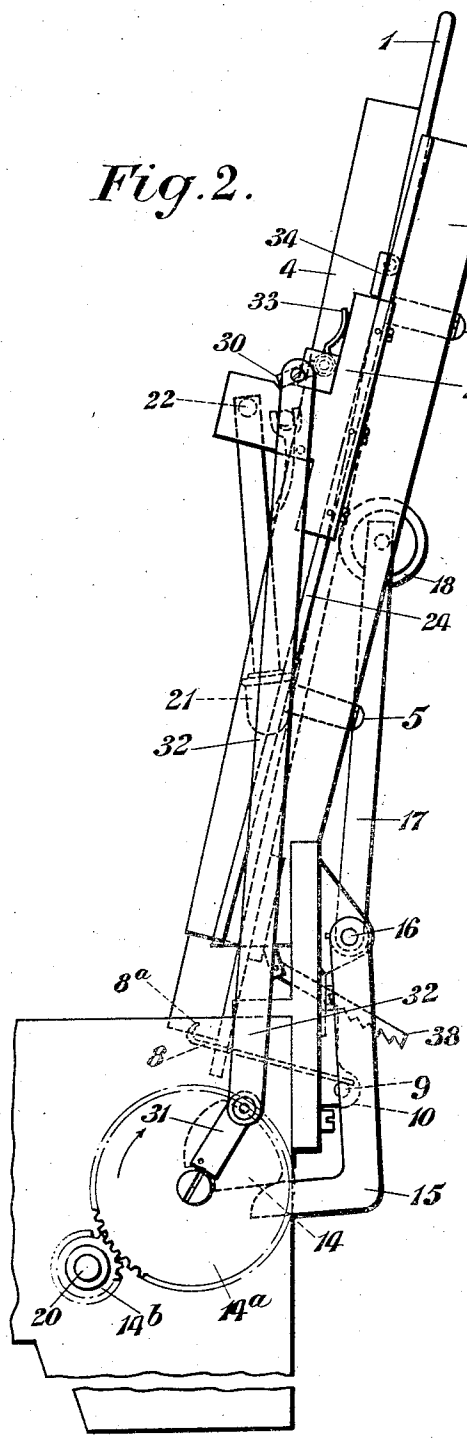
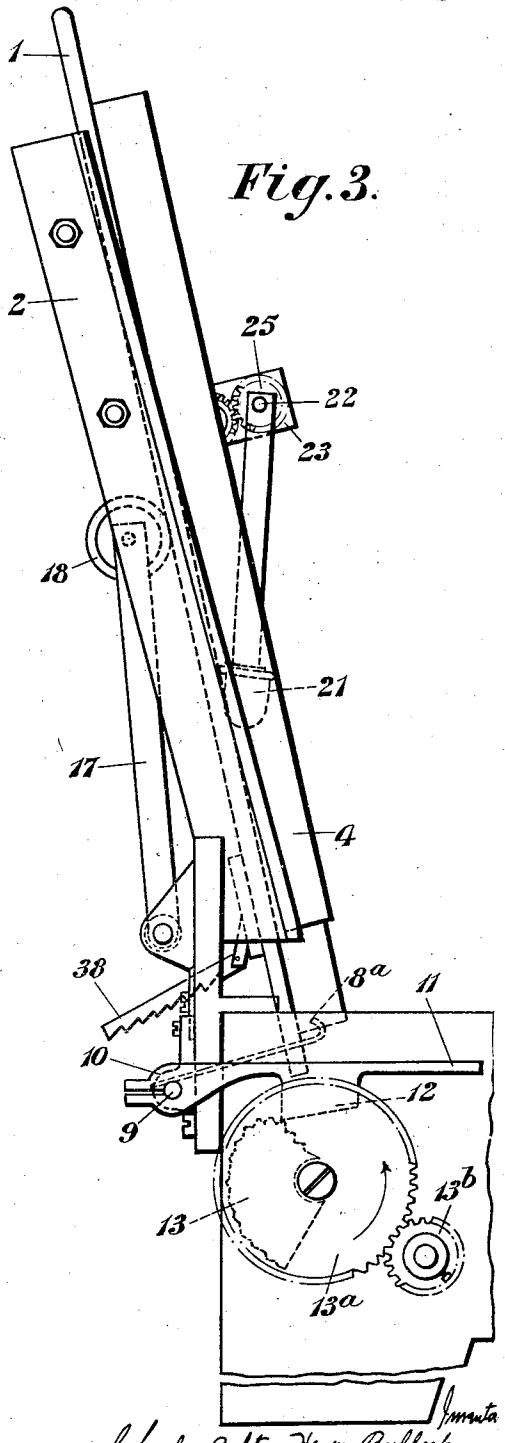


