March 2, 1965 T. D. BISHOP 3,171,647

SUCTION FEED MECHANISM FOR CARDBOARD AND LIKE BLANKS

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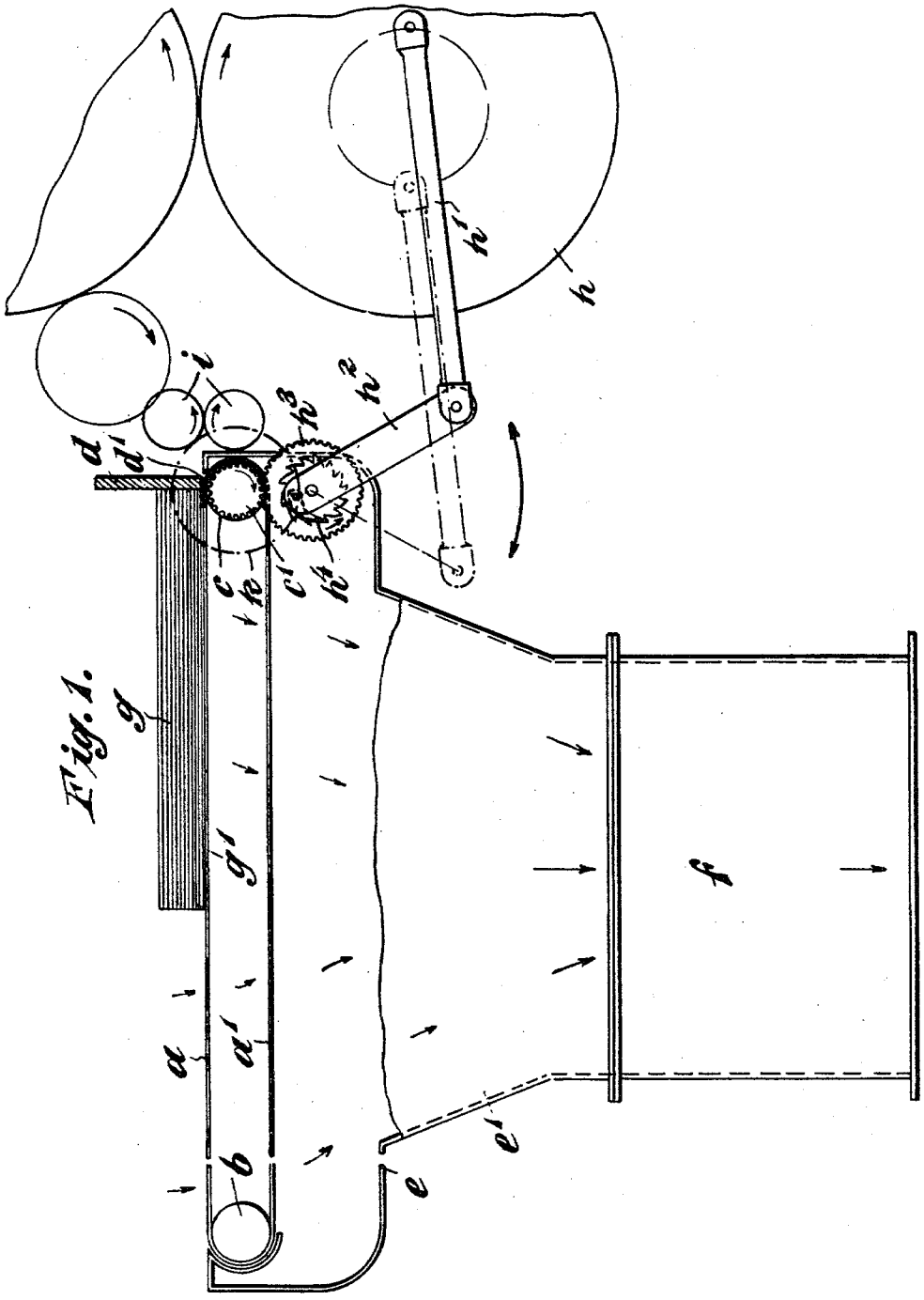


