May 14, 1963 D. E. BROZO 3,089,697

STACK CONDITIONING APPARATUS

Filed Sept. 14, 1961 2 Sheets-Sheet 1

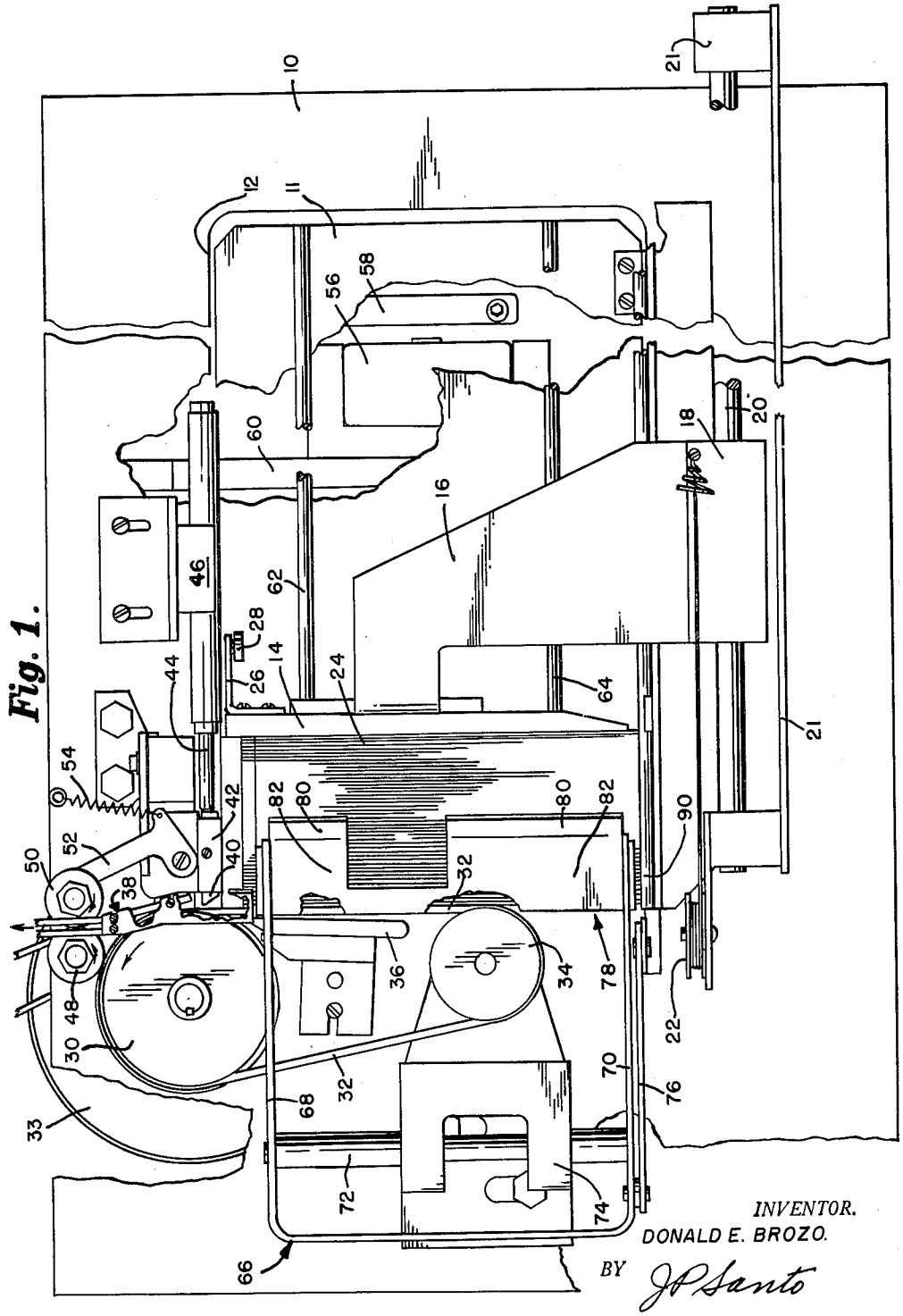


Fig. 1.

