

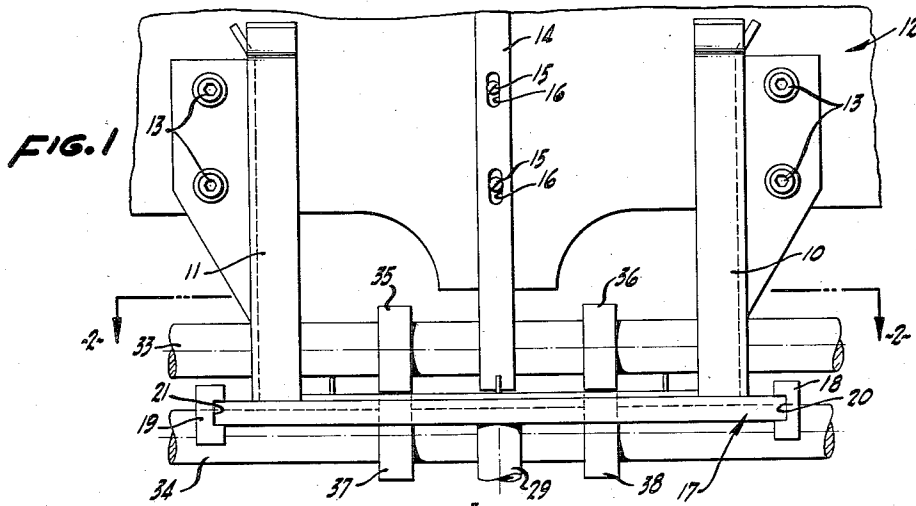
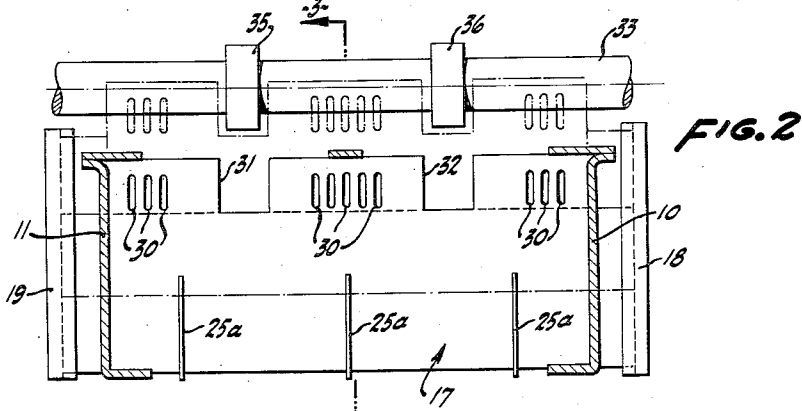
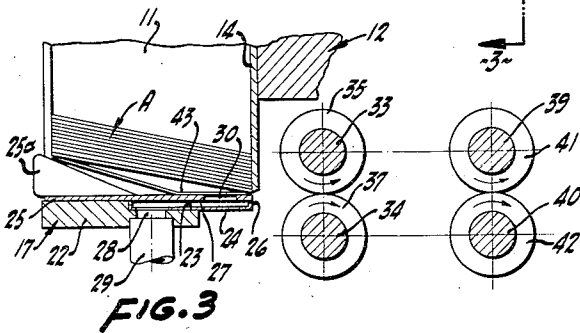
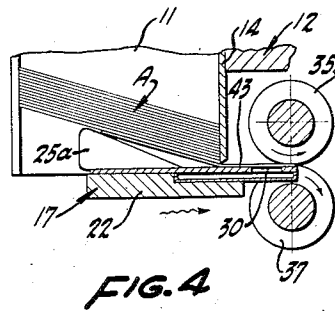
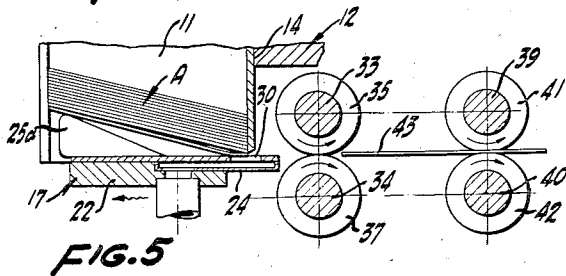
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VACUUM FEED

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1

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VACUUM FEED

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This invention relates to a feeding mechanism for feeding marginally punched cards or the like, one at a time and at high speed, into a machine for punching, sorting, tabulating or performing other operations incidental to the use of cards of this type.