Fig. 3.



Witness
Charles Ashton Henry Bullock
By - B. Singer. Atty.

Dec. 28, 1926. 1,612,260

C. A. H. BULLOCK

FEEDING OF PAPER TO A PRINTING OR OTHER MACHINE

Filed Feb. 10, 1925 4 Sheets-Sheet 3

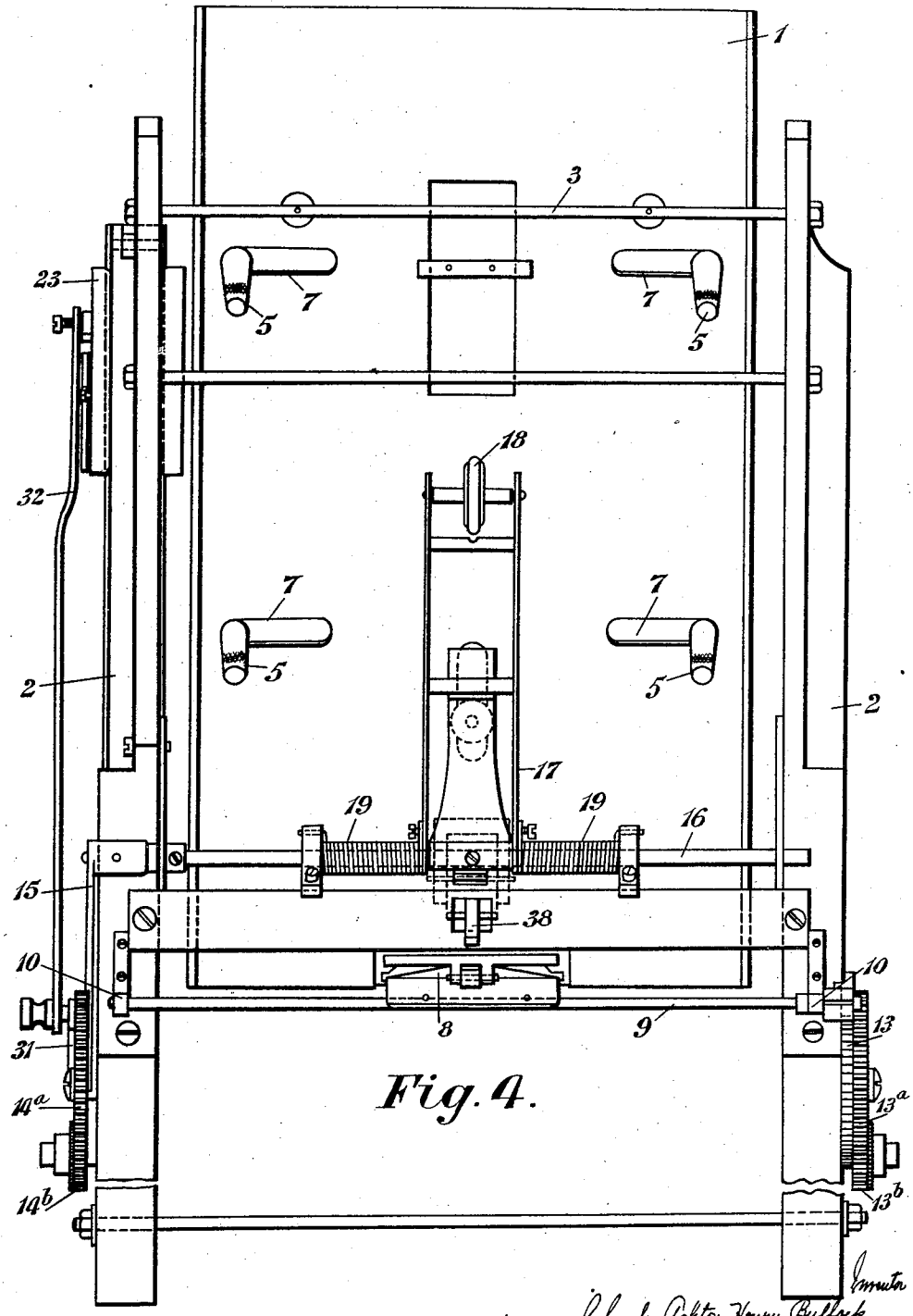


