July 2, 1957 J. C. DAVY ET AL 2,797,920

APPARATUS FOR STACKING CARDS

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Fig. 1.

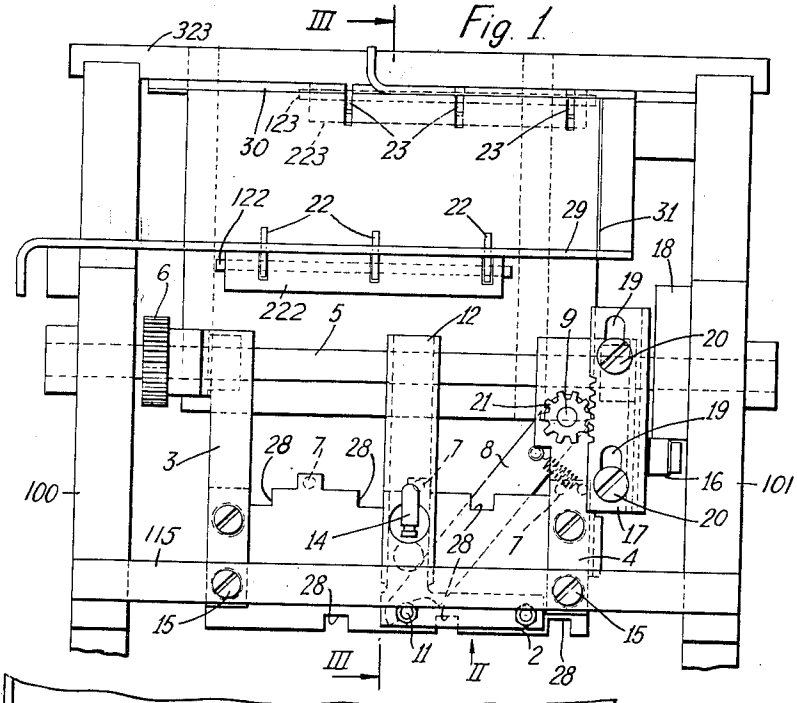
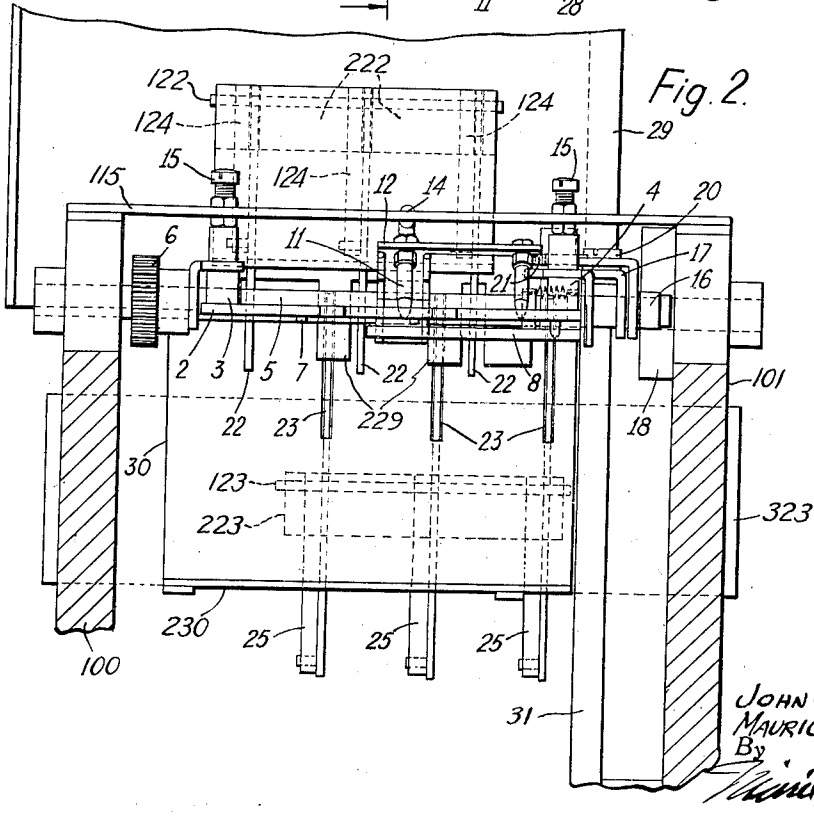


Fig. 2.



