

March 4, 1969

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3,430,947

RECORD CARD HANDLING AND REGISTERING APPARATUS

Filed March 20, 1967

Sheet 1 of 3

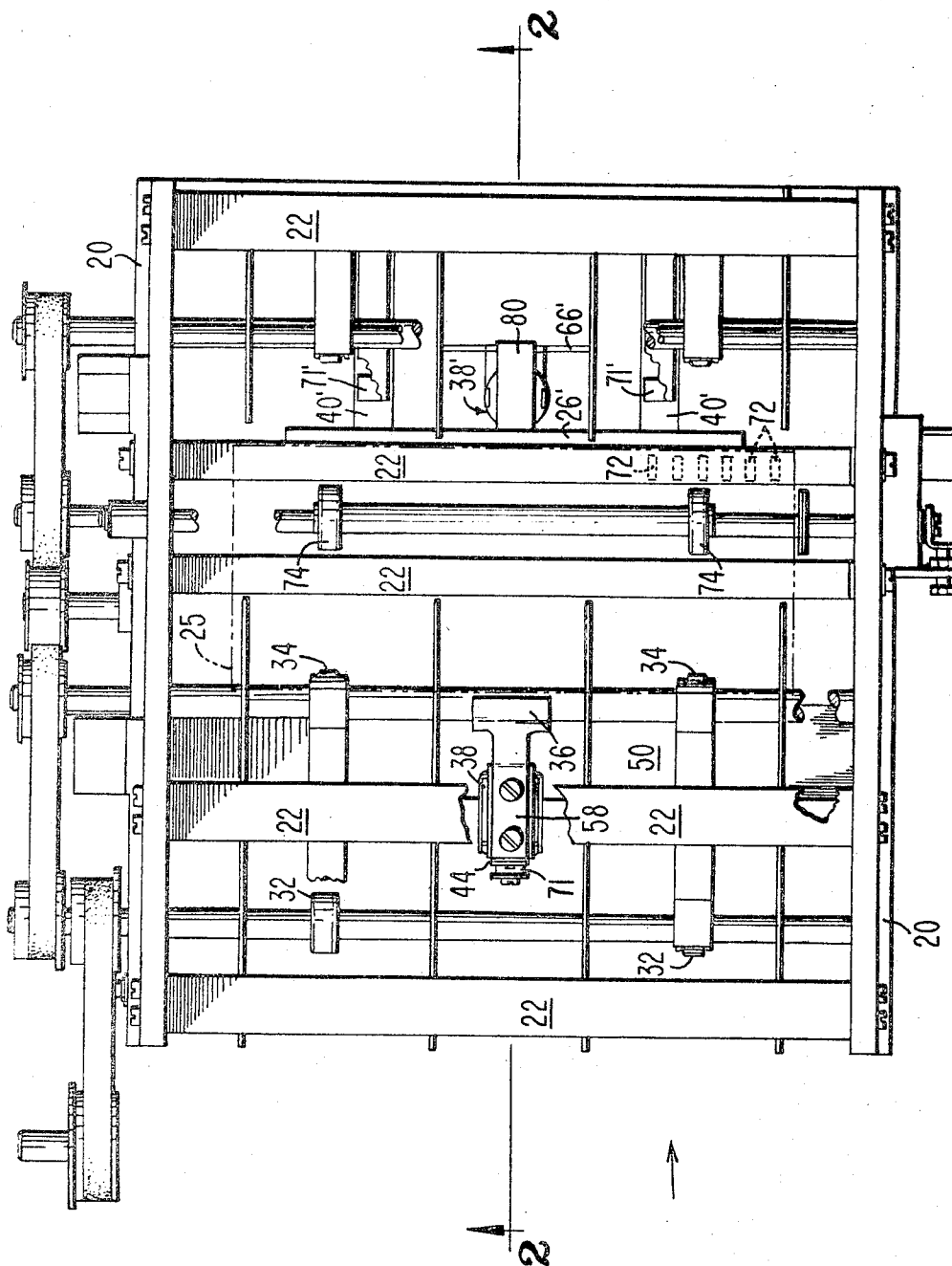


Fig. 1.