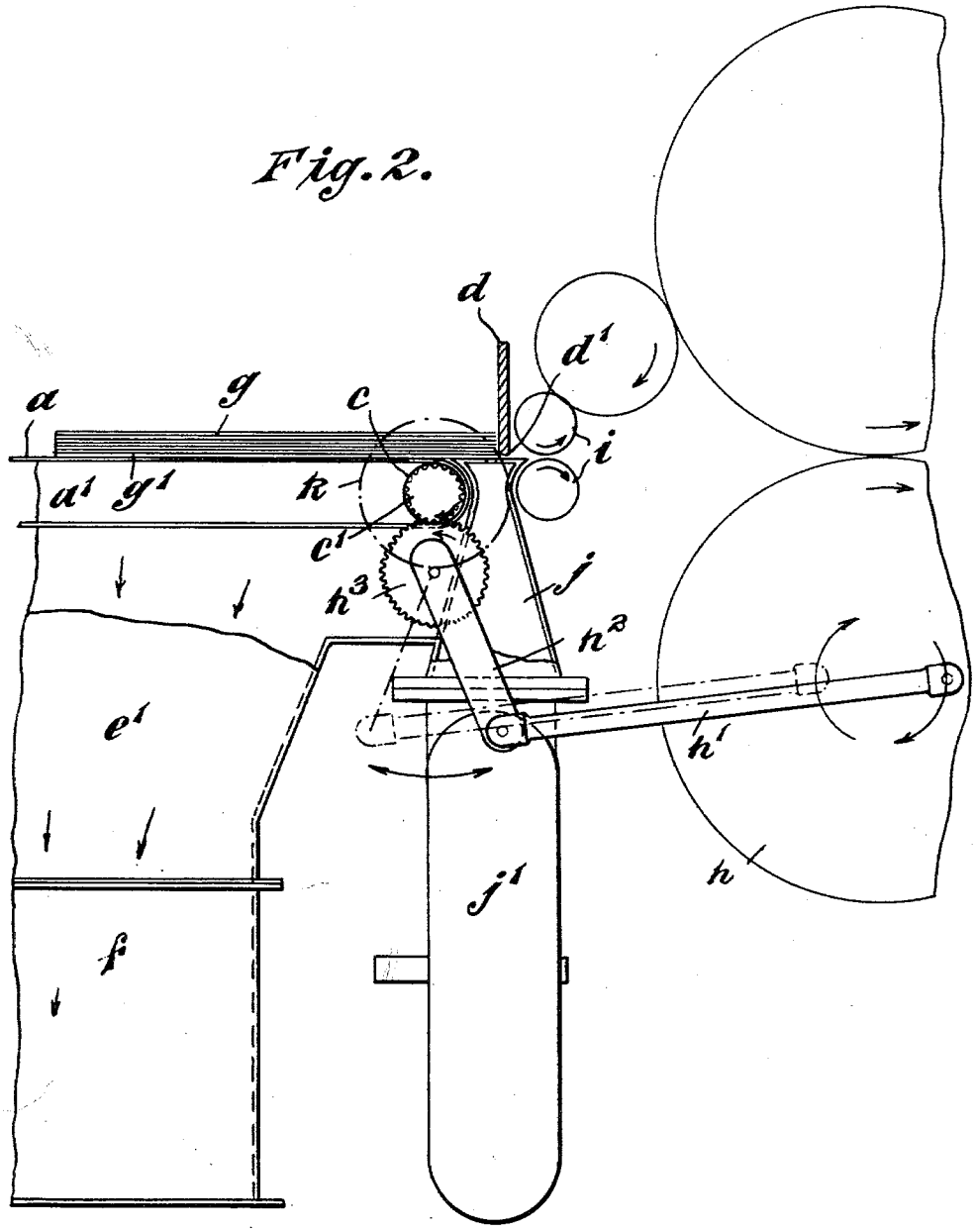
Fig. 1.