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Fig. 3.

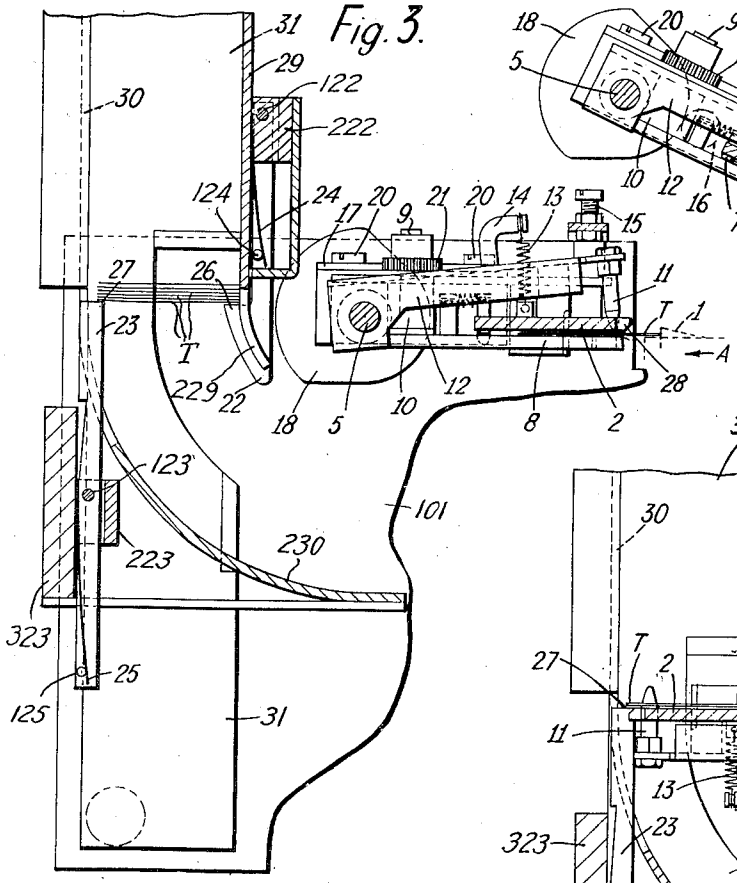


Fig. 4.

Fig. 7.

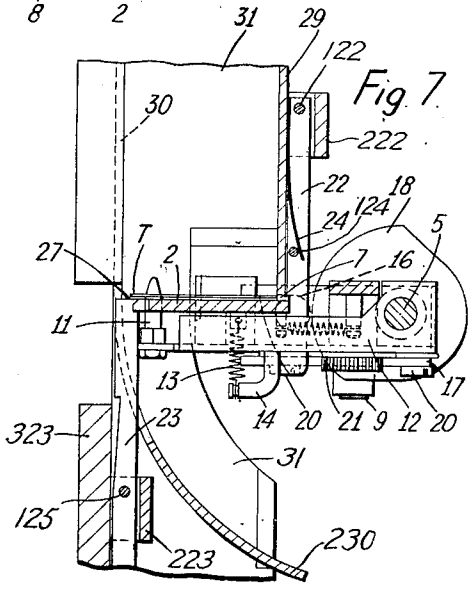


Fig. 6.

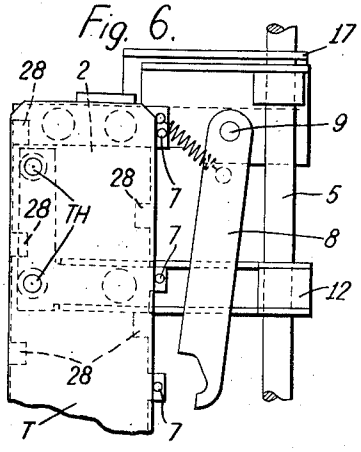
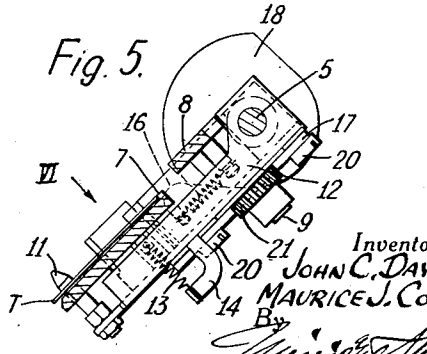


Fig. 5.



