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E. H. DOERNER
RECORD HOLDING DEVICE
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Fig-1

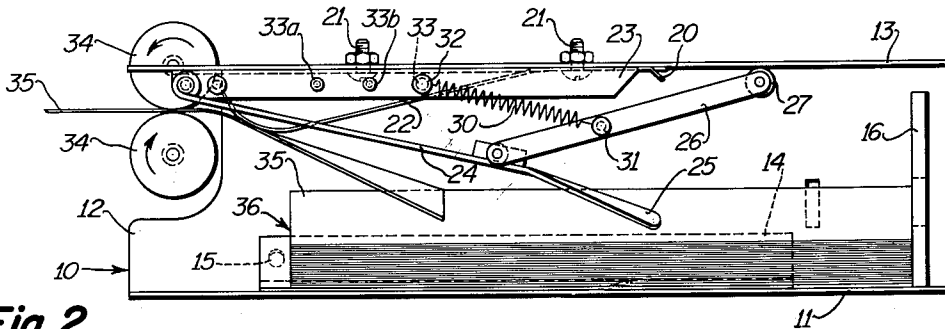
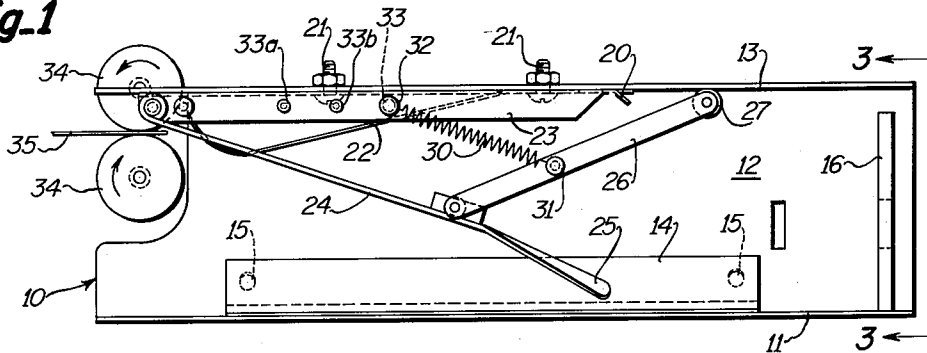


Fig-2

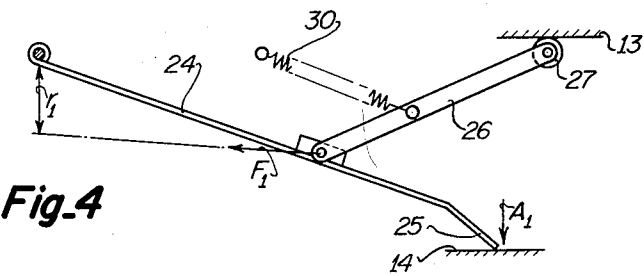


Fig-4

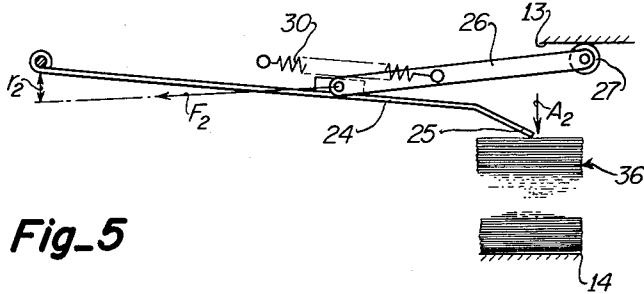


Fig-5

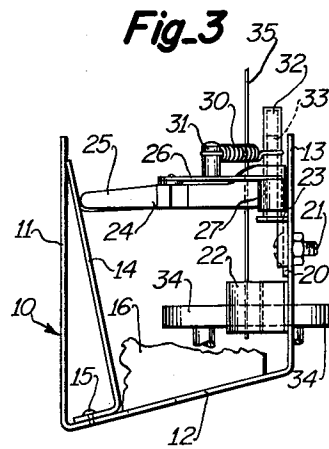


Fig-3

INVENTOR
ERNEST H. DOERNER
BY *Thomas S. Ross*
Albert W. Seibner
ATTORNEYS

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RECORD HOLDING DEVICE

Ernest H. Doerner, Wethersfield, Conn., assignor to Royal McBee Corporation, Port Chester, N.Y., a corporation of New York

