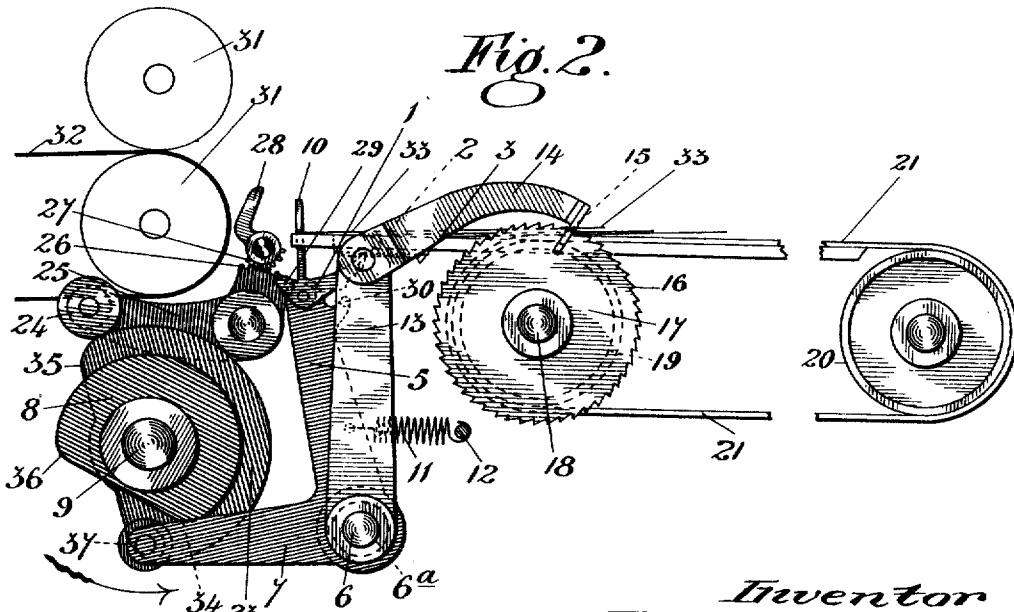
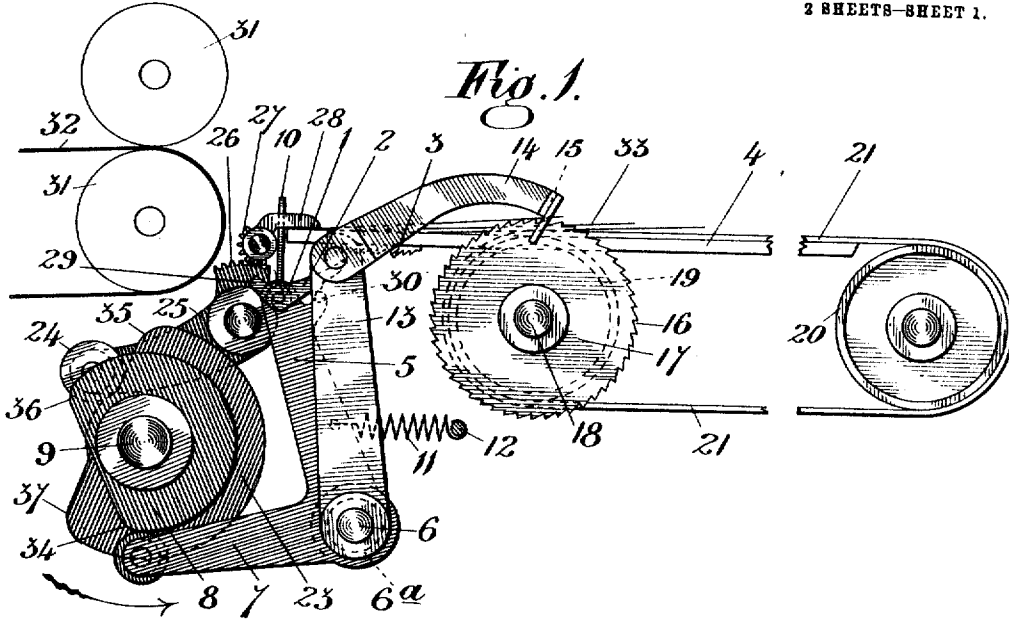


F. W. VICKERY.
SHEET FEEDING APPARATUS.
APPLICATION FILED MAR. 18, 1910.

997,026.

Patented July 4, 1911.