Fig. 4.

Inventor
Charles Ashton Henry Bullock
By B. Singer. Atty.

Dec. 28, 1926. 1,612,260

C. A. H. BULLOCK

FEEDING OF PAPER TO A PRINTING OR OTHER MACHINE

Filed Feb. 10, 1925 4 Sheets-Sheet 4

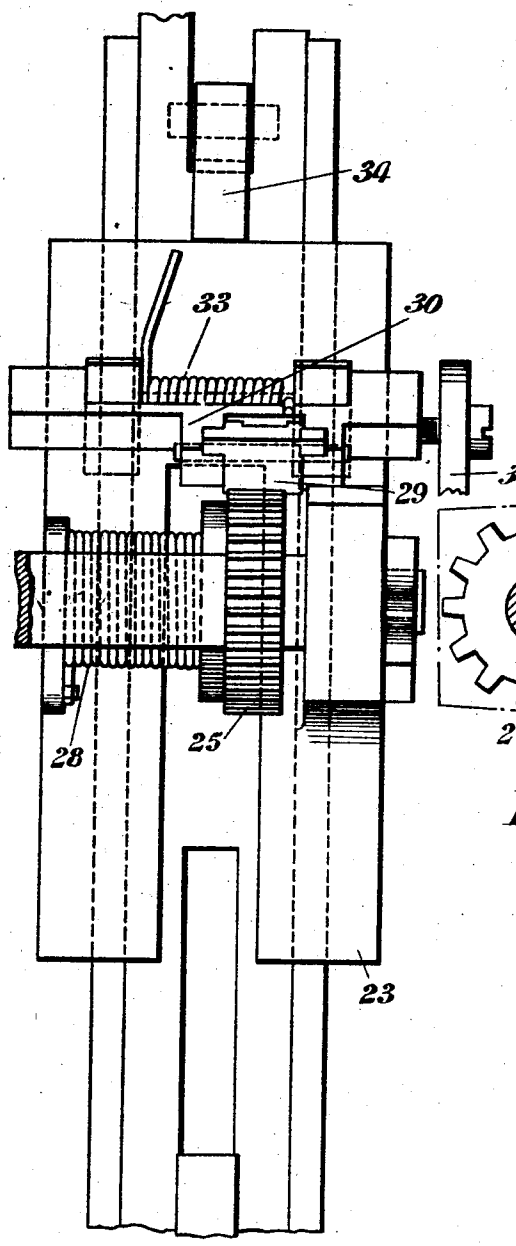


Fig. 5.