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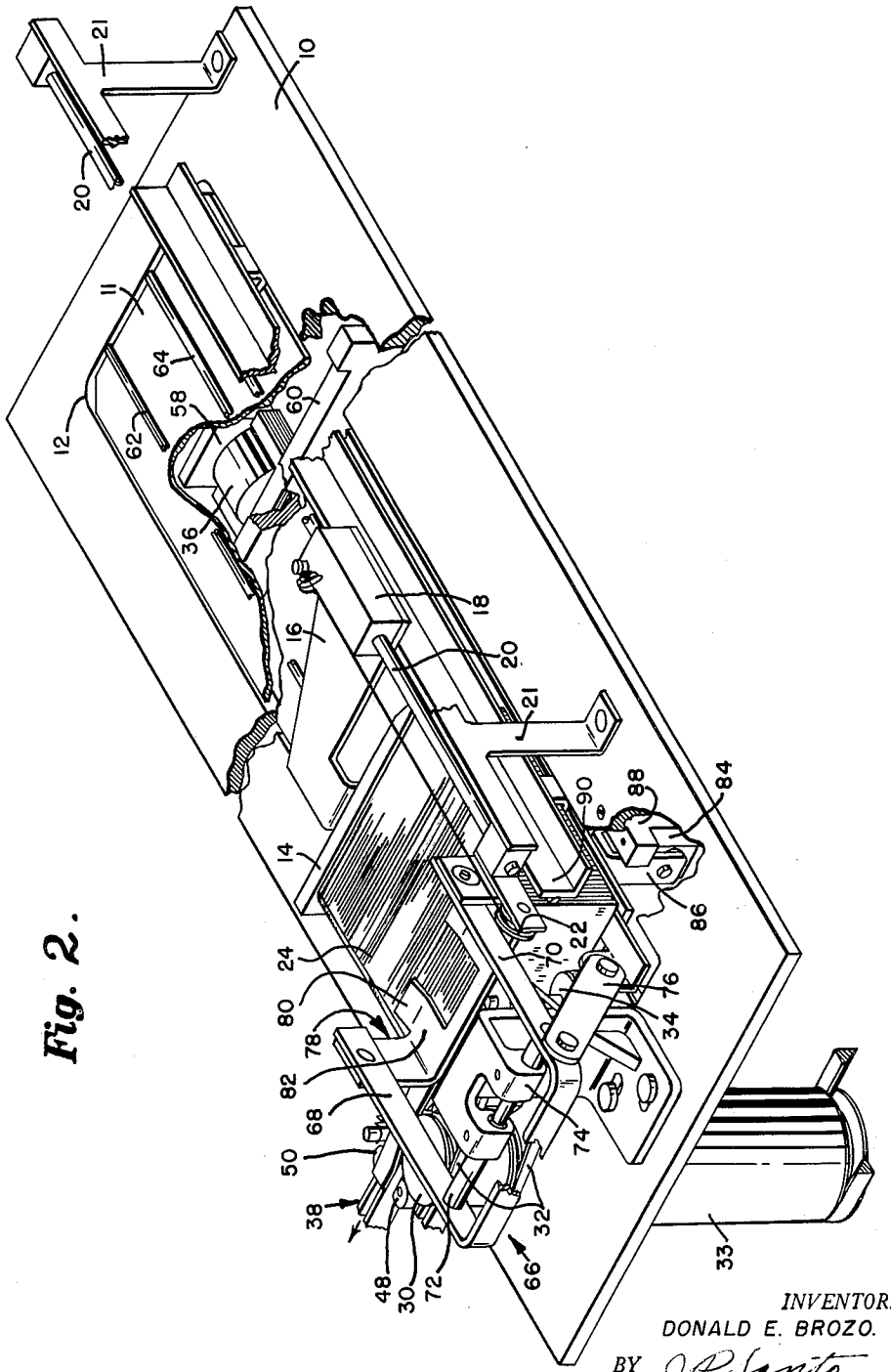


Fig. 2.