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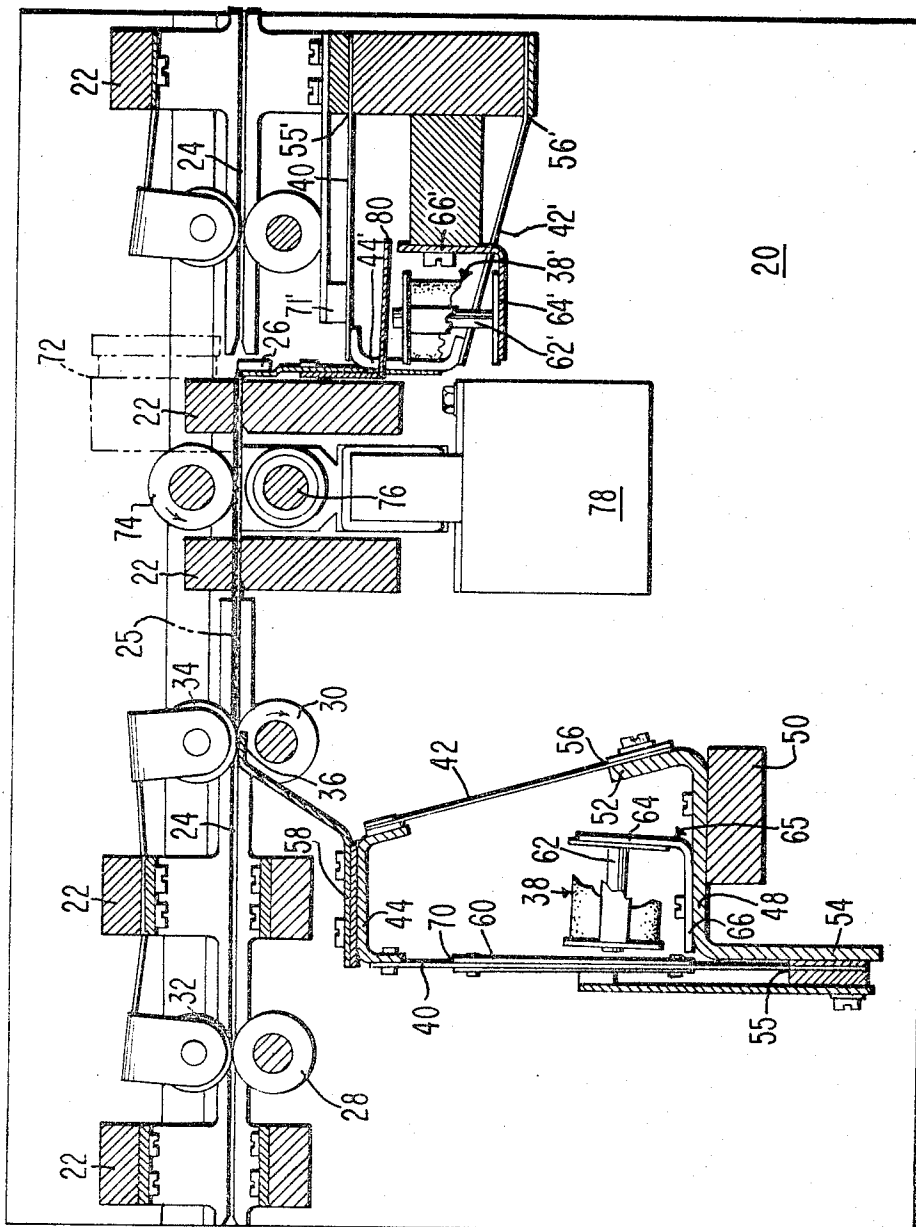


Fig. 2.