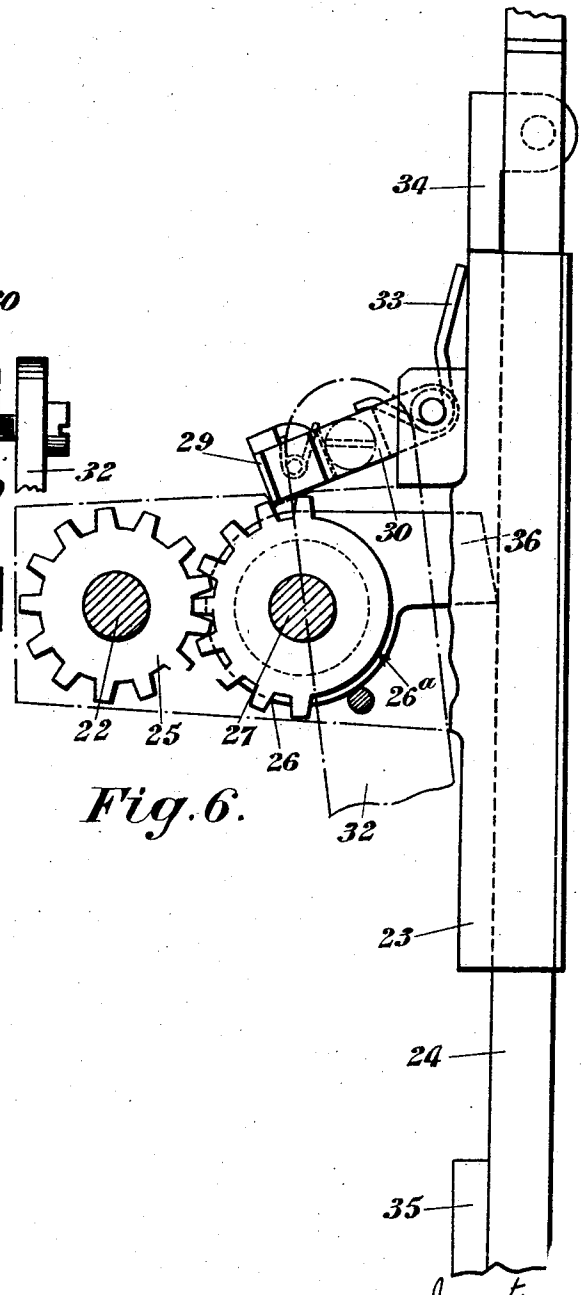


Fig. 6.

Inventor
Charles Ashton Henry Bullock
By B. Singer, Atty

Patented Dec. 28, 1926. 1,612,260

UNITED STATES PATENT OFFICE.

CHARLES ASHTON HENRY BULLOCK, OF LONDON, ENGLAND.

FEEDING OF PAPER TO A PRINTING OR OTHER MACHINE.

Application filed February 10, 1925. Serial No. 8,239, and in Great Britain April 24, 1924.

This invention has reference to the automatic feeding of paper to a printing press or other machine sheet by sheet.

In my prior British application No. 15,407 of 1923 I have described a feed in which the paper to be fed is confined in a clip, such clip being situated at one side of a delivery board, the outer or top sheet being forced back out of the clip against an abutment so as to cause the sheet or a corner thereof to buckle and permit the remaining sheets to be held in the clip, leaving the outer or top sheet free to be removed.

The object of the present invention is to provide a new and improved method of separating the sheets one by one preparatory to feed in which the buckling of the sheet is obviated and a central feed provided thus allowing sheets of any width or thickness to be fed.

The present invention may be said to consist broadly of a method of feeding sheets of paper or the like one at a time from a stack of sheets which consists in displacing the stack of sheets bodily, holding the top sheet in such displaced position returning the remainder of the stack of sheets to its normal position leaving the top sheet in the displaced position and feeding such top sheet forward over the remaining stack of sheets to a position convenient for the removal.

A suitable apparatus for carrying the above method into effect comprises broadly a delivery board upon which the sheets are stacked, a clip at the lower end of the board serving to support the sheets, means for raising and lowering the clip for the purpose of displacing the stack of sheets when the clip is raised and allowing the stack of sheets to return to its normal position when the clip is lowered and means adapted to engage the top sheet when the stack of sheets is displaced and retain such sheet in the displaced position and to subsequently feed such sheet forward over the stack of sheets to a position convenient for removal.

