No. 716,983. Patented Dec. 30, 1902.

M. T. BARBER.

APPARATUS FOR FEEDING SEPARATE SHEETS OF PAPER IN PRINTING OR LIKE MACHINES.

(Application filed June 24, 1902.)

(No Model.) 3 Sheets—Sheet 1.

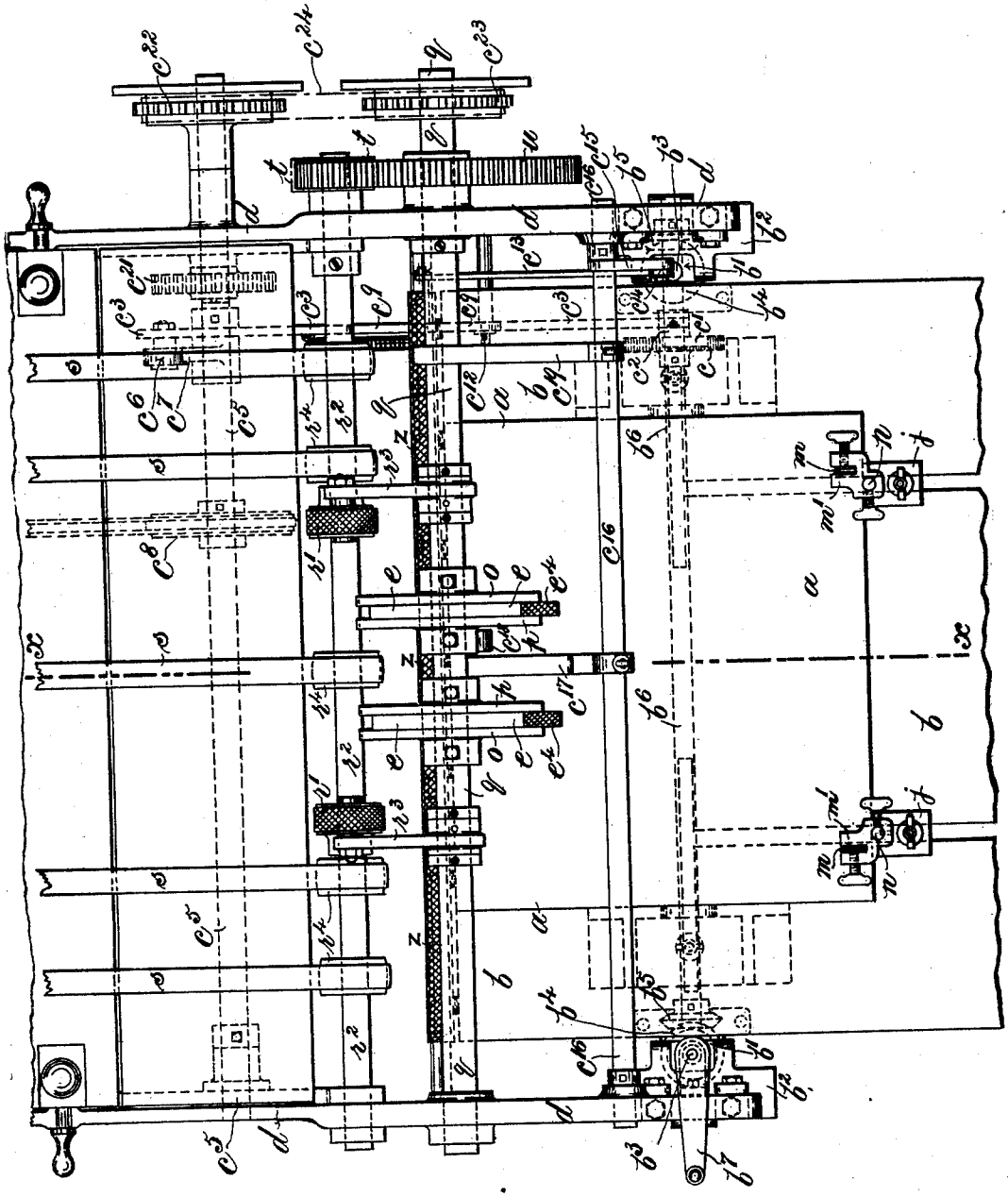


FIG. 1.