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This invention relates to an improved apparatus for stacking and storing key-sort cards and the like, and more particularly relates to a novel device for more efficiently applying a uniform retaining force to cards or records that have been fed into a storage hopper.

In the operation of many present day data processing machines after a record card has been removed from a particular work station it is transported to a hopper in which it is stored along with many similar record cards. As these cards are being successively stacked in said hopper a movable or resilient card retaining member exerts a biasing force on the stacked cards so that the latter are lightly pressed into engagement with one longitudinal side of said hopper. The principal difficulty encountered here is that as the card hopper progressively fills the said biasing force becomes greater and greater. Under these conditions the record cards become pressed more tightly together and in many cases the peripheral notches formed in said cards become mutually caught or otherwise interfere with the normal stacking operations.

The principal object of the invention is to provide a novel card stacking and holding device whereby the cards being stored in a record receiving hopper are pressed together by a substantially uniform force.

Another object of the invention is to provide an improved card stacking and holding device which will efficiently accommodate cards of different length, paper weight and paper texture.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIGS. 1 and 2 are plan views respectively showing the empty and partially filled conditions of the card hopper.

FIG. 3 is a partially cut away right side view of the apparatus of FIGS. 1 and 2 as indicated by line 3—3 of FIG. 1.

FIGS. 4 and 5 are diagrammatic views illustrating the operational characteristics of the device shown in FIGS. 1 and 2.

Referring to FIGS. 1 and 3 the instant card hopper 10 comprises a U-shaped trough member having front, bottom and rear portions 11, 12 and 13 respectively. An inclined card supporting plate 14 is secured to the trough bottom portion 12 by any suitable means, such as rivets 15, and extends upwardly and forwardly towards the upper lip of said trough front portion 11. A card stop end plate 16 is mounted on the bottom portion 12 of the trough member, said stop plate being adjustably secured by any suitable means so as to be longitudinally positionable with respect to the hopper 10 and thereby accommodate cards of various lengths. An angle bracket 20 is mounted on the rear portion 13 of the trough member by means of clamp bolts 21. The said rear trough portion 13 is provided with elongated slots through which said bolts extend whereby said bracket is longitudinally adjustable relative to trough member 10. One end of a horizontally disposed leaf spring 22 is fixedly secured to the rear trough portion 13, the free end of said spring being arcuately formed and disposed adjacent the lower

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portion of the entrance or left end (as seen in FIGS. 1 and 2) of the hopper 10. Pivotaly mounted on the horizontal leg 23 of the angle bracket 20 is a card biasing arm 24 the free end 25 of which is normally urged towards said inclined card supporting plate 14. The means for biasing arm 24 comprises a lever 26 one end of which is articulately connected to arm 24 while the free end thereof rotatably supports a roller 27. A tension spring 30 is secured between a stud 31 and a tubular cap 32 which are respectively detachably mounted on the lever 26 and the upstanding stud 33 secured to the leg 23 of angle bracket 20. Said bracket leg 23 is provided with two similar spaced studs 33a and 33b so that the operative position of cap 32 may be adjusted in order to obtain a variation in the extent of normal tensioning of spring 30. The normal tension action of spring 30 causes roller 27 to engage the inner guide surface of the trough rear portion 13 and also causes the arm 24 to be urged in a counter clockwise direction, as seen in FIGS. 1 and 2, thereby yieldably moving said lever end 25 into engagement with said card supporting plate 14 as best seen in FIG. 3.