To facilitate the separation of the sheets the stack may be joggled or shaken during both directions of movement of the stack or during one direction of movement only.

In order that the invention may be clearly understood an embodiment of the same will now be described by way of example by aid of the accompanying drawings in which:—

Figure 1 is a front elevation of the apparatus.

Figure 2 is a side elevation of the same looking in the direction of the arrow A in Fig. 1.

Figure 3 is a similar view to Fig. 2 but illustrating the opposite side of the apparatus. Fig. 4 is a rear elevation of the apparatus.

Figures 5 and 6 are front and part sectional side elevations respectively to an enlarged scale of a detail hereafter to be described.

The apparatus illustrated in the drawings comprises a delivery board 1 which is mounted to swing between a pair of frame members 2 about a pivot rod 3 arranged adjacent to the upper end of the board. The board is maintained in an almost vertical position whereby the stacked sheets of paper may fall by gravity as will hereafter appear.

The stacked sheets of paper are located on the face of the board between a pair of angle strips 4 which extend up each side of the board to a height sufficient to effectively position the stacked sheets such strips being adjustably held in position on the board by means of clamping screws 5 the threaded extremities 6 of which extend through lateral slots 7 in the board and into threaded holes in the strips. By this means the strips may be adjusted towards or away from each other to accommodate sheets of various widths.

The stack of sheets is adapted to be positioned on the board between the strips 4 and to be supported thereon by means of a clip 8. This clip is arranged centrally of the lower end of the board and is attached to a pivot pin 9 extending transversely across the back of the board. The pin 9 is supported in bearings 10 and carries on one of its extremities an arm or lever 11 having a depending tappet 12, which tappet is adapted to rest upon the serrated circumference of a cam 13. By these means the clip 8 is raised and lowered about its pivot and at the same time is joggled or rapidly shaken by means of the serrations on the circumference of its operating cam. It will of course be appreciated that the stack of paper or the like which is resting on the clip is similarly raised, lowered and joggled with it the joggling action serving to facilitate separation of the sheets.

The inner end of the clip is formed with a bent over lip 8^a against which the stack of sheets is periodically pressed. This is ef-

fected by moving the delivery board about its pivot 3.

The mechanism for imparting this movement to the delivery board comprises a cam 14 and a tappet lever 15 which lever is mounted upon one extremity of a transverse pivot rod 16.

Mounted upon the centre of this pivot rod is a frame 17 which is capable of relative movement with respect to shaft 16 when the table is arrested by the pile engaging hook 8^a, said frame carrying between its upper extremities a wheel 18 which wheel is normally held out of contact with the back of the delivery board by means of a coiled spring 19 which spring also serves to move the outer end of the tappet lever 15 against the circumference of the cam 14. The cam in its rotation serves to displace the tappet lever 15, turn the pivot rod 16 and so force the wheel 18 against the back of the delivery board which as a consequence is moved forward thus causing the lower edge of the stack of sheets to be clamped between the delivery board and the lip 8^a on the clip 8. The cams 13 and 14 are driven by toothed wheels 13^a and 14^a respectively which wheels in turn mesh with small pinions 13^b and 14^b which pinions, in the present example are mounted upon opposite extremities of a shaft 20 forming part of the driving mechanism of the rotary type of press described in the specification of my prior U. S. application No. 586,250.

The mechanism for feeding the top sheet of the stack according to the example illustrated comprises a centrally mounted rubber tipped finger 21 which is carried at its inner end by a rocking shaft or pivot 22. This shaft or pivot is carried by a reciprocating carriage 23 which is slidably mounted upon a slide 24 carried by one of the frame members 2. The inner end of the shaft or pivot 22 carries a small toothed wheel or pinion 25 which meshes with another toothed wheel 26 (see Fig. 6), a portion 26^a of the circumference of which is devoid of teeth as shown.