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(No Model.) 3 Sheets—Sheet 2.

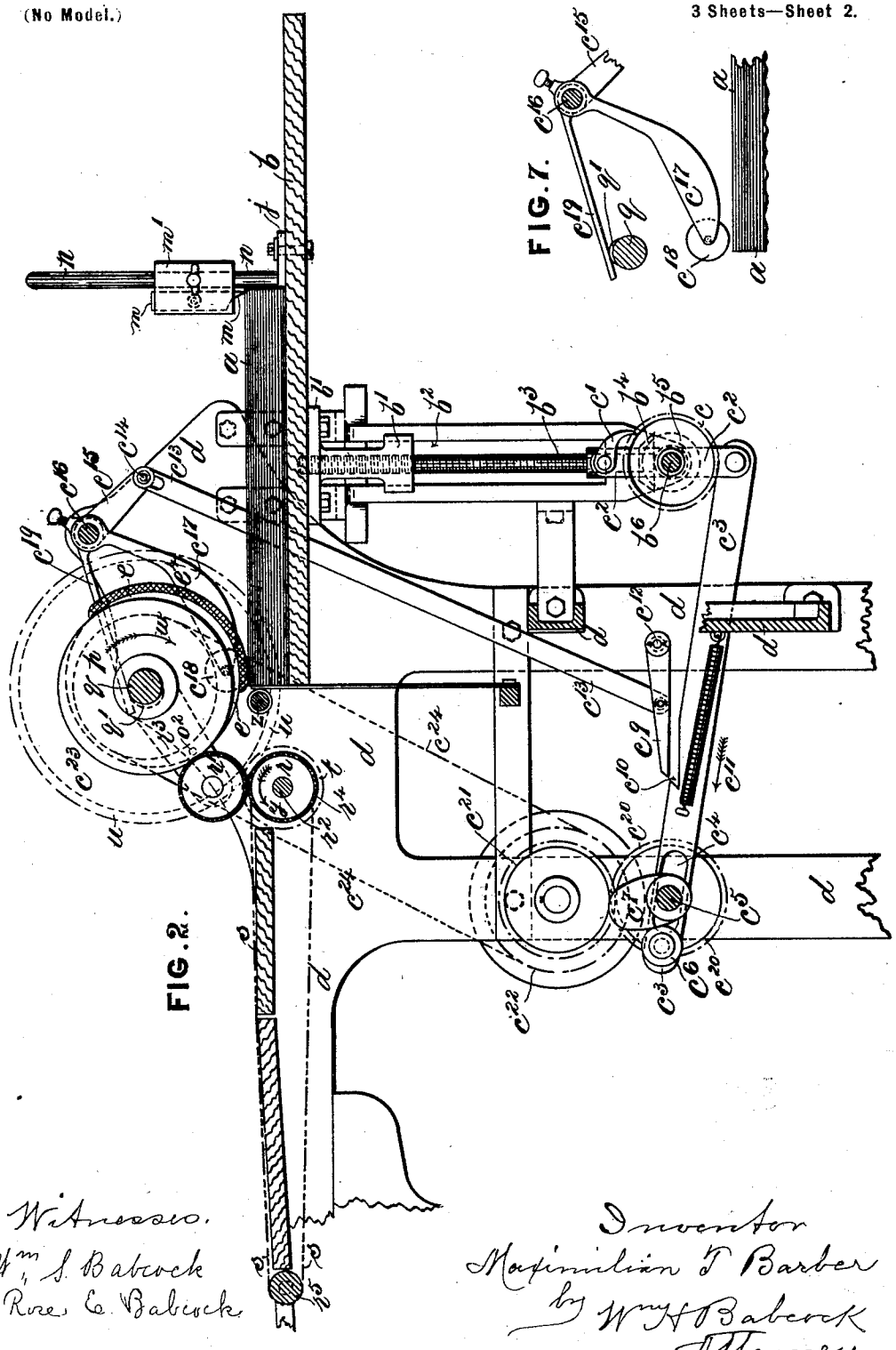


FIG. 2.