Former feeding mechanisms for machines of this character were generally of two types. The first type was of the "picker" or "slicer" type wherein a reciprocating picker or knife, approximately one-half the thickness of the card in height, traveled backwardly and forwardly toward and away from the feed throat of the machine. On each forward stroke, the knife or picker strikes the rear edge and picks off the bottom card of the stack and pushes it into the throat of the machine. This type of feed mechanism is capable of high speed and works well with perfectly flat relatively stiff cards, but is unable to feed warped cards, nor can it be used to feed checks or other non-rigid paper sheets.

The second type of feed mechanism in general use is a vacuum feed. Vacuum feeds employ a suction head which sucks the bottom card or paper from the stack and moves it toward the throat of the machine. Timed valve means cut off the vacuum during the return movement of the suction head. This type of feed is very successful in feeding light non-rigid papers but, because of the intermittent air flow and because of the various timing and synchronizing mechanisms required, this type of feed mechanism must operate at speeds considerably less than feed mechanisms of the picker type.

The principal object of this invention is to provide an improved form of vacuum feed mechanism capable of feeding both rigid and non-rigid sheets at a high rate of speed.

Another object of this invention is to provide a continuous vacuum feed mechanism wherein the use of valves and timing devices therefor is eliminated.

Still another object of this invention is to provide a vacuum feed mechanism capable of feeding cards or sheets to a machine at any rate of speed within, and up to, the maximum operating speed of the machine without requiring any adjustment to the feeding mechanism.

A further object of this invention is to provide a feed mechanism capable of feeding marginally punched cards or sheets one at a time from a stack, even when such cards or checks are nested together because of curl or warp induced by atmospheric conditions or other causes.

A preferred form of the invention is described in the following detailed specification, and illustrated by way of example in the accompanying drawings, wherein:

Fig. 1 shows a front elevation of a feed mechanism constructed in accordance with the principles of the invention.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1, showing the feeding carriage in its retracted position in full lines and in its extreme advanced position in dot-dash lines.

Fig. 3 is a schematic sectional view taken generally

2

on line 3—3 of Fig. 2 and shows the reciprocating feed plate in its retracted or pick up position.

Fig. 4 is a similar view to Fig. 3 but shows the reciprocating feed plate in its advanced position.

Fig. 5 is a similar view to those shown in Figs. 3 and 4 and shows the feed plate in an intermediate position during its return stroke.

The feeding device disclosed herein consists of a pair of inwardly facing channel-shaped members 10 and 11 each bolted to the front face of a machine, generally indicated at 12, adjacent the feed throat thereof by suitable fastening devices 13. The two channel-shaped members 10 and 11 form a chute to hold a stack of record cards generally indicated at A. A vertically adjustable bar 14 is fastened to the front face of the machine 12 midway between the members 10 and 11 by a pair of bolts 15 extending through suitable slots 16 in the bar.

A flat reciprocating feed carriage 17 is mounted for horizontal reciprocating motion toward and away from the feed throat of the machine 12 by a pair of guide blocks 18 and 19 having grooves 20 and 21 formed in their respective opposed faces. The guide blocks 18 and 19 are mounted to the machine 12 in any suitable manner (not shown).

The reciprocating carriage 17 comprises a base plate 22 having its upper surface cut out, as indicated at 23, adjacent its inner edge. A relatively thin plate 24 is mounted in the cut-out section 23 and extends inwardly beyond the inner edge of the base plate 22. An upper plate 25 is secured to the upper surface of the plate 22 and to the upturned inner edge 26 of the plate 24. The plate 25 is spaced from the plate 24 and provides a transversely extending chamber 27 therebetween. The chamber 27 is connected to a suitable vacuum pump (not shown) by a hose connection 28 extending through the plates 22 and 24 and a flexible hose 29. As best seen in Fig. 2, the upper plate 25 is provided with three sets of slots 30 to permit the vacuum in chamber 27 to suck the bottom card from the stack A down against the upper surface of the plate 25. The inner edges of the plates 25 and 24 are slotted between the sets of slots 30, as indicated at 31 and 32, for purposes which will presently be described.

