Feb. 8, 1927. 1,616,565

N. P. ANDREW

MACHINE FOR SCORING, CUTTING, OR OTHERWISE TREATING CARDBOARD OR THE LIKE

Filed May 19, 1925

Fig. 1.

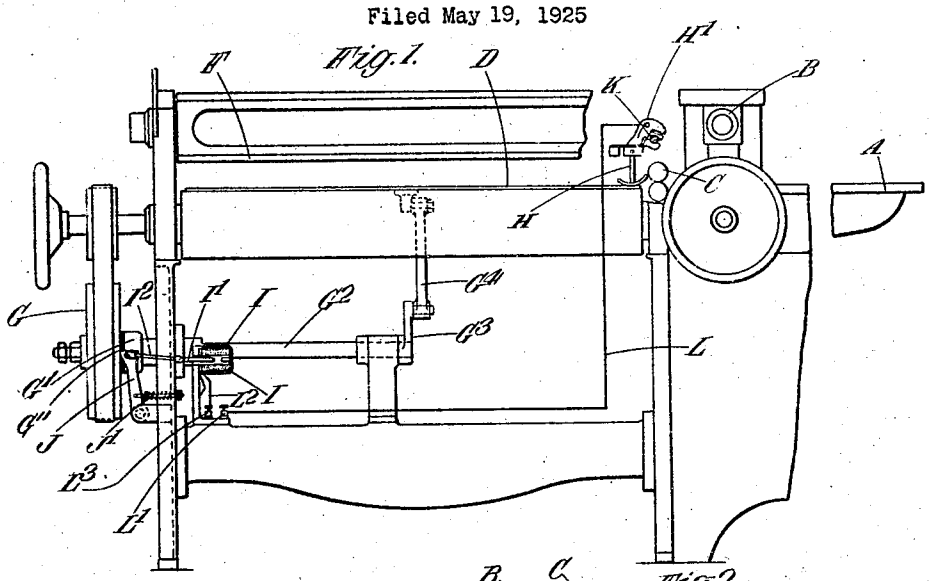


Fig. 2.

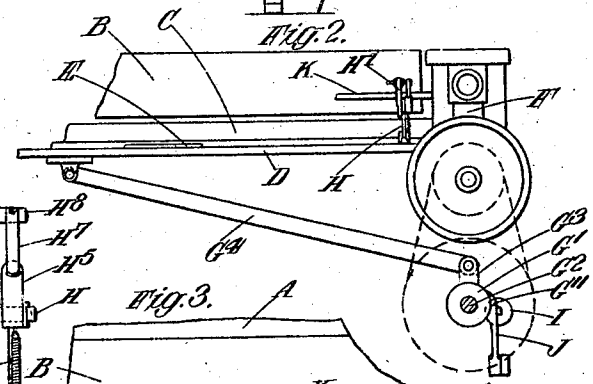


Fig. 3.

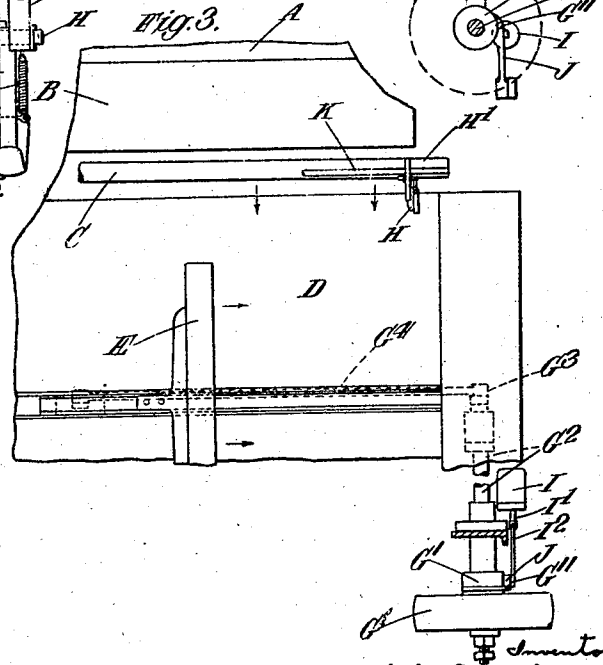


Fig. 4.