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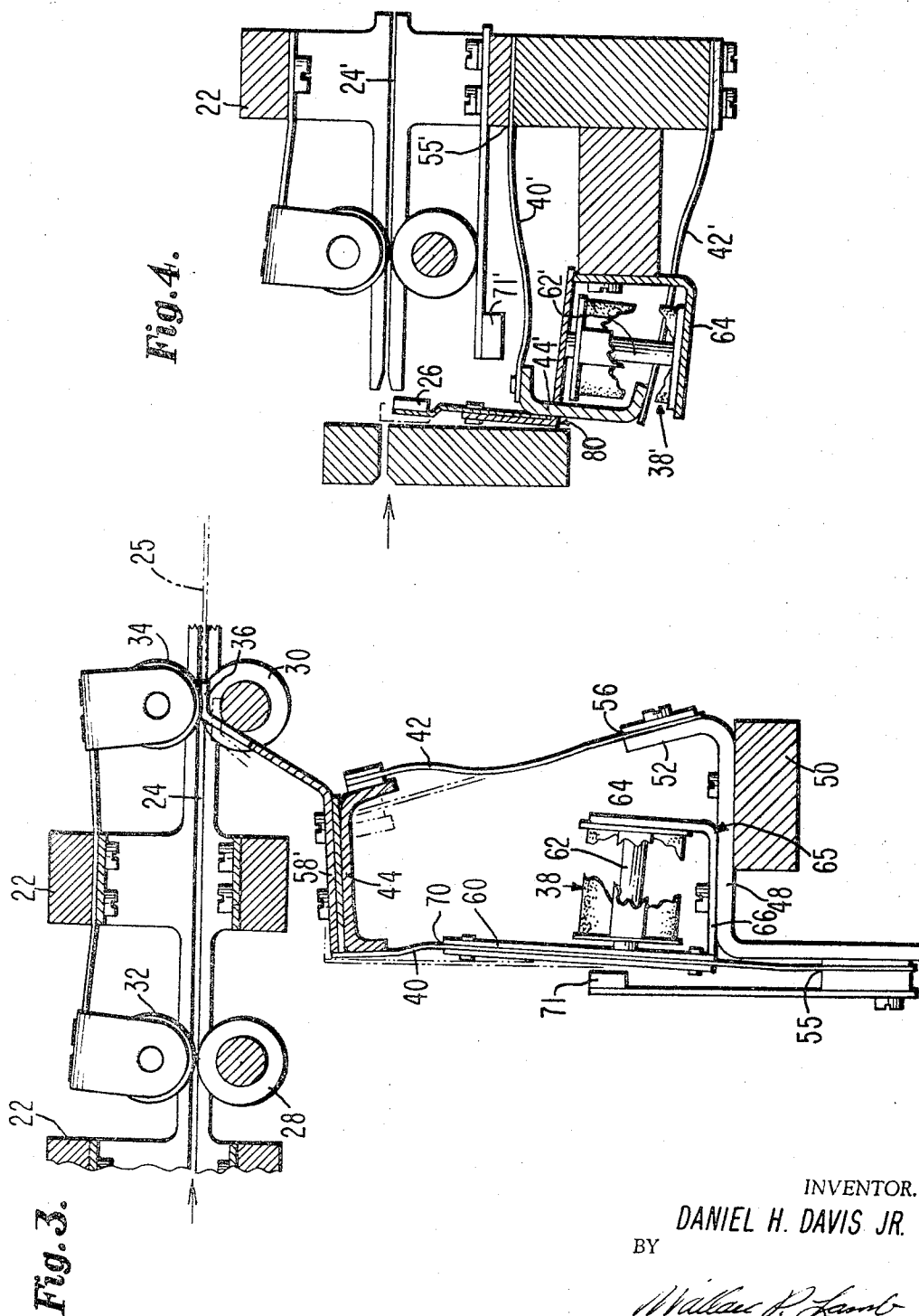
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RECORD CARD HANDLING AND REGISTERING APPARATUS

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13 Claims

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ABSTRACT OF THE DISCLOSURE

The disclosure embraces a card guideway along which cards are fed singly to a "ready station" where a card is freely thrust with its leading edge against a retractable abutment or registering bar by a second abutment engaging the trailing edge of the card, the abutments being moved by electromagnets acting through flexure interposers.

The invention relates generally to card handling apparatus and particularly to card registering mechanism.

Summary of the invention

The invention resides in the mounting of a card abutment on the corresponding movable ends of a pair of oppositely disposed flexible cantilevers which are relatively arranged and connected together such that a flexing of one of them causes the other to flex in an opposite direction to move a card abutment between ineffective and effective positions.

In the drawings

FIG. 1 is a plan view of a card transporting apparatus having a card ready station embodying my invention;

FIG. 2 is a vertical sectional view, taken along the line 2-2 of FIG. 1;

FIG. 3 is a fragmentary side view of the ready station, illustrating the operation of certain parts of an operating mechanism, and

FIG. 4 is a fragmentary view of another area of the ready station, illustrating the operation of certain parts of an operating mechanism.