2 SHEETS—SHEET 1.



Witnesses:
[Signature]
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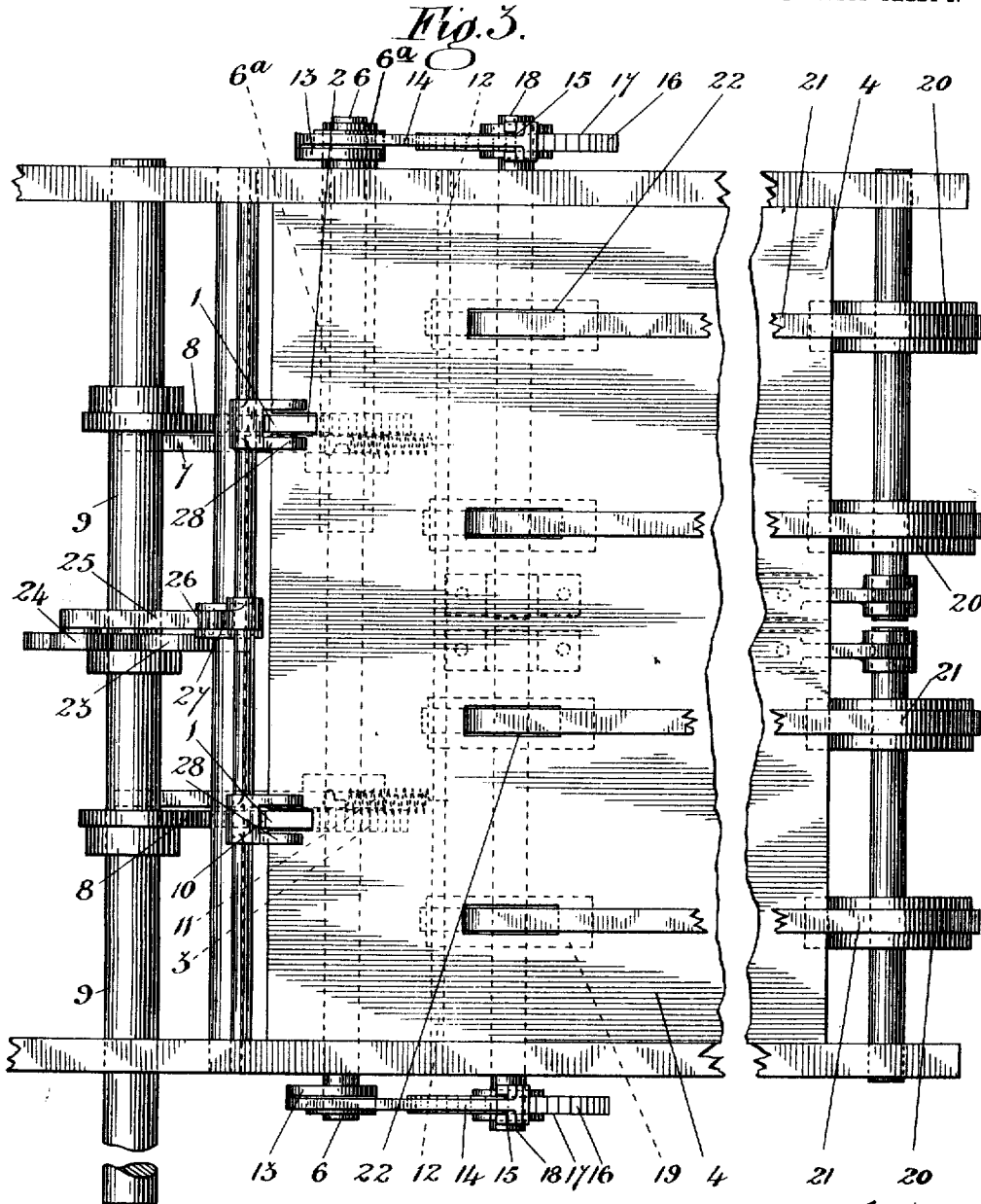
Inventor
Frederick W. Vickery
By *[Signature]*
James L. Morris, Jr.
Attys

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UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM VICKERY, OF LONDON, ENGLAND.

SHEET-FEEDING APPARATUS.

997,026.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed March 18, 1910. Serial No. 550,110.

To all whom it may concern:

Be it known that I, FREDERICK WILLIAM VICKERY, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in Sheet-Feeding Apparatus, of which the following is a specification.

The object of the present invention is to insure that the most advanced sheet of a "bank" or pile of paper in sheet feeding and other apparatus shall always be in a given position for engagement by the grippers or other removing devices. To facilitate description I will describe it as applying to a pile of paper in a "banked out" or "fanned out" condition. Such bank is placed on conveyers, preferably of the endless band type and in the position it is required that the front lay edge of the sheet should be.