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Fig. 2.



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SUCTION FEED MECHANISM FOR CARDBOARD AND LIKE BLANKS

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3 Claims. (Cl. 271—11)

The present invention has relation to improved suction feed mechanism for cardboard and like blanks, more particularly the type of feed involving an endless belt upon which the blanks are stacked against a stop plate to be successively drawn from the lowermost blank between feed rolls to slotting, creasing, folding or other machinery, said endless belt being associated with a vacuum chamber and being of a perforate, slotted or like character so that the lowermost blank is sucked against the upper run of the belt and fed forward through the feed rolls.

The present invention has for its object certain improvements in this type of mechanism whereby a more positive and efficient feed of the blanks successively from the bottom of the stack is afforded and also whereby skewing, skidding or irregular entry of the blank is prevented, the board being held particularly flat against a stationary belt even when normally warped or distorted in manufacture, and secondly to make it possible to feed the blanks in the correct timing to suit the subsequent machine, for example, a rotary slotter or rotary printer.

According to the present invention, there is provided suction feed mechanism for a cardboard or like blank of the type hereinbefore referred to, wherein an endless perforate or slotted belt is intermittently driven from a suitable power source in such a manner that the lowermost blank is pulled by suction onto the top run of the belt and fed until it reaches the feed rolls, then the belt is retarded to rest whilst the feed rollers take over the feed, during which stationary period the next lowermost blank is effectively sucked on the top run of the stationary belt preparatory to the next forward intermittent feed motion of the belt automatically from a power source which may be derived from the machine treating the blanks. The belt is unidirectional but intermittent in operation.

In order that the invention may be clearly understood and readily carried into practice reference may be had to the accompanying explanatory drawings in which:

The FIGURES 1 and 2 illustrate diagrammatically embodiments of the present invention.

In that embodiment of the present invention illustrated in FIGURE 1, there is provided an endless belt a, a^1 running over two parallel rollers b, c or like devices and this belt is of a perforated or slotted character for the passage of air or it may be in the form of a plurality of side by side narrow belts. The top run a of the belt is disposed horizontally or substantially horizontally and adjacent what may be termed the formed roller c is a stop plate d. Formed on the underside of the belt is a box-like structure e, e^1 and a container f enclosing an extraction fan is provided for exhausting air from e, e^1 to provide a degree of vacuum, the endless belt a, a^1 closing or substantially closing the upper part of this structure e, e^1 so that air is drawn through its perforations or slots. The cardboard g which may be corrugated or plain, is stacked on the top run a of the belt against the stop plate d having the gap d^1 and it will be appreciated that the bottom board g^1 is sucked or held on to the top run of the belt by virtue of the negative pressure in the box-like container e, e^1. The characteristic of this invention resides in the fact that the belt is driven intermittently and

this may be effected in a number of different ways. For example the forward roller may be geared and linked to one of the rotating members h of the machine with which the present suction feed is associated so that the said forward roller c is rotated a predetermined number of revolutions sufficient to remove the bottom blank g^1 until it is taken over by the feed rolls i, and in this position the driving mechanism of the forward roller is such that it is arrested from rotation by mechanism hereinafter described and consequently the belt a, a^1 becomes stationary to very effectively engage the next bottom blank of the stack during the removal of the lower blank g^1 by the rollers i.

In the embodiment shown in FIGURE 1 it will be noted that the connecting rod h^1 is attached to the rotating member h and this rod connects with a link h_2 which drives a toothed wheel h^3 by virtue of a one way clutch h^4. The dot and dash lines illustrate the stroke of the connecting rod h^1 and it will be appreciated that continuous rotation of h causes intermittent rotation of the toothed wheel h^3 by virtue of the alternate forward drive and declutching of h^4 and again it is noted that h^3 drives a toothed wheel c^1 on the forward roller c so that the belt a, a^1 is intermittently actuated so that its upper run a^1 stops and starts travelling forwardly in intermittent manner. In order to prevent intermittent over-run of the belt a, a^1 a friction brake drum or clutch k may be employed. In operation the lowermost blank g^1 is fed to the feed rolls i which takes over the movement of the blank when the belt slows down to a standstill, following which the next upper blank falls on to the upper run a and is sucked like the preceding blank on to the feed run by the extraction fan f.