Encircling the axis pin 27 of the wheel 26 is a coiled spring 28 which tends to rotate the wheel 26 in a clockwise direction and as a result to turn the outer end of the finger 21 inwards into contact with the surface of the top sheet of the stack of sheets. The finger 21 is however normally held out of contact with the stack of sheets by means of a small auxiliary pawl 29 carried by a larger and main pawl 30, which auxiliary pawl engages the teeth on the wheel 26 and prevents it from rotating under the influence of its spring 28.

The carriage 23 is reciprocated through the medium of a crank 31 and a connecting link 32 the upper end of which is attached to the main pawl 30. The thrust of the crank 31 is thus taken by the pawl 30 and such thrust is resisted by a spring 33 which is sufficiently strong as to maintain the pawl in the lowered position shown in Figure 6 and in contact with the carriage 2. The upward thrust of the crank consequently serves to slide the carriage to the top of its travel and before the crank 31 has completed its upward throw the movement of the carriage is checked by a positive stop 34 which can be thrown out of action if desired so as to make the apparatus inoperative.

As a result the continued movement of the crank serves to lift the pawl 30 against the action of its spring thus also moving the auxiliary pawl 29 out of engagement with the teeth of the wheel 26 which being freed is rotated by its spring and in turn imparts a similar rotation to the wheel 25 thus turning the finger 21 into engagement with the stack of sheets on the delivery board.

The finger 21 is returned again to its normal position upon the completion of the downward movement of the carriage by means including a positive stop 35 and a projection or lever 36 mounted on the axis pin 27, the stop 35 engaging the lever 36 and forcing the same upwards to the position shown in Fig. 6 in which position it is maintained by the engagement between the teeth on the wheel 26 and the auxiliary pawl 29.

In operation and assuming that the finger 21 has completed its downward feeding movement the delivery board is permitted to move backwards thus freeing the stack of sheets from the lip on the clip 8. The clip is then turned upwards about its pivot thus lifting the complete stack of sheets with it. When the stack of sheets has attained this displaced position the finger 21 is allowed to turn inwards, as before explained, into contact with the top sheet. The clip then turns downwards again and under the influence of gravity the stack of sheets follows it leaving however the top sheet behind, such top sheet being held frictionally by the finger 21. The delivery board then moves outwards again until the lip 8^a firmly clamps the lower edge of the remaining stack of sheets. The finger 21 then moves downwards bringing with it the top sheet which is slidden over the top of the lip of the clip 8 and into the printing press indicated generally as 37 on the drawings.

It will be thus seen that the joggling motion imparted to the clip when moving up and down serves to facilitate the separation of the top sheet from the remainder of the stack of sheets by the finger 21.

To limit the distance the delivery board is required to move and to allow of approximately the same amount of outward travel whether the amount of paper on the delivery board is much or little I provide it with a rack 38 the teeth of which are sloped so as

to permit the board to move forward but limits the backward movement to an extent which allows the stack of sheets to be freed from the lip 8a only. If this rack were not provided the board would be free to move back the full distance permitted by the wheel 18.

In some cases I may employ more than one clip the number being determined by the width of the sheets to be fed.

What I claim and desire to secure by Letters Patent is:—

1. Apparatus for feeding sheets of paper or the like one at a time from a stack of sheets comprising a delivery board upon which the sheets are stacked, a clip at the lower end of the board serving to support the sheets, means for raising and lowering the clip for the purpose of displacing the stack of sheets when the clip is raised and allowing the stack of sheets to return to its normal position when the clip is lowered and means adapted to engage the top sheet when the stack of sheets is displaced and retain such sheet in the displaced position and to subsequently feed such sheet forward over the stack of sheets to a position convenient for removal.

2. Apparatus according to claim 1, wherein the clip is raised and lowered by means of a cam the periphery of which is serrated so as to impart a joggling motion to the clip as it is raised and lowered such motion being in turn imparted through the clip to the stack of sheets to facilitate their separation one from another.