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United States Patent Office 3,089,697 Patented May 14, 1963

3,089,697

STACK CONDITIONING APPARATUS

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Filed Sept. 14, 1961, Ser. No. 138,122
10 Claims. (Cl. 271—34)

This invention relates generally to mechanisms for sheet feeding and, more particularly, to an apparatus, for placing in alignment the edges of a stack being fed.

It is an object of this invention to form rough stacks of sheets or cards into quickly formed and properly aligned piles.

It is an object of this invention to provide stack conditioning apparatus operable to align the stack as the stack is being advanced toward a feed station.

It is an additional object of this invention to provide an apparatus operable to vibrate a feed plate longitudinally and to oscillate an edge aligning device from a common operating mechanism.

In accordance with the foregoing objects, the invention first briefly described comprises a stationary base, a vibrating table for advancing a stack of cards, a vibrating operating means for the table, a pivotable member, a tamping member of particular configuration mounted on the pivotable member engageable with the edges of the cards in the stack, and means interconnecting the table and the tamping member to transform a rectilinear movement of the table into an oscillating movement of the tamping member against the edges of the stack.

The aforementioned and other objects of the invention will be apparent from a consideration of the following specification taken in connection with the appended drawings showing a preferred embodiment of the invention by way of example, and wherein:

FIG. 1 is a plan view of a sheet transport and feed apparatus; and

FIG. 2 is a perspective view with parts broken away to best illustrate the preferred embodiment.

Referring to the drawings;

FIG. 1 shows the stationary base 10 with a central cut-out portion 12 adapted to receive a vibrating table 11. The advancing mechanism for the stack is mounted on base 10 and includes a back-up plate 14 with a laterally extending arm 16. Arm 16 terminates in a block 18 which is journalled on a guide rod 20 and is slidably movable leftwardly and rightwardly thereon. Rod 20 is secured at its ends in a frame 21 mounted on base 10 in a manner better shown in FIG. 2. A spring wound drum 22 is also mounted on frame 21 and is coupled to block 18 to exert a constant but yieldable force to advance back-up plate 14 against the rear of a stack of vertically upstanding sheets or cards 24. Support for back-up plate 14 is further provided by a downwardly extending arm 26 carrying roller 28. Roller 28 is adapted to rest upon the upper surface of vibrating table 11.

Mounted on base 10 near its upper lefthand corner is the feeding apparatus toward which the stack 24 is advanced as the stack is depleted. The feeding apparatus is of the friction drum type well known in the art. A friction feeding drum 30 is rotated in a counter-clockwise direction by a drive motor 33. A pair of friction belts 32 is mounted on drum 30 and on an idler pulley 34 spaced from the drum, as shown. Friction belts 32 serve to initially separate the outermost card from the stack and advance it to the feeding drum 30. A tension adjusting block 36 is mounted on base 10 and is selectively movable into engagement with the inner surface of belts 32 to maintain the proper forwarding and feeding force by the belts against the face of the outermost card in the stack 24. A guideway 38, with its upper plate shown broken away, is employed to provide an exit path for the card being fed. A separator block 40 is mounted at the entrance to guideway 38 to define an opening of approximately one card width to inhibit double card feed. Separator block 40 is slidably mounted in a housing 42 and adjustably movable and retained therein by a rod 44 mounted in an upstanding post 46 on base 10. A pair of forwarding rolls 48 and 50 are provided projecting into guideway 38 of which roll 48 is the driving member and roll 50 is the driven member. Roll 48 has a fixed mounting on base 10. Roll 50 is pivotably mounted on lever 52 and is spring biased by a spring 54 into engagement with roll 48 in a manner which permits removal of roll 50 to provide ready access to the guideway to clear sheet jam conditions.

The operating means to vibrate the table 11 comprises a field coil 56 and an armature 58 mounted in operatively spaced relation to each other. Field coil 56 is mounted on a bracket 60 anchored to the under surface of base 10 and may be alternately energized and de-energized by a pulsating direct current in a manner well known in the art. The armature 58 is secured to the underside of the table 11. The pulsating current applied to the field coil 56 causes the armature to be intermittently attracted so as to vibrate and cause vibration of the table 11 in a rectilinear fashion. Thus, the leftward movement of the stack of cards 24 is facilitated due to the reduction of friction forces between the cards themselves and between the lower edges of the cards and the rails 62 and 64 attached to the upper surface of table 11.