Referring to the drawings by characters of reference, the card transport section or ready station shown includes a frame structure having oppositely disposed side members 20 rigidly connected together by cross members 22 having aligning sections of a horizontal card guideway 24. A record card 25 is shown at rest at the card ready station where the leading edge of the card is shown adjacent a retractable abutment or card registering bar 26. Normally, the registering bar 26 is in its effective or raised position shown in FIG. 2. The card 25 is fed to the position shown by feed rollers including two laterally positioned sets of rollers each of which comprises lower driven rollers 28 and 30 and upper pressure rollers 32 and 34. It will be noted in FIG. 2 that the distance from the discharge side of the feed rollers 30 and 34 to the registering bar 26 is slightly greater than the distance from the leading to the trailing edge of the card. Consequently, the card is discharged by the rollers 30 and 34 in free flight against the registering bar 26 and rebound of the card is contained by and between the rollers and the bar.

To register the leading edge of the card 25 against the bar 26 there is provided a movable abutment member or card pusher 36. Normally the abutment 36 is in its ineffective position just below the guideway 24, as shown in FIG. 2, and is movable arcuately upwardly and forwardly by and upon activation of a solenoid 38. In order to operatively connect the solenoid 38 with the card abutment 36,

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I provide a flexure structure, including a pair of flexible cantilevers 40 and 42 and a rigid connecting web 44. A mounting bracket 46 for the flexure structure has a horizontal base 48 resting on and affixed to a rigid cross member 50 of the frame and the base has an upturned flange 52 at one end thereof and a downturned flange 54 at the other end thereof.

The flexible cantilever 40 or first cantilever has a lower end portion secured to the bracket leg 54, providing a fixed fulcrum, as at 55, the lever extending upright and preferably vertical to the plane of the guideway 24. The flexible cantilever 42 or second cantilever has one end affixed to the upturned bracket flange 52, providing a fixed fulcrum, as at 56, and is shorter than the cantilever 40. Also, the cantilever 42 is positioned at an acute angle to the cantilever 40 such that the cantilevers diverge from the web 44 toward their fulcrums. As shown in FIG. 2, the abutment or card pusher 36 is carried by the web 44, the pusher having a base 58 which seats on the web and may be welded, or be otherwise suitably affixed thereto.

Mounted on and supported solely by the flexible cantilever 40 there is an electrically operated means or actuator 60, preferably a plate type armature of the electromagnet 38. One end of the core 62 of the magnet 38 is disposed toward the armature 60 and is connected to the upright leg 64 of a bracket 65 which provides part of a magnetic path between opposite ends of the core 62. A horizontal leg 66 of the bracket 65 has its end normally spaced from the armature 60, adjacent the lower end of the latter such that the armature will bridge the end of leg 66 and the core 62 when the magnet is energized. As shown, the magnet 38 is axially inclined slightly to the horizontal to allow for a predetermined degree of flexing of the cantilever 40. An upward extension of the armature 60 provides a movable fulcrum, as at 70, for the cantilever 40. On the other side of the cantilever from the magnet 38, a stop member 71 is provided to limit flexing of the cantilever.

Adjacent the registering bar 26, one or more card markers or punches 72, shown in dash-and-dot lines in FIG. 1, may be provided for marking or punching the card with coded information after the card has been properly aligned at the station. Also, in the area of the card markers 72, suitable feed rollers, including an upper pair of driven rollers 74 and a lower pair of pressure rollers 76, are provided to feed the card 25 along the guideway during the punching operation. The pressure rollers are retractable by a solenoid 78 which is activated at a predetermined time to move them down to allow the card to freely pass therebetween to the registering bar 26.

As previously mentioned, the card registering bar 26 is normally in its position shown in FIG. 2 in the path of a card 25. Following the registration of a card against the bar 26, the bar is retracted below the card path to allow the card to proceed. The mechanism for retracting the bar 26 is similar to the previously described mechanism for moving the card pusher 36. Accordingly, reference characters of the pusher mechanism have been given primed reference characters to designate similar parts of the bar retracting mechanism so as to avoid unnecessary repetitious description. The registering bar retracting mechanism differs from the pusher moving mechanism in that the bar 26 is carried by the webs 44 of a pair of laterally spaced apart flexure units. The armature 80 is affixed to the registering bar 26 which in turn is affixed to and moves with the web 44' of the flexible cantilevers. As shown in the plan view of FIG. 1, two flexure structures are preferably used to operate the registering bar 26 with the desired stability.