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APPARATUS FOR STACKING CARDS

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Application May 4, 1956, Serial No. 582,797

Claims priority, application Great Britain May 25, 1955

4 Claims. (Cl. 271—87)

This inventon relates to apparatus for stacking cards in a receiver as they issue one at a time from a machine.

Data is sometimes recorded on sales tags from which it is to be reproduced on record cards for use in statistical machines such, for example, as tabulators. The sales tags are, in effect record cards in miniature, but they are often of different lengths thus necessitating the provision therein of a locating hole or holes relative to which the data is recorded and by which they can be located for passage through a reproducing machine or other machine. It will be understood that although the tags are of different lengths they must all be orientated relative to their locating holes prior to a pile thereof being inserted into the reproducing machine and it is sometimes required to feed the cards a number of times in the same order. If, therefore, the cards are, as is customary, delivered from the reproducing machine into the top of a card receiver it is not only necessary to re-orientate the tags prior to their re-insertion into the reproducing machine, but it is not possible to maintain the relative disposition of the tags with relation to the locating holes therein when the tags are of different lengths. It is a main object of the present invention to provide a card stacking apparatus whereby cards of different lengths issuing from a machine may be so stacked in a receiver that they will be properly orientated therein relative to their locating holes and in a manner such that on removal of the stack from the receiver, the stack can be re-introduced into a reproducing or other machine so that the cards will be fed to the machine from the stack in the same order as that in which they were delivered to the receiver.

According to the present invention card-stacking apparatus comprises a receiver provided at the bottom thereof with latches spring-urged towards each other to retain cards in the receiver, and a card-reversing device to receive a card with one side thereof facing upwards, to locate the card relative to a locating hole therein, and to turn the card over while moving it from the position at which it is received by the reversing device and between said latches into the receiver for retention therein by the latches in a position such that the locating hole thereof is aligned with the locating holes of the other cards supported in the receiver.

In order that the invention may be clearly understood, one embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a top plan of apparatus according to the invention;

Fig. 2 is an elevation looking in the direction of arrow II, Fig. 1;

Fig. 3 is a section on line III—III, Fig. 1,

Fig. 4 illustrates, partly in section, an intermediate position of the tag-reversing device;

Fig. 5 illustrates the tag-reversing device just prior to the insertion thereby of a tag into the receiver;

Fig. 6 is a view of Fig. 5 looking in the direction of arrow VI; and

Fig. 7 illustrates a tag inserted into the receiver just prior to the reversing device being returned to the starting position thereof.

In Fig. 6 there is illustrated a portion of a small record card shown as a tag T from which it will be noted that the tag is provided with locating holes TH by which the tag is located for passage through apparatus, not shown, by which data is sensed therefrom and transmitted to a reproducing machine so that data recorded on the tag by small data-indicating perforations, not shown, can, in known manner, be reproduced in a statistical record card of normal size. The length of the tags may vary, but as the tags are all orientated relative to the holes TH therein the tags will be correctly presented for sensing.

The tags as they issue from the sensing apparatus are moved in the direction indicated by the arrow A, Fig. 3, movement of the tags being effected by any suitable means, as for example by a feeding device **1** diagrammatically illustrated in Fig. 3.