3. Apparatus for feeding sheets of paper or the like one at a time from a stack of sheets comprising a delivery board, on which the sheets are positioned, means for displacing the stack of sheets bodily in a direction longitudinally of the delivery board, means for holding the top sheet in such displaced position while the remainder of the sheets are released and permitted to return to their normal position by gravity and means for feeding such top sheet by sliding the same longitudinally across the remaining stack of sheets to a position convenient for removal.

4. Apparatus for feeding sheets of paper or the like one at a time from a stack of sheets comprising a delivery board on which the sheets are positioned, means at the lower end of the board for supporting the sheets, said means being positively and periodically moved to effect the displacement of the stack of sheets bodily, means for frictionally engaging the top sheet and holding the same in such displaced position while the remainder of the sheets are returned to their normal position and means for feeding such top sheet over the remaining stack of sheets to a position convenient for removal.

5. Apparatus for feeding sheets of paper or the like one at a time from a stack of sheets comprising a delivery board upon which the sheets are stacked, supporting means at the lower end of the board serving to support the sheets, means for raising and lowering the supporting means for the purpose of displacing the stack of sheets when the supporting means are raised and allowing the stack of sheets to return to its normal position when the supporting means are lowered and means adapted to engage the top sheet when the stack of sheets is displaced and retain such sheet in the displaced position and to subsequently feed such sheet forward over the stack of sheets to a position convenient for removal.

6. Apparatus for feeding sheets of paper or the like one at a time from a stack of sheets comprising a movable delivery board upon which the sheets are stacked, a clip at the lower end of the board serving to support the sheets, means for raising and lowering the clip for the purpose of displacing the stack of sheets when the clip is raised and allowing the stack of sheets to return to its normal position when the clip is lowered, means for moving the delivery board forward so as to cause the clip to firmly engage the lower edge of the stack of sheets and means adapted to engage the top sheet when the stack of sheets is displaced and to feed such sheet forward over the stack of sheets, when such sheets are held by the clip, to a position convenient for removal.

7. Apparatus for feeding sheets of paper or the like one at a time from a stack of sheets, comprising a pivoted delivery board, a clip at the lower end of the board serving to support the stack of sheets, said clip being adapted to be periodically raised and lowered relatively to the board so as to raise and lower the stack of sheets and to simultaneously joggle the same, a finger which is movable both pivotally and rectilinearly, and is adapted to be brought into engagement with and to frictionally hold the top sheet of the stack when such stack is in the raised position such finger serving to retain such top sheet in the raised position while the remaining sheets are returned to their lowered and normal position, means for turning said board about its pivot so as to press the stack of sheets firmly against the clip and means for moving said finger downwards longitudinally of the stack of sheets while still in engagement with the top sheet so as to feed such top sheet over the remaining sheets, which are held by the clip, to a position convenient for removal.

8. Apparatus for feeding sheets of paper or the like one at a time from a stack of sheets comprising a delivery board on which the sheets are positioned, means for displacing the sheets bodily and means for holding the top sheet in such displaced position while the remainder of the sheets are returned to

their normal position and for feeding such top sheet over the remaining stack of sheets to a position convenient for removal comprising a pivoted finger carried by a reciprocating carriage which finger is held out of engagement with the stack of sheets by a pawl against the action of a spring, such pawl being automatically disengaged when the carriage has completed its traverse in one direction allowing the spring to press the finger into engagement with the top sheet of the stack, the finger being turned automatically to a position out of engagement with the stack of sheets when the carriage has completed its traverse in the opposite direction in which position the finger is again held by the pawl.

9. Apparatus for feeding sheets of paper or the like one at a time from a stack of sheets comprising a delivery board on which the sheets are positioned, means for displacing the stack of sheets bodily in a direction longitudinally of the delivery board and for simultaneously jogging the same, means for holding the top sheet in such displaced position while the remainder of the sheets are released and permitted to return to their normal position by gravity and means for feeding such top sheet by sliding the same longitudinally across the remaining stack of sheets to a position convenient for removal.

In witness whereof I affix my signature.

CHARLES ASHTON HENRY BULLOCK.