In order to insure that the inner edge of the bottom card in the stack A is adjacent the upper surface of the plate 25, even if the cards should be warped, three triangular-shaped supports 25a are fastened to the upper surface of the plate 25 and extend upwardly therefrom with their widest portion adjacent the outer edge of the plate.

Immediately inside the throat of the machine 12 are two transverse contra-rotating feed shafts 33 and 34. The shafts 33 and 34 are mounted equal distances above and below the plane of the upper surface of the plate 25 on the feed carriage 17. A pair of rollers 35 and 36 are each mounted on the shaft 33 in line with the slots 31 and 32, respectively. Similarly, a pair of rollers 37 and 38 are each mounted on the shaft 34 in opposed relation to and in contact with the rollers 35 and 36, respectively. A second pair of contra-rotating shafts 39 and 40 are each mounted parallel to, and spaced inwardly from, the shafts 33 and 34, respectively. The shafts 39 and 40 are provided with opposed pairs of rollers in the same manner as shafts 33 and 34. One pair of said rollers is shown at 41 and 42 in Figs. 3 and 5.

In the operation of the device, the shafts 33, 34 and 39, 40 are rotated in opposite directions by the drive mechanism of the machine 12 in timed relation to the operation of the machine. The feed carriage 17 is reciprocated toward and away from the feed rollers 35, 37 by a suitable mechanism (not shown) connected to the drive mechanism of the machine 12. The throat bar

14 is adjusted to clear the upper surface of the plate 25 by substantially the width of one card or sheet. The stack of cards A is inserted into the top of the channel-shaped guides 10 and 11, and the air entering the slots 30 sucks the bottom card 43 down against the upper surface of the plate 25 in the manner shown in Fig. 3. The feed carriage 17 is then reciprocated inwardly to the position shown in Fig. 4 wherein the inner edge of the plate 25 is between the feed rollers 35 and 36 in the manner shown in dot-dash lines in Fig. 2. The inner edge of the card 43 is now between the pairs of rollers 35, 37 and 36, 38 and is advanced inwardly by said rollers and stripped from the upper surface of the plate 25 as the feed carriage 17 returns to its outermost position. As shown in Fig. 5, the card 43 is advanced from the rollers 35, 37 and is picked up by the rollers 41, 42 at the same time as the slots 30 in the plate 25 again come under the stack A and suck down the next card, in preparation for feeding said card to the rollers 35 and 37.

From the foregoing description it may be seen that by stripping the card from the upper surface of the feed carriage 17 by the nipping action of the contra-rotating pairs of feed rollers 35, 37 and 36, 38, the need for shutting off the vacuum chamber 27 is eliminated and no valves or timing mechanism for performing this function is required. It may further be seen that since no picker or slicer pushing against the rear edge of the card being fed is used, the feed mechanism is equally able to feed thin sheets or checks as well as relatively thick or stiff cards. Since the feed carriage 17 is reciprocated by, and the feed shafts 33, 34, 39 and 40 are rotated by the main drive assembly of the machine 12, the feed mechanism is automatically in synchronism with the machine at all operating speeds of the machine 12 without requiring adjustment. When used to feed cards of different dimensions, only one adjustment is required in the drive between the main drive of the machine 12 and the drive for the shafts 33, 34, 39 and 40 and the drive for the reciprocating assembly 17.

While we have shown and described the preferred form of our invention, it should be understood that various changes may be made in its construction by those skilled in the art, without departing from the spirit of the invention as defined in the appended claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. In a feed mechanism for feeding marginally punched cards or sheets into the feed throat of a machine, a feed chute adapted to receive said cards or sheets in stacked relation, a reciprocating feed carriage adapted to be reciprocated from a position below said feed chute toward and away from the feed throat of said machine, a vertically adjustable bar adjacent the side of said chute nearest said machine adapted to be positioned with its bottom edge spaced approximately the width of one card from the upper surface of said feed carriage, means to force the forward edge of the bottommost card in said stack along the length thereof downwardly against said feed carriage, said means comprising a plurality of triangularly shaped supports extending upwardly from the upper surface of said feed carriage with their wide ends adjacent the rear edge of said carriage, a constant source of vacuum, slots in the upper surface of said feed carriage continuously connected to said source of vacuum, a pair of contra-rotating feed shafts within the feed throat of said machine, pairs of opposed rollers on said feed shafts, and slots in the forward edge of said feed carriage in alignment with said pairs of opposed rollers.

