

April 19, 1927.

1,624,912

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PAPER FEEDING APPARATUS

Filed Dec. 1, 1923

2 Sheets-Sheet 1

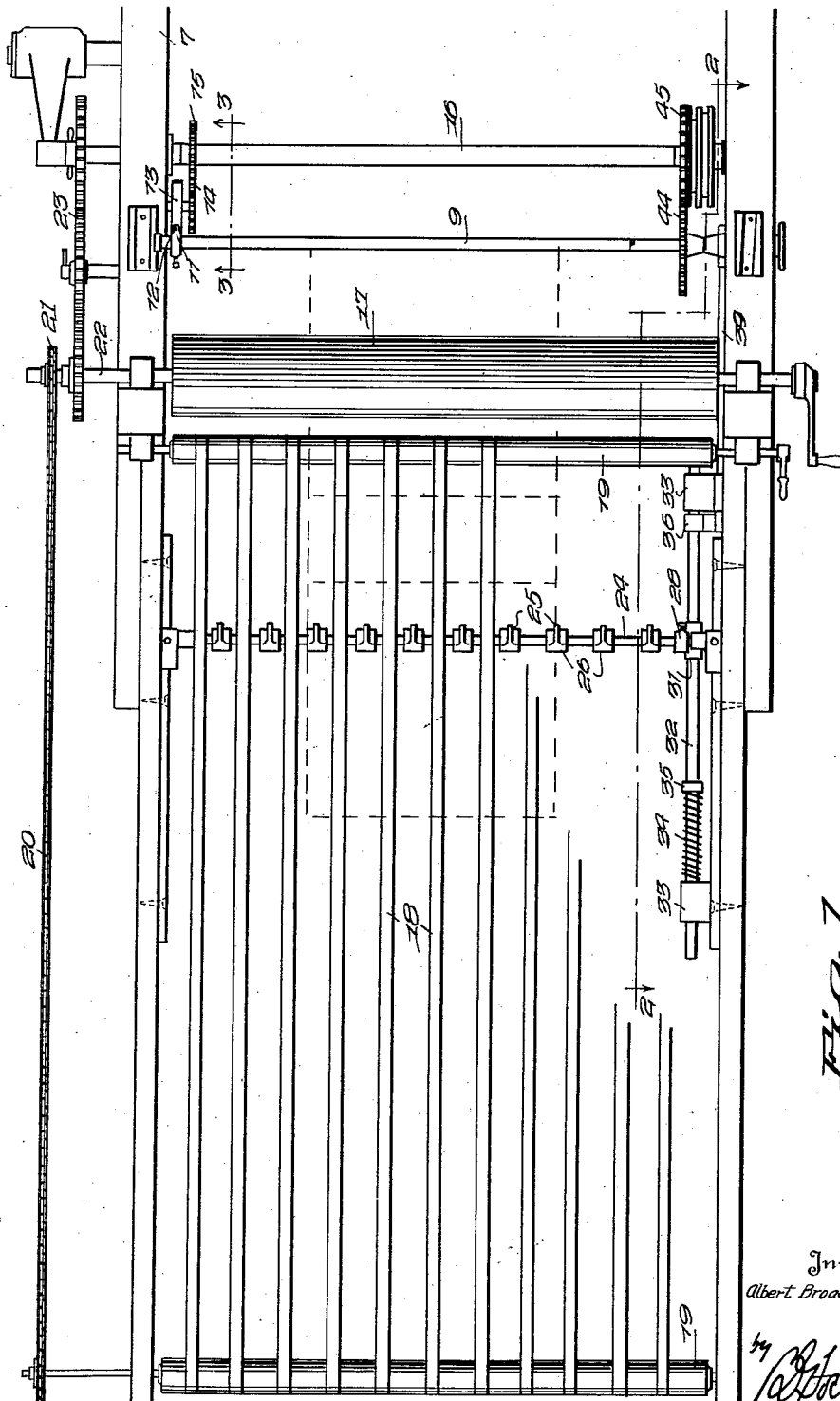


Fig. 1.