The cooperating card feed rolls 34 associated with the machine for processing the cards are shown here in order to indicate the relative orientation of each card 35 as it is progressively fed into the hopper 10. The leading edge of each card 35 first engages the arcuately formed free end of leaf spring 22 and is thereby deflected forwardly toward the card supporting plate 14 as illustrated in FIG. 2. Continued feed motion of a card 35 serves to displace the leading edge of the card under the free end 25 of arm 24 and into engagement with the hopper end plate 16. When the latter occurs the trailing edge of card 35 will have passed through rolls 34 and the entire card will thus become pressed against the stack 36 of cards that have already been received in the hopper. As the hopper progressively fills with cards the card biasing arm 24 is gradually displaced in a counter-clockwise direction, as seen in FIG. 2, and if the said arm 24 were subjected to the direct action of a biasing spring the force exerted by the arm end 25 against the stacked cards would become greater and greater. This is a very undesirable operational characteristic here in that when said cards 35 are peripherally notched, as is the case with certain key-sort record cards, and when said biasing force reaches a certain magnitude the card edges become mutually caught and relative sliding motion therebetween is greatly hampered. The instant construction and arrangement insures the proper and continued stacking of the cards in that the biasing or pressing force exerted by the end 25 of arm 24 against the center of the card stack 36 remains substantially constant regardless of the operative rotative position of the arm 24. This feature is best illustrated by reference to the two diagrammatic views of FIGS. 4 and 5 which respectively correspond to the operative conditions shown in FIGS. 1 and 2. In order for the forces A_1 and A_2 exerted by arm end 25 to be substantially equal the torque applied to arm 24 by the action of spring 30 must be substantially the same. That this is true here may be seen from the fact that the torque applied to arm 24 under the conditions of FIG. 4 is equal to $F_1 r_1$ and that torque applied under the conditions of FIG. 5 is equal to $F_2 r_2$. The increase of F_2 over F_1 is here offset by a corresponding decrease of r_2 from r_1 so that the product value or torque $F_1 r_1$ is substantially equal to the product value or torque $F_2 r_2$. This hyperbolic relation between the values of F and r remains substantially the same for all positions of lever 24 and thus the torque $F_1 r_1$; $F_2 r_2$, etc. applied to said lever always remains at a substantially uniform predetermined value which is large enough to efficiently retain the cards 35 in the proper stacked relation in the hopper 10, but

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which is not great enough to cause said peripheral card notches to become mutually caught. By adjusting the respective longitudinal positions of the end plate 16, the angle bracket 20, and the cap 32 cards of various lengths having different paper thickness, weight and texture may be efficiently, reliably and expeditiously handled by the instant device.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration only and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

The invention claimed is:

1. In a card holding device; a card receiving hopper having a guide surface along one side thereof, means for yieldably retaining a plurality of cards in stacked relation against the other side of said hopper, said means comprising a lever having one end articulately mounted adjacent said one side of said hopper and having a free end which is adapted to engage said stacked cards, an arm having one end articulately connected to an intermediate portion of said lever and having a free end which is adapted to move along said guide surface, and spring means connected to said arm so to yieldably bias said free lever end into engagement with said stacked

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cards whereby the stack retaining force exerted on said cards is substantially uniform for different operative positions of said arm.

2. In a card holding device; a card hopper adapted to receive a plurality of record cards, said hopper having an inner longitudinal guide surface along one side thereof, a card biasing lever having one end articulately connected to said one side of said hopper and having a free end which is adapted to be swung into engagement with a plurality of cards stacked against the other side of said hopper, an arm having one end articulately connected to an intermediate portion of said lever and having a free end which rotatably supports a roller that is adapted to roll along said guide surface, and a tension spring operatively connected between said one side of said hopper and said arm so that a substantially uniform torque is applied to said lever for different positions of the latter whereby a substantially constant stacking force is applied to said cards by said lever.

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