The pivotable member which serves to condition the stack is embodied in the form of a two-armed lever 66 with spaced arms 68 and 70. Lever 66 is journalled near its leftward end on a rod 72. Rod 72 is carried by a vertical support post 74. Support post 74 is anchored to the upper surface of base 10. A link 76 connects the leftward end of lever 66 to table 11 so that the rectilinear motion of the table is converted into an oscillating motion of lever 66 toward and away from the table. A downwardly bent tamping member 78 is supported between the forward ends of arms 68 and 70 of lever 66. Tamping member 78 has a first inclined portion 80 engageable with the upper edges of the cards 24 and a second flat portion 82 substantially parallel to the upper surface of table 11. It will thus be seen that the cards 24 in the leftwardly advancing stack will be subjected to gradually increasing forces downward until the stack is properly conditioned into the proper state of even edge alignment.

FIG. 2 shows further detail of the mode of construction of the elements described in connection with FIG. 1. Also shown is the manner in which table 11 is resiliently mounted at each of its four corners on base 10. At each corner a block of resiliently deformable material 84 is mounted between downward projections 86 and 88 from table 11 and base 10, respectively, in a manner which permits the table 11 to be moved to and fro in a horizontal rectilinear path in response to the movement of armature 58 as hereinbefore described. The manner of mounting further permits a slight upward and downward vibration of the table 11 in response to the intermittent blows provided by tamping member 78. A vertical upstanding side registration member 90 is utilized to facilitate the side edges of the stack of cards 24. The base 10 may furthermore be inclined at a slight angle to the horizontal to promote the side registration of the stack. Various other modifications may be made in the structure shown without departing from the spirit or scope of my invention.

What is claimed is:

1. In a mechanism for feeding cards from a stack of vertical cards, apparatus for conditioning the stack com-

prising a base, a stack supporting table resiliently supported theron, means for vibrating said table, a pivotable member mounted on said base, a tamping member fixed to said pivotable member engageable with the exposed edges of the cards in the stack, and means interconnecting said pivotable member and said table whereby the vibrating movement of said table is converted to an oscillating movement of said tamping member into and away from engagement with the edges of the cards in the stack.

2. In a mechanism for feeding cards from a stack of vertical cards, mechanism for conditioning the stack comprising a base, a stack supporting table resiliently supported thereon, means for vibrating said table in a rectilinear path substantially in the plane of said table, a pivotable member mounted on said base, a tamping member fixed to said pivotable member and having an inclined undersurface engageable with the upper edges of the cards in the stack and means interconnecting said pivotable member and said table whereby the rectilinear movement of said table is converted into an oscillating movement of said tamping member orthagonal to the movement of said table and into and away from engagement with the edges of the cards in the stack.

3. In a mechanism for feeding cards from a stack of vertically upstanding cards, apparatus for conditioning the stack comprising a base, a stack supporting table resiliently supported thereon, means for vibrating said table in a rectilinear path, a pivotable member mounted on said base, a tamping member fixed to said pivotable member and having an inclined undersurface engageable with the upper edges of the cards in the stack, and means interconnecting said pivotable member and said table whereby the vibrating movement of said table is converted to an oscillating movement of said tamping member into and away from engagement with the edges of the cards in the stack.

4. In a mechanism for feeding cards from a stack of vertically upstanding cards, apparatus for conditioning the stack comprising a base, a stack supporting table resiliently supported thereon, means for vibrating said table in a rectilinear path substantially in the plane of said table, a pivotable member mounted on said base, a tamping member fixed to said pivotable member and having an inclined undersurface engageable with the upper edges of the cards in the stack, and means interconnecting said pivotable member and said table whereby the rectilinear movement of said table is converted to an oscillating movement of said tamping member into and away from engagement with the edges of the cards in the stack.