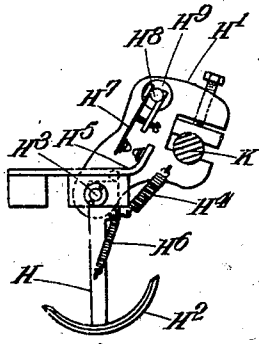


Fig. 5.

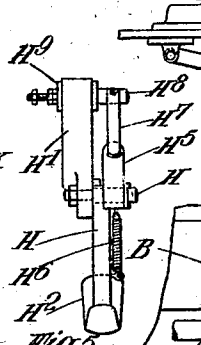
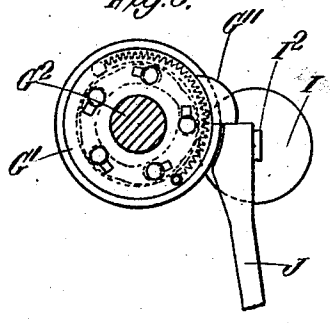


Fig. 6.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR SCORING, CUTTING, OR OTHERWISE TREATING CARBOARD OR THE LIKE.

Application filed May 19, 1925, Serial No. 31,349, and in Great Britain March 16, 1925.

This invention relates to machines for scoring, cutting or otherwise treating cardboard or the like and has particular though not exclusive reference to machines known as "double scoring" machines, wherein the cardboard blanks or the like to be scored are fed successively to scoring tools or cutters in one direction and are then successively moved at right angles by an automatically operated pusher bar to another set of scoring tools or cutters so as to be scored at right angles.

The main object of the present invention is to provide an automatic contrivance or mechanism which does not involve the use of any complicated devices or gearing, for causing the pusher bar to operate according to the rate at which the blanks are fed to the first or initial scoring means.

The contrivance or mechanism according to this invention comprises an electrical switch or make and break device which is adapted to be operated by each blank during or as a result of its feeding movement into the machine for electrically controlling the operation of a clutch by means of which the pusher bar mechanism is rendered operative or inoperative. The said switch or make and break device may, after the blank has passed the initial scoring means, establish a circuit and energize a device which thereby allows or causes the clutch to couple the pusher bar mechanism to its driving means so as to cause the pusher bar to perform its forward stroke and supply the blank (which has been scored in one direction) to the second scoring means in the direction at right angles to the initial movement, whereupon the pusher bar recedes or moves rearwardly into its normal or inoperative position. Upon the pusher bar reaching this position the said clutch is automatically disconnected so that the pusher bar remains inoperative until the next blank is fed forward and actuates the switch device which then establishes the circuit and thus causes the clutch to be connected to the driving means. The rate of feeding movement of the blanks may be as rapid or as slow as desired but the operation of the pusher bar is entirely dependent upon the rate at which the blanks are initially fed forward and which always corresponds with the rate or rapidity with which the blanks are initially fed into the machine.

In order that the said invention may be clearly understood and readily carried into effect, the same will be more fully described with reference to the examples illustrated in the accompanying diagrammatic drawings, in which:—

Figures 1, 2 and 3 represent a side view, a plan and an end view of so much of a well known construction of double scoring machine, as is necessary for a proper understanding of the invention, with the electrically controlled feed mechanism according to the present invention applied thereto.

Figures 4 and 5 are respectively a side view and an end view of the switch or make and break device.

Figure 6 is an interior view of a well known type of clutch which may be used for the purpose of the present invention.