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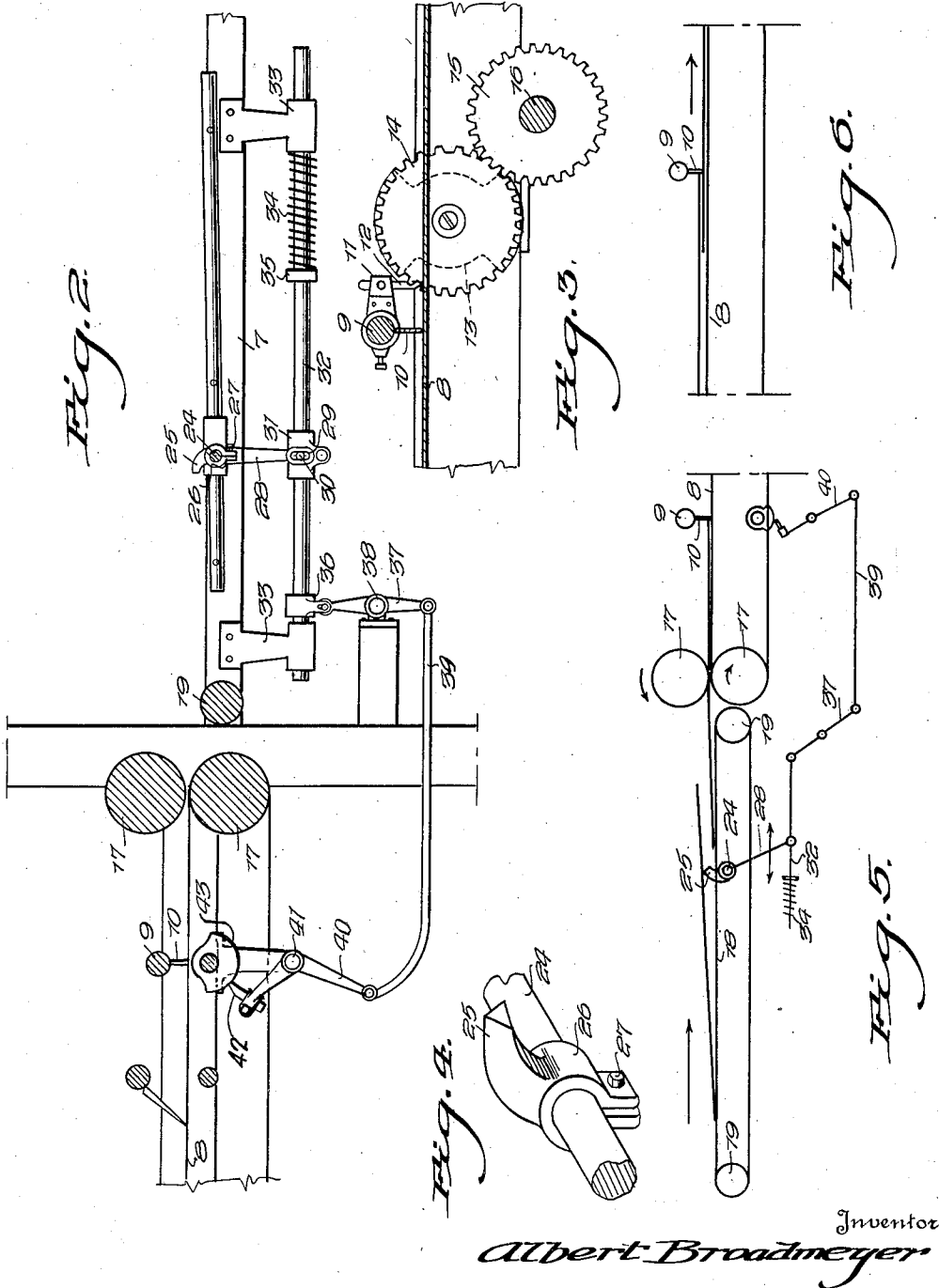
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PAPER-FEEDING APPARATUS.

Application filed December 1, 1923. Serial No. 678,012.

Heretofore one of the objectionable features in feeding apparatus has been the necessity of allowing a material amount of space between succeeding sheets on the feeding conveyer, in order to allow for the variation in the feeding control and the passage of the sheets past the gate. The object of the present invention is to overcome this objection by permitting the second sheet behind the one stopped at the gate to overlap the first or stopped sheet, as a consequence of which the output of the machine is very materially increased.

In the accompanying drawings:—

15 Figure 1 is a plan view of a feeding apparatus showing the improvements applied thereto,

Figure 2 is a sectional view on the line 2—2 of Figure 1,

20 Figure 3 is a detail cross sectional view on the line 3—3 of Figure 1,

Figure 4 is a detail perspective view of a portion of the rock shaft and one of the elevating fingers thereon,

25 Figure 5 is a diagrammatic view illustrating the overlapping movement of the sheets,

Figure 6 is a view illustrating how the lapping is controlled and again eliminated 30 by the gate.