In that embodiment shown in FIGURE 2 of the drawings an auxiliary depression or vacuum chamber j is employed subjected to a centrifugal fan enclosed in the container j^1 so that the leading edge of the lowermost board g^1 is brought properly beneath the gap d^1 disposed beneath the stop plate d. In this embodiment there may also be incorporated an automatic brake k its object being to arrest rotation or over-run of the belt between its intermittent feeding movements.

In this invention in both embodiments the belt is driven until such time as the lower blank g^1 is taken over by the feed rollers i when the belt a, a^1 is retarded to rest and the next loose blank is taken over by the stationary top run a of the belt a, a^1 when the operation commences again, the intermittent action of the belt displacing the blanks one by one from beneath the stack pile. A relatively long stop plate d with a relatively broad belt may be employed with suction means beneath the entire belt and the arrangement may be such that the mechanism may be divided into sections and partitioned and this is useful where the board is of such a dimension that the entire width of the feed mechanism is not required. The invention provides for the correct timing of the blank to suit the subsequent machine which may be a slotter or printer, and this is done by adjusting the setting of the reciprocating belt mechanism in relation to the machine from which it is driven or in any other desired manner. This could be effected by altering the setting of the link h^1 on the member h.

I claim:

1. Feeding mechanism for cardboard blanks comprising, in combination, a continuously driven feeder, a primary feeder comprising a pervious belt for carrying cardboard blanks into the continuously driven feeder, means for retaining a stack of cardboard blanks on the belt with the full weight of the stack resting on the lowermost blank, comprising a stop for preventing forward movement of all the blanks above the lowermost blank, a suction chamber which is in communication with the under-

side of the belt throughout substantially the entire area underlying the stack of blanks, and intermittent drive mechanism which imparts to the belt an intermittent forward movement alternating with a finite dwell, the length of the forward movement being sufficient to bring the lowermost blank from its initial position into positive engagement with the continuously driven feeder, and the duration of the dwell being sufficient to permit the continuously driven feeder to pull the lowermost blank entirely out from under the stack.

2. Feeding mechanism for cardboard blanks comprising, in combination, a continuously driven feeder, a primary feeder comprising a pervious belt for carrying cardboard blanks into the continuously driven feeder, the belt being adapted to support a stack of blanks, a stop for preventing forward movement of all the blanks above the lowermost blank in the stack, a suction chamber in communication with the underside of the belt, and intermittent drive mechanism which imparts to the belt an intermittent forward movement alternating with a finite dwell, the length of the forward movement being sufficient to bring the lowermost blank from its initial position into positive engagement with the continuously driven feeder, and the duration of the dwell being sufficient to permit the continuously driven feeder to pull the lowermost blank entirely out from under the stack.

3. Feeding mechanism for cardboard blanks comprising, in combination, a continuously driven feeder, a primary feeder comprising a pervious belt for carrying cardboard blanks into the continuously driven feeder, the belt being adapted to support a stack of blanks, a stop for preventing forward movement of all the blanks above the lowermost blank in the stack, a suction chamber in communication with the underside of the belt, intermittent drive mechanism which imparts to the belt an intermittent forward movement alternating with a finite dwell, the length of the forward movement being sufficient to bring the lowermost blank from its initial position into positive engagement with the continuously driven feeder, and the duration of the dwell being sufficient to permit the continuously driven feeder to pull the lowermost blank entirely out from under the stack, and a brake which operates to hold the belt stationary during the dwell.

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