My invention will be clearly understood from the following description aided by the annexed drawings in which:—

Figure 1 is a side elevation of the appliances forming my invention, such appliances being in the position occupied just previous to their operation. Fig. 2 is a similar view to Fig. 1 but with the appliances in the position they occupy after the first operation. Fig. 3 is a plan of an apparatus with two sets of appliances in position.

For the purpose of my invention I position a bell crank lever 1, or its equivalent, having the end of the arm 2 formed as a pawl for engagement with a stationary ratchet, rack 3 or its equivalent, preferably in the same plane as, or parallel with the paper and affixed to the feed board 4, such bell crank lever being pivotally carried by one arm 5 of a second bell crank lever fixed to a shaft 6, the other arm 7 having its free end provided with a roller in engagement with a cam 8 fixed to a driving shaft 9. The shaft 6 is free in its bearings and the arm 5 has a spring 11 connecting it with a rod 12 on the frame of the apparatus or to some other fixture. On the shaft 6 is also fixed a lever 13 carrying at its free end a loosely pivoted arm 14 having a tooth 15 which engages the peripheral teeth 16 of a ratchet 17. Said ratchet is secured to the shaft 18 of the end rollers 19 of the conveyer, these rollers, in conjunction with the front rollers 20, carrying the tapes 21 for feeding the bank of paper so that the top sheet will always occupy a given position, hereinafter

specified, previous to being engaged by the removing devices.

The tapes 21 pass over the end of the table or feed board 4 and through holes 22 and then under the table as will be understood from the drawings so that the end of the table or feed board will be perfectly smooth. The driving shaft 9 also carries a cam 23 which has action on the roller 24 mounted on the free end of one arm of a pivoted bell crank lever 25 the other arm of which is provided at its free end with teeth 26 which mesh with the teeth 27 on a pivoted presser foot 28 which is employed for engaging the top sheet of paper as hereafter explained.

29 is a counterbalance on the bell crank lever 1, the arm 2 of which in normal condition rests upon the stop 30 on the lever 5, the arm 2 being only slightly heavier than the counterbalance 29.

Motion may be imparted to the shaft 6 and lever 25 by mechanism other than cams.

Any device for removing the top sheet of the pile after it has been placed in a position where it can be engaged by such device may be employed, as for instance a gripper, suction devices, or other lifting and removing appliances, and the sheets as removed may be passed to and between rollers 31 for conveyance by belt 32 to a printing or other machine in a manner well known.

When a small sheet only is being fed I may only employ one set of my appliances, but when large sheets of paper are to be fed, or two sheets side by side of different thicknesses, I employ two or more sets, preferably two as shown in Fig. 3 in which case there is only one driving shaft 9, but the shaft 6 is made in two parts, one being solid and the other in the form of a sleeve 6^a encircling the shaft 6 but having an independent motion altogether and also I employ two separate sets of conveyer tapes. The shafts 6, 6^a, are caused to act independently so that should a sheet not be in such position with regard to the pile that it can be moved to the given position in a straight line, one lever 5 will have a greater travel than the other and in consequence the sheet can be properly positioned at the completion of the movement of the cams 8.

I will describe the operation of one set of appliances. Now supposing the appliances be in the position they occupy in Fig. 1 and the sheets of paper 33 in a spaced out