In the embodiment disclosed, a well-known type of feeding machine is illustrated, which includes a frame 7 in which operates the usual endless sheet-carrying belt 8. Cooperating with the belt is a sheet controlling gate, the same consisting of a rock shaft 9 carrying a plate 10 that is movable into and out of a position to engage the front edges of the sheet carried by the belt 8. The rock shaft 9 has a crank arm 11 having a wiper pin 12 that is operated upon by a rotary cam 13. This cam is suitably fixed to a gear 14, in mesh with another gear 15 on a main driving shaft 16. Co-operating with the receiving portion of the belt 8 is a suitable roller 17 around which pass the usual cords that cooperate with the sheet carrying belt 8 in a manner well understood.

50 The sheets are carried to the belt 8 by endless tapes 18 passing around suitable rollers 19, and motion is transmitted to said tapes through one of the rollers 19, driven by an endless sprocket chain 20 geared, as

shown at 21, to the shaft 22 of the roller 17. 55 This shaft 22 is operated by gearing 23 from the main driving shaft 16. So far as thus described the structure is known to the art, and it will be understood that sheets are delivered successively on to the tapes 18, 60 either manually or by any well-known delivering means. As above stated these sheets ordinarily are spaced a material distance apart, so that as the foremost sheet comes to a position against the gate 10 and 65 is thereby stopped the succeeding sheet must be far enough away so that it will not be brought up against the rear end of the stopped sheet. This distance therefore must be maintained in order that there will be 70 no interference between the sheets.

In the present structure, a rock shaft 24 is journaled between the upper and lower stretches of the tapes 18 and is provided with a series of short rearwardly curved 75 fingers 25 in line with the spaces between the upper stretches of the tapes, these fingers being sufficiently long so that their upper ends will swing above the tapes when the rock shaft is turned in one direction and 80 will move below the upper stretches when the rock shaft is turned in the opposite direction. Preferably as shown in detail in Figure 4, each finger is carried by a contractile split collar 26 embracing the shaft 85 and tightened by a tie screw or bolt 27, so that the fingers can be properly adjusted and related.

The rock shaft 24 has at one end a depending crank arm 28 having its lower end 90 slotted, as shown at 29, and engaged in the slot is a pin 30 carried by a collar 31. This collar is adjustably clamped to a reciprocating rod 32 slidably mounted in boxes 33 fixed to the main frame. A coiled spring 95 34, surrounding the rod, has a bearing against an abutment 35, on said rod, and also has a bearing against one of the boxes 33, this spring serving to move the rod in one direction. The rod also has mounted 100 thereon a collar 36 having a pivotal connection with a rocker 37 pivoted between its ends, as illustrated at 38. This rocker has a link connection 39 with the lower end of a lever 40 fulcrumed between its ends, as 105 shown at 41. The upper end of the lever carries a wiper pin 42 that is operated against by a cam 43. The cam 43 is con-

nected with a gear 44 meshing with another gear 45 on the driving shaft 16.

The relation of the parts is such that as the driving shaft 16 rotates, the gate 10 will be intermittently swung between an operative position shown in Figure 3 to an inoperative position out of contact with the belt 8, and through the gearing 44 and 45 and the cam 43, the lever 40 will be periodically moved in one direction, thereby moving the rod 32 longitudinally against the action of the spring 34, and through the crank arm 28 the shaft 24 will be turned and the fingers 25 elevated. The action of the parts can therefore be best made clear by reference to Figures 5 and 6. As the sheets are successively carried by the tapes 18 toward the gate 10, said gate is moved downwardly in advance of the foremost sheet, and said sheet will be brought against it and held against further movement until the gate again is elevated to permit the sheet to pass beneath it. While the foremost sheet is held the succeeding sheets are being advanced and as already stated and as indicated in Figure 5, the fingers 25 will be elevated. As a consequence the front end of the second sheet will be carried forward over the rear end of the first or stopped sheet. When the fingers are again depressed the gate 10 opens, allowing the first sheet to pass beneath it, but said gate again closes before the first sheet has entirely passed it and in advance of the overlying front end of the second sheet. Consequently the second sheet will be caught and stopped while the first sheet is drawn on by the belt 8. This is indicated in Figure 6. The sheet succeeding the second sheet is then advanced in the same manner. As a consequence it will be evident that the sheets may be fed more rapidly on to the tapes 18, so that the lost time due to spacing is overcome. At the same time the gate, as usual, controls the feeding of the sheets on to the next apparatus and the overlapping action in no way interferes with the final action upon the sheets.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim, is:—

1. In sheet feeding apparatus, the combination with a carrier on which sheets are successively placed in substantial line one behind the other, of means movable to a position above the carrier for elevating the front portions of the sheets out of such line

to permit each to override the rear portion of the one in advance of it, and mechanism for automatically and periodically moving the sheet-elevating means.