FIG. 7.

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(No Model.) 3 Sheets—Sheet 3.

FIG. 6.

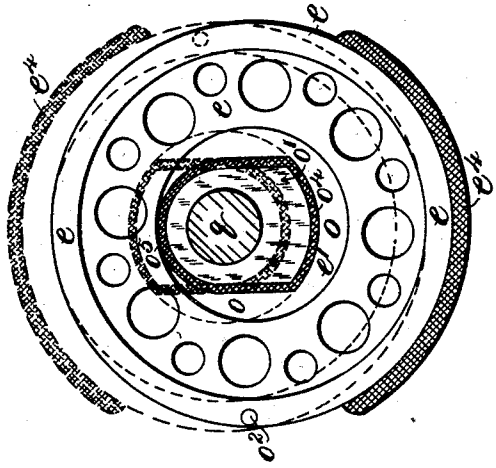


FIG. 5.

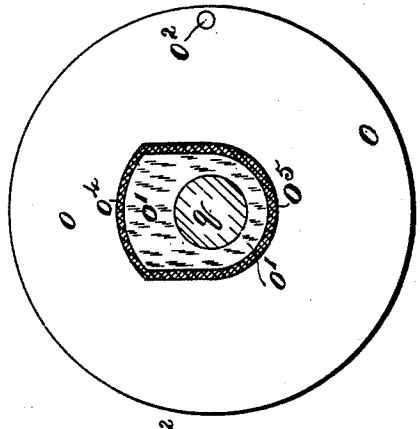


FIG. 4.

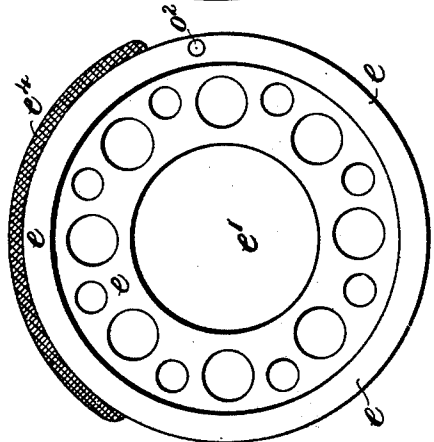
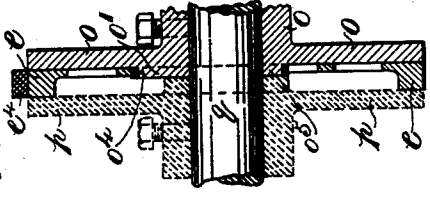


FIG. 3.



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UNITED STATES PATENT OFFICE.

MAXIMILIAN THOMAS BARBER, OF MANCHESTER, ENGLAND.

APPARATUS FOR FEEDING SEPARATE SHEETS OF PAPER IN PRINTING OR LIKE MACHINES.

SPECIFICATION forming part of Letters Patent No. 716,983, dated December 30, 1902.

Application filed June 24, 1902. Serial No. 112,991. (No model.)

To all whom it may concern:

Be it known that I, MAXIMILIAN THOMAS BARBER, a subject of the King of Great Britain and Ireland, and a resident of 14 Cumberland street, Manchester, England, have invented certain new and useful Apparatus for Feeding Separate Sheets of Paper in Printing or the Like Machines, (for which I have filed application for a British patent, No. 10,931, dated May 13, 1902;) 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.

This invention relates to an improved automatic paper-feed device for printing and the like machines; and it consists in the construction and combination of parts hereinafter more particularly set forth and claimed.

In the drawings, Figure 1 is a plan. Fig. 2 is a sectional elevation through x x of Fig. 1. Fig. 3 is a sectional elevation, to a larger scale, of the taking-off apparatus. Fig. 4 is a side elevation of one of the taking-off disks. Fig. 5 is a side elevation of the taking-off shaft and cam-plate. Fig. 6 is a side elevation showing the taking-off shaft and the disks in different positions. Fig. 7 is a detached detail view of part of the table-control apparatus.