or banked condition lying on the conveyers and the presser foot 28 catching hold or lying on the front edge of the top sheet. The cams 8 and 23 are moving in the direction of the arrow but all other appliances are at rest; so soon as the roller end of the arm 7 just passes the nose 34 of the cam 8, the spring 11 pulls over the lever formed by said arms 5 and 7 and in so doing moves the bell crank lever 1 with it, the arm 10 moving toward the top sheet of paper held by the presser foot 28 and so soon as the arm 10 comes in contact with the edge of the top sheet of paper it is arrested and the bell crank lever 1 moves about its pivot and causes the arm 2 to position its end in the teeth of the rack 3 and thus prevent further movement of the said lever arms 5 and 7. At the same time the lever 13 has also moved and the tooth 15 of the arm 14 has moved over the ratchet teeth 16 of the wheel 17 and repositioned itself therein. Just at, or after the finish of these movements the roller 24 on the end of the main arm of the lever 25 is riding over the nose 35 of the cam 23 and the rocking of said lever causes the teeth 26 on its other arm to move the presser foot 28 free of the top sheet of paper as will be understood from Fig. 2. The arm 28 is kept in this position while in contact with the circular edge of the cam and during the next described movements. The top sheet of paper is now ready for being brought into position for engagement by the removing devices, and this is effected when the nose 36 of the cam 8 actuates the lever arm 7 and brings it and also the arms 5 and 13 back, putting tension on the spring 11; at the same time the arm 14 revolves the conveyer rollers 19 and brings the whole pile of paper along, the arm 10 of the bell crank lever 1 moving in unison with the edge of the top sheet and touching it and when the roller end of the arm 7 has passed onto the circular edge of the cam 8 the movement is stopped and the top sheet has been placed at the required position, ready for being lifted and taken away to the printing or other machine in perfect register. The ends of the arm 7 and the main arm of lever 25 are on the circular portions of their respective cams and the lifting and removal of the top sheet of the pile takes place, and after this the roller 24 of the end of the said main arm of lever 25 rides over the nose 37, whereupon the said main arm will drop and the teeth on the other arm of lever 25 will cause the presser foot 28 to fold over on to the now top sheet of the pile and hold same for a repetition of the above described operations.

It will be seen that the lever arm 7 and bell crank lever 1 are capable of traveling the full stroke allowed by the cam 8 provided that said bell crank lever 1 does not

meet any obstacle to cause the pawl to come into contact with the rack 3, and when the bell crank lever comes in contact with the sheet edge, the latter then acts as a stop, the lever rocking slightly, bringing the pawl into engagement with the rack which prevents any further forward movement.

It will be seen that if the lengths of the various lever arms and the diameter of the wheels are right, the ratchet wheel pawl will be advanced as many teeth on wheel 17 as the pawl end of arm 2 of the bell crank lever 1 has advanced teeth on rack 3, and when the shaft 6 is reversed, the conveyers bring the paper forward a distance equal to the distance the lever 1 has had to travel to meet the top sheet. I provide the pressure foot or feet to press down on to the paper at about the time the lever 1 advances to meet the edge of the sheet, so that there is no possibility of the sheet of paper however thin or weak being crumpled or injured, but I could get the same results by directing a current of air on to the sheet to keep it flat. It is possible by the use of this mechanism to get the front edge of the most advanced sheet into its correct position before the removing mechanism attempts to operate upon it. For large sheets of paper, or two sheets side by side, I use two or more of those bell crank levers and one on each side, as at Fig. 3, and I make my conveying mechanism to work each side independent of the other so that in case one side of the sheet is advanced farther than the other side, the fault will be corrected by advancing the conveyers on one side more than those on the other side.

What I do claim as my invention, and desire to secure by Letters Patent is:—

1. In a sheet feeding apparatus, the combination, with a conveyer; of a drive shaft; a rock shaft; a pair of levers secured to the rock shaft; a member secured to the drive shaft and arranged to engage one of said levers for periodically rocking the second-named shaft in one direction; connections between the other lever and the conveyer for advancing the latter during the movement of the second-named shaft; and means connected to one of said levers for rocking said second-named shaft in the opposite direction at the termination of such movement.

2. In a sheet feeding apparatus, the combination, with a conveyer; of a drive shaft; a rock shaft; a bell crank lever secured to the rock shaft; a cam secured to the drive shaft and engaged with one arm of said bell crank lever for rocking the same in one direction; a second lever secured to said rock shaft; connections between the second lever and the conveyer for advancing the latter during the rocking movement of said bell crank lever; means connected to one of said

levers for returning both levers to their initial position at the termination of such movement; and means carried by the other arm of said bell crank lever for automatically terminating such return movement.

3. In a sheet feeding apparatus, the combination, with a conveyer; of a drive shaft; a rock shaft; a bell crank lever secured to the rock shaft; a cam secured to the drive shaft and engaged with one arm of said lever for rocking the same in one direction; connections between said rock shaft and the conveyer for advancing the latter during the rocking movement of said bell crank lever; means connected to the other arm of said bell crank lever for rocking the same in the opposite direction, at the termination of the first-named movement thereof; and means carried by the said other arm for automatically terminating the second-named movement of said bell crank lever.

4. In a sheet feeding apparatus, the combination, with a conveyer; of a drive shaft; a rock shaft; a bell crank lever secured to the rock shaft; a cam secured to the drive shaft and engaged with one arm of said lever for rocking the same in one direction; connections between said rock shaft and the conveyer for advancing the latter during the rocking movement of said bell crank lever; means connected to the other arm of said bell crank lever for rocking the same in the opposite direction, at the termination of the first-named movement thereof; and a member carried by the said other arm and arranged to engage the foremost sheet during the second-named movement of the bell crank lever for automatically terminating such movement.