2. In sheet feeding apparatus, the combination with a movable carrier on which sheets are successively placed and transported, of means for periodically stopping each advance sheet, means between the ends of said movable carrier and movable to and from a position above the carrier for causing the following sheet to be elevated and override the sheet on the carrier, so stopped, and mechanism for automatically moving the sheet elevating means.

3. In sheet feeding apparatus, the combination with an endless belt carrier on which sheets are successively placed, of means for periodically stopping each advance sheet carried thereby, means between the terminal portions of the carrier and movable to and from a position above the belt for elevating the front end of the following sheet from the belt to permit it to override the rear end of the sheet so stopped that is resting on said belt carrier, and mechanism for automatically moving the sheet-elevating means.

4. In sheet feeding apparatus, the combination with a movable carrier on which sheets are successively placed, of means for periodically stopping each advance sheet, an upwardly movable means for causing the front end of the following sheet to be elevated from the carrier and override the sheet so stopped, and mechanism for operating the stopping means to release the front sheet and stop the overlying sheet so as to permit the released sheet to move from its lapped relation and the second sheet to be lapped by a succeeding sheet.

5. In sheet feeding apparatus, the combination with a conveyor on which sheets are successively placed, of a movable device that moves to and from a position above the conveyor for causing the sheets moved by the conveyor to assume a lapped relation.

6. In sheet feeding apparatus, the combination with a conveyor on which sheets are successively placed, of means for stopping the advance sheet moved by the conveyor while the succeeding sheet continues its movement, and movable means between the ends of the conveyor for directing the succeeding sheet to a lapping position with respect to the sheet in advance said means operating between positions above and below the face of the conveyor on which the sheets are carried.

7. In sheet feeding apparatus, the combination with a conveyor on which sheets are successively placed, of means for stopping the advance sheet moved by the conveyor while the succeeding sheet continues its movement, and movable means operating between an elevated and a depressed position

for elevating the succeeding sheet while being moved by the conveyor to permit it to lap over the rear of the sheet in advance.

8. In sheet feeding apparatus, the combination with a gate, of a conveyor for moving successive sheets towards the gate, means for moving the gate to and from a position to stop the sheets, and means operating through the conveyor to a position above the same for directing the successive sheets moved by the conveyor to permit a sheet succeeding one stopped by the gate to lap such stopped sheet.

9. In sheet feeding apparatus, the combination with a gate, of a conveyor for moving successive sheets towards the gate, means for moving the gate to and from a position to stop the sheets, a movable device for raising the advance ends of the sheets from the conveyor to permit them to pass over the rear ends of the sheets in advance, and means for periodically operating said device to elevate it and thereby the portion of the sheet that is thereon.

10. In sheet feeding apparatus, the combination with a gate, of a conveyor for moving successive sheets towards the gate, means for moving the gate to and from a position to stop the sheets, a movable device for raising the advance ends of the sheets from the conveyor to permit them to pass over the rear ends of the sheets in advance, and means for periodically operating said device alternately with the operation of the gate.

11. In sheet feeding apparatus, the combination with a gate, of a conveyor for moving successive sheets towards the gate, a rock shaft located transversely of the conveyor and having sheet elevating fingers movable to and from a position above the conveyor, and means for operating the gate and turning the shaft.

12. In sheet feeding apparatus, the combination with a sheet controlling gate, of spaced conveyor tapes for carrying succes-

sive sheets towards the gate, a rock shaft located transversely of the tapes and having sheet elevating fingers movable to and from positions above the tapes, a pair of cams, means operated by one of the cams for moving the gate between an operative and an inoperative position, means operated by the other cam for operating the rock shaft, means for causing the cams to operate to cause the elevation of the fingers when the gate is in its active position, and means for effecting the feeding movement of the tapes.

13. In sheet feeding apparatus, the combination with a sheet conveyor comprising spaced tapes, of means extending between the tapes and movable above and below the normal upper surface of the same to elevate the front portions of the sheets carried by the tapes above the rear ends of the sheets in advance to permit the sheets to overlap, and mechanism for raising and lowering the said means.

14. In sheet feeding apparatus, the combination with a sheet conveyor, of means cooperating with the conveyor and movable upwardly to cause the front end portions only of successive sheets to be elevated from the conveyor to permit their movement to overlapping position over the rear ends of the sheets in advance while the rear ends of the sheets remain on the conveyor, said means being also movable downwardly below the normal upper surface of the conveyor, and mechanism for moving the elevating means upwardly and downwardly.

15. In sheet feeding apparatus, the combination with a sheet conveyor comprising spaced tapes, of means operating between the tapes and movable between a position below the upper carrying surfaces and a position above the same to elevate portions of the sheets from the conveyor and cause them to overlie sheets in advance of the same.

In testimony whereof, I affix my signature.
ALBERT BROADMEYER.