The pile of paper a rests on a feed-table b. The latter is carried in slide-blocks b', working in guideways b^2 at each side of the machine. The slide-blocks b' are vertically screw-tapped and engage with screw-shafts b^3, so as to be raised and lowered by the rotation of the latter. Each screw-shaft b^3 carries a bevel-wheel b^4, gearing with a bevel-wheel b^5. The two bevel-wheels b^5 are mounted on a common shaft b^6, the rotation of which operates both screw-shafts. One screw-shaft is continued upward above the table and carries a lever and handle b^7 for raising and lowering the table by hand when required. Secured to the shaft b^6 is a ratchet-wheel c, operated by a pawl c'. The pawl c' is fulcrumed to the upper arm of the lever c^2, turning freely on the shaft b^6. The lower arm of the lever c^2 is connected to a reciprocating bar c^3, having a slot c^4, which takes freely around a shaft c^5. At its extreme end the bar c^3 carries a roller c^6, which is continually pulled to the periphery of a cam c^7, mounted on the shaft c^5. The latter is driven from any convenient rotating part of the machine. In Fig. 1 it is shown as being driven by a chain-wheel c^8 from the main shaft. When not put out of operation, the reciprocating bar c^3 moves to and fro under the action of the cam c^7 and operates the pawl c', so as to turn the shaft b^6 and lift the table. To put the bar out of action a catch or detent c^9 is caused to fall into the notch c^{10}, when the bar c^3 is carried by the cam c^7 its full extent in the direction of the arrow c^{11}. The detent prevents the return of the bar c^3. The detent c^9, which is fulcrumed at c^{12} to the frame d of the machine, is connected to a link c^{13}, which in turn is connected at c^{14} to a lever c^{15}, secured to a rocking shaft c^{16}. The latter carries a detector-arm c^{17}, armed with a roller c^{18}. The arm c^{17} is made so heavy that its weight overcomes the weight of the connected parts, and thus causes the roller c^{18} to ordinarily bear on the top of the paper. When the paper rises to a certain height, the roller c^{18} lifts, and thereby inserts the detent c^9 in the bar c^3. The lifting action of the screws b^2 is then interrupted. As paper is taken off the pile the roller c^{18} descends, and consequently the detent c^9 is lifted, when the raising of the table is resumed.

The action thus described enables the upper surface of the paper to be preserved at the normal predetermined feed-level, irrespective of the thickness of the individual sheets of the pile.

To prevent the roller c^{18} impeding the taking off of the paper, the rocking-shaft c^{16} carries a relieving-arm c^{19}, extending over the taking-off shaft q. A cam q' on the shaft q lifts the arm c^{19} at each revolution, and thereby momentarily relieves the paper of the pressure of the roller c^{18}. (See Fig. 7.) The position of the cam q' is so arranged that this momentary relief takes place simultaneously with the taking off of the top sheet, so that the latter operation may not be impeded by the drag of the roller c^{18}.

The taking-off shaft q derives its motion from the cam-shaft c^5 through gearing-wheels c^{20} c^{21}, chain-wheels c^{22} c^{23}, and a chain c^{24}.

To retain the lower sheets of paper while

the uppermost sheet is being taken off, I use retaining prickers or knives m in blocks m', which are free to slide by gravity down the stalk n, formed on the stops or gages j. The knife m being so mounted is caused by its own weight to penetrate or prick through the fore edge of the top sheet of paper and into one or more of the lower ones, so as to retain them while the upper sheet is drawn off. The use of such prickers is not new, and I make no general claim to such prickers or knives.