5. In a sheet feeding apparatus, the combination, with a feed table, and a conveyer movable thereacross; of a drive shaft; a rock shaft; a bell crank lever secured to the rock shaft; a cam secured to the drive shaft and engaged with one arm of said lever for rocking the same in one direction; connections between said rock shaft and said conveyer for advancing the latter during the movement of said bell crank; means connected to the other arm of said bell crank lever for rocking the same in the opposite direction at the termination of the first-named movement thereof; a toothed member secured to said table; and means connected to said other arm and arranged to engage said member at a predetermined point in the second-named movement of said bell crank lever for automatically terminating such movement.

6. In a sheet feeding apparatus, the combination, with a feed table, and a conveyer movable thereover; of a rock shaft; a lever secured thereto; means for rocking said lever in one direction; connections between said shaft and said conveyer for advancing

the latter during the movement of said lever; means connected to said lever for automatically returning it to its initial position at the completion of such movement; a toothed member secured to said table; and means connected to said lever and arranged to engage said member at a predetermined point in said return movement for automatically terminating such movement.

7. In a sheet feeding apparatus, the combination, with a feed table, and a conveyer movable thereover; of a rock shaft; a lever secured thereto; means for rocking said lever in one direction; connections between said shaft and said conveyer for advancing the latter during the movement of said lever; means connected to said lever for automatically returning it to its initial position at the completion of such movement; a toothed member secured to said table; and a member pivoted to said lever and arranged to engage said toothed member at a predetermined point in said return movement for automatically terminating such movement.

8. In a sheet feeding apparatus, the combination, with a feed table, and a conveyer movable thereover; of a rock shaft; a lever secured thereto; means for rocking said lever in one direction; connections between the said shaft and said conveyer for advancing the latter during the movement of said lever; means connected to said lever for automatically returning it to its initial position at the completion of such movement; a toothed member secured to said table; and a bell crank lever pivoted to the first-named lever and having one arm thereof adapted to strike against the edge of the foremost sheet at a predetermined point in said return movement, to bring its other arm into engagement with said toothed member, for automatically terminating such return movement.

9. In a sheet feeding apparatus, the combination, with a feed table, and a conveyer movable thereacross; of a rock shaft; a bell crank lever secured thereto; a drive shaft provided with a cam engaging one arm of said bell crank lever for rocking the same in one direction; connections between said rock shaft and said conveyer for advancing the latter during the movement of said bell crank lever; means connected to the other arm of said bell crank lever for returning the same to its initial position at the completion of the first-named movement; a toothed member secured to said table; and a bell crank lever pivoted to the said other arm of the first-named bell crank lever and having one arm adapted to strike against the edge of the foremost sheet at a predetermined point in said return movement, to bring its other arm into engagement with said toothed member, for automatically terminating such return movement.

10. In a sheet feeding apparatus, the combination, with a feed table, and a conveyer movable thereacross; of a rock shaft; a pair of levers secured thereto; a drive shaft; connections between the drive shaft and one of said levers for turning the rock shaft in one direction; connections between the other lever and the conveyer for advancing the latter during the movement of said rock shaft in such direction; means connected to one of said levers for turning said rock shaft in the opposite direction; a presser foot adapted to engage the foremost sheet; and connections between said drive shaft and the presser foot for moving said presser foot into inoperative position substantially at the completion of one movement of said rock shaft, and into operative position substantially at the completion of the other movement of said rock shaft.

11. In a sheet feeding apparatus, the combination, with a conveyer; of a drive shaft; connections between said shaft and said conveyer for periodically operating the latter; a pivotally-mounted bell crank lever; a

presser foot operatively connected with one arm of said lever and adapted to engage the foremost sheet; and connections between said shaft and the other arm of said lever for periodically operating said presser foot.

12. In a sheet feeding apparatus, the combination, with a conveyer; of a drive shaft; connections between said shaft and said conveyer for periodically operating the latter; a pivotally-mounted bell crank lever having one of its arms provided with a series of teeth; a presser foot adapted to engage the foremost sheet, said presser foot being formed with a series of teeth meshing with the teeth on said arm; and a cam secured to said shaft and engaging the other arm of said lever for periodically operating said presser foot.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FREDERICK WILLIAM VICKERY.

Witnesses:

WM. F. BRAIDER,

FRED L. HOPKINS.

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