A represents the feed table of the double scoring machine on which the blanks are supplied by hand to pass successively under a row of scoring knives or cutters located at B and between feed rollers C that are driven in any usual or suitable manner and cause the blanks as they are scored at B to pass onto a table D. E represents the reciprocatory pusher bar (see Figures 2 and 3) which is adapted to move the scored blank along the table D in a direction at right angles to the initial feeding movement so that the blank can be passed under another row of scoring knives located at F which score it at right angles to the previous scorings. In the example shown the pusher bar E is adapted to be operated by means of the belt driven pulley G through an automatically controlled clutch G′ which when required couples the pulley G and the shaft G^2 together so that the latter can be rotated for imparting through the cranked end G^3 and the connecting link G^4, reciprocatory movement to a slide on which the pusher bar E is adjustably secured in the usual manner so that the latter can be reciprocated as and when required for the purpose of pushing the blank at right angles to its initial feeding movement as aforesaid.

As each blank emerges from the feed rollers C and passes on to the table D it

engages a switch or make and break device H which upon the blank reaching the end of its initial movement operates to establish an electrical circuit for energizing a solenoid I which withdraws a controlling arm J from the engagement with the clutch G′ so that the latter couples the rotating pulley G to the shaft G^2 which is therefore driven so that the pusher bar E can be actuated through the mechanism as aforesaid. The switch device in the example shown comprises a support or bracket H′ adapted to be adjustably clamped on a rod K or other part which may conveniently be disposed adjacent to the feed rollers C and a trip arm H freely suspended on the bracket H′ and provided with a curved lower end H^2 in a position to be engaged by the forward edge of the blank on emerging from the feed rollers C so as to enable the arm H to be angularly displaced on its supporting pin H^3 by the blank. The trip arm H is held in the displaced position while the blank is passing under the same but so soon as the rear edge of the blank has passed beyond the curved end H^2, the arm H moves back to its normal position under the influence of a spring H^4. In moving to the normal position a weighted contact piece H^5 mounted on the pin H^3 and connected to the arm H by a spring H^6, comes into contact with a contact piece H^7 on the bracket H′ so as to establish the circuit. The contact piece H^7 is carried on a pin H^8 fixed in an insulating sleeve H^9 mounted in the bracket H′ and a conductor L leading from a terminal L′ is connected to the said pin H^8. The other contact piece H^5 is earthed through the metal parts of the switch device and the frame of the machine. A conductor L^2 leading from a terminal L^3 is connected to a solenoid I which is also earthed through the frame of the machine. The plunger or core I′ of the solenoid is connected by a link I^2 to the clutch controlling arm J which is pivotally mounted and is maintained in its operative position by a compression spring J′. The clutch G′ is preferably a well known type of single revolution clutch, which comprises a series of locking balls and springs, see Figure 6, and is so arranged that when the projection G″ carried by part of the clutch is engaged by the controlling arm J the clutch is inoperative and the revolving pulley G is not coupled to the shaft G^2. Upon the arm J being moved away from the clutch projection G″ due to the inward movement of the solenoid plunger I′ when the solenoid is energized as aforesaid the clutch automaticall operates and connects the pulley G to the shaft G^2 which is therefore rotated and operates the pusher bar E as aforesaid.

The blanks to be scored are successively fed forward on the table A and as each blank emerges from the feed rollers C the trip arm H is first raised and then falls or returns to its normal position after the blank has reached the end of its initial movement and has assumed a position ready to be moved by the pusher bar E to the scoring knives at F. As the trip arm returns to its normal position its weighted contact piece H^5 makes contact with the fixed contact piece H^7 with the result that the electrical circuit is established for energizing the solenoid whose plunger I′ is then drawn inwardly and through the link I^2 moves the controlling arm J from engagement with the clutch projection G″. The clutch G′ therefore causes the shaft G^2 to be rotated and by means of the crank G^3 and the link G^4 the pusher bar is actuated to cause the blank to be moved towards and under the scoring tools at F in a direction at right angles to its initial movement. After the shaft G^2 has made one complete revolution and the pusher bar has in consequence been moved forward and then rearwardly ready to receive another blank, the clutch projection G″ (which has also made a complete revolution) has moved into contact with the controlling arm J which has been restored to its operative or locking position under the influence of its compression spring J′ upon de-energization of the solenoid due to the contact piece H^5 not remaining in contact with the contact piece H^7 so that the pulley G is automatically uncoupled from the driving shaft G^2 and continues to rotate without operating the shaft or the pusher bar until such time as the circuit is again established for energizing the solenoid. The rate of supply of the blanks may be varied as desired and the operation of the pusher bar is at all times controlled by the rate at which the blanks are successively passed between the feed rollers C. If desired braking or retarding means may be provided to overcome momentum and to ensure that the pusher bar stops in the proper position to receive the blanks as they emerge from the feed rollers C. Instead of a switch device which is operated as a result of the blank engaging it during the initial forward movement of the blank and then allowing it to fall as aforesaid a device may be provided which is adapted to establish the electrical circuit upon being engaged by the forward part or edge of the blank at or towards the end of the initial forward movement. For instance, the forward edge of the blank may come into contact with a stop having a make and break device or switch provided thereon. The control of the pusher bar mechanism such as aforesaid, may be employed in "single scoring" machines or similar machines in which a series of blanks are successively supplied to a position ready to