For taking off the top sheet I employ a taking-off device consisting of a disk e, which rotates in the direction of the arrow w with the cam-plate o to which it is hinged at o^2. The cam-plate o is secured to the rotating taking-off shaft q. (See Figs. 3 to 6.) The said disk e has an aperture or slot e' at its inner part, so that it may slide or swing about the pin o^2 at right angles to the shaft during its rotation, so that the acting edge e^4 of the disk comes into contact with the top sheet of paper when the part o^5 of the cam is at its highest point, as shown in full lines at Figs. 2 and 6. When the part o^5 of the cam is at its lowest point, (see Fig. 5,) the disk e is lifted by the part o^4 into its raised position, and the part e^4 is then farthest away from the paper, as indicated at Fig. 3 and in dotted lines at Fig. 6.

The cam o' may be cushioned with rubber or other suitable material to prevent noise when the disk e falls or is being lifted by the cam. A cover or guide plate p, secured to the shaft q, (shown dotted at Fig. 3,) may be employed to keep the disk e up to the cam-plate.

Part of the circumference of the taking-off device is armed with a cushion or pad at e^4, preferably formed from a mixture of glue and glycerin with or without other ingredients. The pad when the disk e is rotated takes against the top sheet with sufficient friction or "bite" to cause the latter to be drawn forward from the prickers and off the pile. The sheet having been thus taken off the pile is passed forward to a pair of taking-in rollers, consisting of disks or rolls r r', having cushioned or padded peripheries of india-rubber or other like material to nip the sheet and which by their rotation draw the sheet forward onto traveling tapes or carriers s, which convey the sheet to the gripper-bar or other conveying devices suitable for the particular process to which the sheet is to be subjected. The lower disks r, secured on the shaft r^2, are rotated in the direction of the arrow y, Fig. 2, by means of a pinion t, gearing with a tooth-wheel u, secured to the shaft q. The upper disks r' are mounted on arms r^3, carried by the shaft q, and the disks r' are held in rolling contact with the lower rotating disks by the weight of the said arms.

The endless tapes or carriers s pass over pulleys r^4, secured to and rotated by the shaft r^2, and over a guide-roller r^5.

The parts are connected with and driven from the operative parts of the machine to which they are applied so as to synchronize with their action in such a manner as to draw off, take in, and release the successive sheets at the proper times.

To prevent more than one sheet passing forward, I use a brake-rod z, mounted just at the rear of the pile of paper in such a position that as each sheet is fed forward it passes in contact with the rod z. The latter is a fixed rod covered with india-rubber tubing.

If two adherent sheets are fed forward, the drag of the rod z will overcome the adherence of the two sheets, and thus prevent the lower one being carried forward.

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

1. In combination with a table for supporting sheets of paper, a rotary feeding-disk, having a central aperture longer than the diameter of its shaft or journal, to allow play and provided with a cushion at one part of its periphery, which is arranged to bite on the upper sheet of the pile and draw it off, mechanism for rotating the said disk, and plates between which the said disk is guided substantially as set forth.

2. In combination with a table for supporting piled sheets of paper vertically screw-tapped slide-blocks b carrying the same, fixed vertical guideways in which the said slide-blocks move, screw-shafts b^3 engaging the said screw-tapped blocks, bevel-wheels b^4 on the said shafts, a driving-shaft carrying bevel-wheels b^3 gearing with said wheels b^4, a ratchet-wheel c on the said shaft b^6, a pawl c' engaging the said ratchet-wheel, a lever c^2 carrying the said pawl, a slotted and notched reciprocating bar c^3 connected to the short arm of the said lever, a shaft c^5 received in the slot of said bar, a roller on the end of said bar, a cam c^7 on the shaft last named which is continually in contact with said roller, a detent in position to fall into engagement with said notch for locking the said bar and connected mechanism, a lever 15, a rocking shaft 16 in which this lever is mounted, a link connecting the said detent to this last-named lever and a weighted detector-arm moving with said rocking shaft and provided with a roller arranged to bear on the top of the pile of sheets of paper, in order that the rising of the pile of paper above a certain height may, by lifting the said detector-arm, insert the said detent in the said notch substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

MAXIMILIAN THOMAS BARBER.

Witnesses:
E. T. WHITELOW,
JOHN HALL.