5. In a mechanism for feeding cards from an advancing stack of vertically upstanding cards, apparatus for conditioning the stack comprising a base, a stack supporting table resiliently supported thereon, means for vibrating said table in a rectilinear path substantially in the plane of said table, a pivotable member mounted on said base, a tamping member fixed to said pivotable member and having a planar undersurface inclined in the path of advancement of the stack and engageable with the upper edges of the cards in the stack, and means interconnecting said pivotable member and said table whereby the rectilinear movement of said table is converted to an oscillating movement of said tamping member into and away from engagement with the edges of the cards in the stack.

6. In a mechanism for feeding cards from an advancing stack of vertically upstanding cards, apparatus for conditioning the stack comprising a base, a stack supporting table resiliently supported thereon, a field member mounted on said table, an armature member mounted on said base in operative spaced relation to said field member, said field member adapted to be rapidly energized and de-energized by a pulsating electrical current whereby said table is vibrated in a rectilinear path substantially coplanar therewith, a pivotable member mounted on said base, a tamping member fixed to said pivotable member and having a planar surface inclined in the path of advancement of the stack and engageable with the upper edges of the cards in the stack, and means interconnecting said pivotable member and said table whereby the rectilinear movement of said table is converted into an oscillating movement of said tamping member into and away from engagement with the edges of the cards in the stack.

7. In a mechanism for feeding cards from an advancing stack of vertically upstanding cards, apparatus for conditioning the stack comprising a base, a stack supporting table resiliently mounted thereon, a field member mounted on said table, an armature member mounted on said base in operative, spaced relation to said field member, said field member adapted to be rapidly energized and de-energized by a pulsating electrical current whereby said table is vibrated in a rectilinear path substantially coplanar therewith, a pivotable member mounted on said base, a tamping member fixed to said pivotable member having a first planar surface inclined in the path of advancement of the cards in the stack and a second planar surface substantially parallel to the plane of said table said planar surfaces successively engageable with the upper edges of the cards in the stack, and means interconnecting said pivotable member and said table whereby the vibratory movement of said table is converted into an oscillating movement of said tamping member into and away from engagement with the edges of the cards in the stack.

8. In a mechanism for feeding cards from an advancing stack of vertical upstanding cards, apparatus for conditioning the stack comprising a base, a stack supporting table resiliently mounted thereon, a field member mounted on said table, an armature member mounted on said base in operative, spaced relation to said field member, said field member adapted to be rapidly energized and de-energized by a pulsating electrical current whereby said table is vibrated in a rectilinear path substantially co-planar therewith, a pivotable member mounted on said base, a tamping member fixed to said pivotable member and having a first planar surface inclined in the path of advancement of the cards in the stack and a second planar surface substantially parallel to the plane of said table, said planar surfaces successively engageable with the edges of the cards in the stack, and a link pivotally connected at its one end to said pivotable member and at its other end to said table whereby the vibratory movement of said table is converted into an oscillating movement of said tamping member into and away from engagement with the edges of the cards in the stack.

9. In a mechanism for feeding cards from an advancing stack of vertical upstanding cards, apparatus for conditioning the stack comprising a base, a stack supporting table resiliently mounted thereon, a field member and an armature member supported in operative relation to provide a variable magnetic coupling therebetween to vibrate said table in a rectilinear path, a pivotable member mounted on said base, a tamping member fixed to said pivotable member and having a first planar surface inclined in the path of advancement of the cards in the stack and a second planar surface substantially parallel to the plane of said table, said planar surfaces successively engageable with the edges of the cards in the stack and a link pivotally connected at its one end to said pivotable member and at its other end to said table whereby the vibrating movement of said table is converted into an oscillating movement of said tamping member.

10. In a mechanism for feeding cards from a stack of cards, the combination of a stationary base, a stack support resiliently mounted on the base, means vibrating the stack support in a rectilinear path, a member pivotably mounted on the base and having a tamping portion en-

gageable with an edge of the stack, and link means connecting said pivotable member and said stack support and operating the pivotable member into and out of engagement with the edge of the stack through the rectilinear vibration of the stack support independently of the feeding of any of the cards from the stack.

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