be moved forward by an automatically operated pusher bar or the like so as to be scored or otherwise treated.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A cardboard scoring, cutting or similar machine, in which a pusher bar moves the cardboard blanks in succession to a set of scoring knives or cutters, comprising electrical means whereby the operation of the pusher bar is controlled by the passage of each blank out of engagement with said means so that the pusher bar operates according to the rate at which the blanks are supplied thereto.

2. A cardboard scoring, cutting or similar machine, in which a pusher bar moves the cardboard blanks in succession to a set of scoring knives or cutters, comprising an electrical device which is operated by each of the cardboard blanks to establish a circuit as the latter pass out of engagement therewith and are successively supplied to the pusher bar, and means operated each time said circuit is established for causing the pusher bar to be connected to its driving means.

3. A cardboard scoring, cutting or similar machine, in which a pusher bar moves the cardboard blanks in succession to a set of scoring knives or cutters, comprising a switch device adapted to be engaged by each blank to establish an electric circuit as each blank is passed out of engagement therewith and supplied to the pusher bar, mechanism for operating said pusher bar, a clutch for connecting said mechanism to driving means and means energized each time the said circuit is established as a result of the blank actuating the switch device, for controlling said clutch so that it couples the pusher bar mechanism to the driving means each time a blank is positioned ready to be moved by the pusher bar.

4. A cardboard scoring, cutting or similar machine, in which a pusher bar moves the cardboard blanks in succession to a set of scoring knives or cutters, comprising a switch device adapted to be engaged by each blank to establish an electric circuit as each blank is passed out of engagement therewith and supplied to the pusher bar, a shaft for operating said pusher bar, a clutch for connecting said shaft to a continuously rotating driving member, an arm for controlling said clutch and normally maintaining it so that the shaft is not coupled to the driving member, a solenoid energized when said circuit is established, and a plunger within said solenoid for disengaging the controlling arm from the clutch each time the solenoid is energized so that said shaft and pusher bar can be operated.

5. A cardboard scoring, cutting or similar machine, in which a pusher bar moves the cardboard blanks in succession to a set of scoring knives or cutters, comprising a switch device adapted to be engaged by each blank as it is supplied to the pusher bar for establishing an electrical circuit, a shaft for operating said pusher bar through a crank and link connection, a clutch for connecting said shaft to a continuously rotating driving member, a spring controlled arm adapted to hold the clutch so that the shaft is not coupled to the driving member, a solenoid which is energized each time the circuit is established, a plunger within said solenoid, and a link connecting said solenoid plunger to the said clutch controlling arm so as to withdraw the said arm from engagement with the clutch each time the solenoid is energized, the clutch being such as to enable the shaft to make one revolution and cause the pusher to move forwardly and then rearwardly whereupon it is again engaged by said controlling arm to uncouple the said shaft from the driving member until the circuit is again established by the next succeeding blank.

6. A cardboard scoring, cutting or similar machine in which a pusher bar moves cardboard blanks in succession to a set of scoring knives or cutters, comprising feed rollers for successively supplying the blanks to a pusher bar, mechanism for reciprocating said pusher bar, a shaft for operating said mechanism, and a clutch for connecting the shaft to a driving member, an electrical switch or make and break device located in a position to be actuated by each blank as it is supplied to the pusher bar for establishing a circuit, a solenoid which is energized each time the circuit is established, and a member which normally holds the clutch inoperative but which is operated by said solenoid when energized for allowing the clutch to couple the said shaft to said driving member so as to cause the pusher bar to be moved forwardly and then rearwardly.