2. In a feed mechanism for feeding marginally punched cards or sheets into the feed throat of a machine, a feed chute adapted to receive said cards or sheets in stacked relation, a reciprocating feed carriage adapted to be reciprocated from a position below said feed chute toward and away from the feed throat of said machine, a vertically adjustable bar adjacent the side of said chute nearest

said machine adapted to be positioned with its bottom edge spaced approximately the width of one card from the upper surface of said feed carriage, means to force the forward edge of the bottommost card in said stack along the length thereof downwardly against said feed carriage, said means comprising a plurality of triangularly shaped supports extending upwardly from the upper surface of said feed carriage with their wide ends adjacent the rear edge of said carriage, a constant source of vacuum, slots in the upper surface of said feed carriage continuously connected to said source of vacuum, a first pair of contra-rotating feed shafts within the feed throat of said machine, first pairs of opposed rollers on said first feed shafts, slots in the forward edge of said feed carriage in alignment with said pairs of opposed rollers, a second pair of contra-rotating feed shafts spaced inwardly of said machine from said first pair of feed shafts, second pairs of opposed rollers on said second pair of shafts adapted to receive the cards from said first pair of rollers and pass the cards inwardly to the machine.

3. In a feed mechanism for feeding marginally punched cards or sheets into the feed throat of a machine, a feed chute adapted to receive said cards or sheets in stacked relation, a reciprocating feed carriage adapted to be reciprocated from a position below said feed chute toward and away from the feed throat of said machine, a vertically adjustable bar adjacent the side of said chute nearest said machine adapted to be positioned with its bottom edge spaced approximately the width of one card from the upper surface of said feed carriage, means to force the forward edge of the bottommost card in said stack along the length thereof downwardly against said feed carriage, said means comprising a plurality of triangularly shaped supports extending upwardly from the upper surface of said feed carriage with their wide ends adjacent the rear edge of said carriage, a constant source of vacuum, slots in the upper surface of said feed carriage continuously connected to said source of vacuum, a pair of contra-rotating feed shafts within the feed throat of said machine, pairs of opposed rollers on said feed shafts, slots in the forward edge of said feed carriage in alignment with said pairs of opposed rollers, and means operatively connected to the drive assembly of said machine for rotating said feed shafts and rollers and for reciprocating said feed carriage in synchronism with the operation of said machine.

4. In a feed mechanism for feeding marginally punched cards or sheets into the feed throat of a machine, a feed chute adapted to receive said cards or sheets in stacked relation, a reciprocating feed carriage adapted to be reciprocated from a position below said feed chute toward and away from the feed throat of said machine, a vertically adjustable bar adjacent the side of said chute nearest said machine adapted to be positioned with its bottom edge spaced approximately the width of one card from the upper surface of said feed carriage, means to force the forward edge of the bottommost card in said stack along the length thereof downwardly against said feed carriage, said means comprising a plurality of triangularly shaped supports extending upwardly from the upper surface of said feed carriage with their wide ends adjacent the rear edge of said carriage, a constant source of vacuum, slots in the upper surface of said feed carriage continuously connected to said source of vacuum, a first pair of contra-rotating feed shafts within the feed throat of said machine, first pairs of opposed rollers on said first feed shafts, slots in the forward edge of said feed carriage in alignment with said pairs of opposed rollers, a second pair of contra-rotating feed shafts spaced inwardly of said machine from said first pair of feed shafts, second pairs of opposed rollers on said second pair of shafts adapted to receive the cards from said first pair of rollers and pass the cards inwardly to the machine, and means operatively connected to the drive assembly of said machine for rotating said feed shafts and rollers and for reciprocating

said feed carriage in synchronism with the operation of
said machine.

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