FIG. 3 illustrates the flexing of the cantilevers 40 and 42 when the pusher 36 is operated to push the card 25

against the registering bar 26. It will be noted that the effective flexing of the cantilever 40 is about its movable fulcrum 70 and that flexing of the cantilever by the magnet 38 causes the junction of the cantilever 40 with the web 44 to move downwardly and toward the cantilever 42. At the same time, the flexing force is transmitted by the cantilever 40 through the rigid web 44 to the cantilever 42 which flexes the cantilever 42 clockwise, which causes its junction with the web 44 to move upwardly and to the right. This compound action of the cantilevers 40 and 42 carries the card pusher 36 through an arcuate path upwardly and forwardly to engage the trailing edge of the card and move it against the registering bar 26. The solenoid 38 may be time controlled and be pulsed to effect the pushing of a card against the registering bar 26 after which the tension of the flexible cantilevers 40 and 42 is released to return the pusher 36 to its normally retracted position shown in FIG. 2.

FIG. 4 shows the registering bar 26 as retracted by the solenoid 38' through the flexing of the first and second cantilevers 40' and 42' respectively. When the solenoid 38' is energized, the armature 80 is attracted thereto and the web 44' moving with the armature is yieldingly opposed by cantilevers 40' and 42'. As the cantilevers 40' and 42' are not of the same length and normally the cantilever 42' is at an acute angle to cantilever 40' and the card path, the cantilevers cause the registering bar to move in an arc, downwardly and forwardly from the leading edge of card 25, out of the card path to allow the card to be fed beyond the bar 26 in the card punching operation. When the card has received the required number of punches, the solenoid 38' is de-energized whereby the tension of the cantilevers 40' and 42' is released to restore the bar 26 to its normal position shown in FIG. 2.

What is claimed is:

1. In a card registering apparatus, a card guideway, supporting means, a first flexible cantilever affixed at one end thereof to said supporting means, a second flexible cantilever affixed at one end thereof to said supporting means in spaced relation to and opposite said first flexible cantilever, a web joining the other ends of said cantilevers together and disposed in broadside relationship to the plane of the card path, an abutment carried by said web for movement between a retracted position and a position in the card path, said first cantilever being arranged to flex and move its junction with said web away from the plane of the card path and said second cantilever flexed by the first and being arranged to move its junction with said web toward the plane of the card path, said abutment carried by said web adjacent the said last-mentioned junction, and power operated means operable to flex said first cantilever in one direction.

2. In a card registering apparatus as defined by claim 1 in which said second flexible cantilever is inclined to

said first lever diverging with respect thereto from said web.

3. In a card registering apparatus as defined by claim 1 in which said first cantilever is longer than said second cantilever.

4. In a card registering apparatus as defined by claim 1 which includes a fulcrum normally spaced from said first mentioned cantilever fulcrum and said web.

5. In a card registering apparatus as defined by claim 1 in which the means to flex said first cantilever is an electromagnet, a rigid armature plate carried by said first cantilever to in part bridge the ends of the magnet and including a second fulcrum for said first cantilever between said web and said magnet.

6. In a card registering apparatus as defined by claim 1 in which said means is an electromagnet disposed between said flexible cantilevers.

7. In a card registering apparatus, a card guideway defining a path of card travel, supporting means, a pair of laterally positioned flexible cantilevers, a web connecting the movable ends of said cantilevers together and disposed toward said guideway, an abutment carried by said web, and an actuator operatively connected to said web and operable to apply a force thereto in a direction and at a point to arcuately displace and tilt the latter to move said abutment between positions within and without said guideway.

8. In a card registering apparatus as defined by claim 7 in which one of said cantilevers is longer than the other.

9. In a card registering apparatus as defined by claim 7 in which one of said cantilevers is longer than the other and inclined at an acute angle thereto.

10. In a card registering apparatus, as defined by claim 7 wherein said actuator is operable to exert a force on said web at a point closer to the junction of said web and one of said cantilevers than to the junction of said web and the other of said cantilevers.

11. In a card handling apparatus as defined by claim 7 wherein said actuator is connected to one of said cantilevers.

12. In a card handling apparatus as defined by claim 7 wherein said actuator is connected to and carried by one of said cantilevers.

13. In a card handling apparatus as defined by claim 7 wherein said actuator is connected to said web.

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U.S. Cl. X.R.

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