7. A cardboard scoring, cutting or similar machine in which a pusher bar moves cardboard blanks in succession to a set of scoring knives or cutters, comprising feed rollers for successively supplying the blanks to a pusher bar, a shaft for reciprocating said pusher bar through suitable mechanism, a single revolution clutch for connecting the shaft to a driving member, an electrical make and break device located adjacent to said feed rollers to be actuated by each blank for establishing a circuit as each blank passes the same, a solenoid energized each time the circuit is established, and a pivoted spring controlled arm normally held in engagement with a projection on one of the clutch members to prevent the said shaft from being coupled to its driving member, the said arm being adapted to be withdrawn from engagement with said clutch

projection when the solenoid is energized for coupling said shaft to the driving member and causing the pusher bar to move forwardly and then rearwardly, whereupon the clutch is again engaged by the controlling arm to uncouple the shaft until such time as the next blank operates the make and break device and establishes the circuit.

8. A cardboard scoring, cutting or similar machine in which a pusher bar moves cardboard blanks in succession to a set of scoring knives or cutters, comprising feed rollers by means of which each blank is passed to a pusher bar, a pivoted arm adapted to be raised by the forward edge of the blank and to fall after the blank has moved beyond it, a contact piece carried by said arm for engaging a fixed contact on a bracket carrying said pivoted arm, a solenoid energized each time the circuit is established, a shaft for operating the pusher bar, a driving member for said shaft, a clutch for connecting said shaft to said driving member and an arm which normally holds the clutch inoperative and which is withdrawn from engagement with the clutch by the solenoid when energized to allow the shaft to be coupled to its driving member for causing the pusher bar to move the blank forwardly and then to be moved rearwardly ready to receive another blank and to operate again when such blank is supplied.

9. For use on a cardboard scoring, cutting or similar machine in which the blanks are successively supplied to a set of scoring knives or cutters by a pusher bar, a feed controlling device comprising a trip arm having a curved end adapted to be engaged by each blank when being supplied to the pusher bar, a support on which said arm is freely suspended, an electrical contact piece movable with said arm, a contact piece on said support, the contact piece on the said arm being adapted to come into contact with the contact piece on the support for establishing a circuit, each time a blank is supplied to the pusher bar and means operated as a result of the circuit being established for bringing the pusher bar into operation to move each blank as and when it is supplied thereto.

10. For use on a cardboard scoring, cutting or similar machine in which the blanks are successively supplied to a set of scoring knives or cutters by a pusher bar, a feed controlling device comprising a trip arm having a curved end adapted to be engaged by the blank when being supplied to the pusher bar, a support on which said arm is freely suspended, a contact piece movable with said arm, a contact piece on said support, the contact piece on the said arm being adapted to come into contact with the contact piece on the support for establishing a circuit, a solenoid adapted to be energized when the circuit is established and a controlling member adapted to be actuated by the solenoid when energized to allow a clutch to connect the pusher bar mechanism with a driving member.

11. For use on a cardboard scoring, cutting or similar machine in which the blanks are successively supplied to a set of scoring knives or cutters by a pusher bar, an electrical feed controlling mechanism comprising a trip arm having an end adapted to be engaged by each blank, a support on which said arm is freely suspended, a contact piece resiliently connected to and movable with said trip arm, a contact piece on said support. a pin on which the latter contact piece is fixed and to which an electrical conductor is connected, an insulating sleeve in said bracket and supporting said pin, means for adjustably fixing the bracket on a suitable part of the machine, a solenoid adapted to be energized when said contact pieces come into engagement to establish an electrical circuit and a member operated by said solenoid for controlling a clutch which couples the pusher bar mechanism to its driving means each time a blank is supplied to the pusher bar and actuates the said trip arm for establishing the circuit.

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