As the tag issues from the machine it is moved by the feeding device **1** beneath a plate **2**, the plate being located above and parallel to the path in which the card is moved by device **1** towards a receiver and supported by a pair of support arms **3**, **4**, Figs. 1 and 2, which are freely pivoted on a shaft **5** rockable in the side frames **100**, **101** of the machine. The rocking shaft **5** has secured thereto a pinion **6**, Figs. 1 and 2, which meshes with a rockable sector, not shown, arranged to effect rocking movement of the rocking shaft **5**. As the tag is fed beneath the plate **2**, the leading edge of the tag is engaged by stop pins **7** projecting from the underside of the plate, it being understood that at this time the tag has one side thereof facing upwards. As the tag is moved beneath plate **2** it is moved over a card-retaining member shown as an arm **8** which at this time is in the position thereof shown in Fig. 1. The card-retaining arm **8** is secured to a spindle **9** which pivots in a bush **10**, Fig. 3, carried by the support arm **4** and permits movement of the arms relative to the plate **2** in a plane parallel to that of the plate. The tag is accordingly arrested by the stop pins **7** and supported between the plate **2** and card-retaining arm **8** in the position in which it has been fed through the reproducing machine.

The plate **2** is provided with apertures which are aligned with the locating holes TH when the tag is located against the pins **7**, and when the tag is located against the pins **7**, locating elements, shown as pins **11** are moved downwards, as viewed in Fig. 3, through the apertures in plate **2** and the locating holes TH in the tag. The locating pins **11** are carried at the end of a driving arm **12** secured to the rocking shaft **5** for rocking movement therewith. Just after the tag has been located against the stop pins **7**, the rocking shaft **5** is moved clockwise, as viewed in Fig. 3, so that the driving arm **12** is moved downwards and into engagement with plate **2**, the locating pins **11** during this movement being passed through the locating holes TH in the tag. When the driving arm **12** engages the plate **2**, the plate, tag, and card-retaining arm are caused to move therewith in an arcuate path about the axis of shaft **5**. Until it is engaged by the driving arm **12** on downward movement thereof the plate **2** is retained in the position shown in Fig. 3 by a spring **13** anchored at one end to the plate and at the other end to a post **14** carried by the driving arm **12**, the plate **2** being arrested in the position shown in Fig. 3 by stops **15** carried by a bar **115** secured in any suitable manner as by screws, not shown, to the tops of frames **100**, **101**.

Continued movement of the driving arm **12** moves plate **2** and card-retaining arm **8**, together with the tag T retained therebetween, in a clockwise direction, as viewed in Fig. 3, the location of the parts at this time

being as illustrated in Fig. 4. When the plate 2 reaches the position at which it is disposed substantially vertically below the axis of the rocking shaft 5, a cam follower 16 carried by a toothed rack 17 is moved by co-operation with a stationary cam 18 thereby to effect lengthwise movement of the toothed rack 17, which, as can be seen from Fig. 1, is provided with slots 19 co-acting with shouldered screws 20 secured to the arm 4. The toothed rack 17 is slidable lengthwise relative to the arm 4 and the teeth on the rack mesh with a pinion 21 secured to the spindle 9. Accordingly, on lengthwise movement of the rack, downwards as viewed in Fig. 1, the card-retaining arm 8 is moved clockwise, as viewed in Fig. 1 to its final position in which it is substantially parallel to shaft 5. The retaining arm 8 reaches the position shown in Fig. 6 when the tag-reversing device reaches approximately the position illustrated in Fig. 5. Further movement of the tag-reversing device causes the tag to be moved by the plate 2 between latches 22 and 23 which are urged towards each other by springs 24, 25. The latches 22 are freely pivoted on a spindle 122 supported by a block 222 secured to the front wall 29 of the receiver and each latch 22 has a laterally extending pin 124 which is engaged by the free end of a spring 24, the fixed ends of the springs being clamped between the block 222 and the front wall 29 of the receiver. The latches 23 are freely pivoted on a spindle 123 supported by a block 223 which is mounted on a bar 323 secured to the ends of frames 100, 101, and each latch 23 has a laterally extending pin 125 which is engaged by the free end of a spring 25, the fixed ends of the springs 25 being clamped between the block 223 and the bar 323. The movement of the tag and plate between the latches urges the latches outwards away from each other, as viewed in Figs. 3 and 7, until the tag has been moved slightly beyond the latch faces 26, 27, when the latches, under the action of their springs 24, 25 are restored to the normal positions thereof and are located in slots 28 formed in the plate 2. The rocking shaft 5 now commences to return the tag-reversing apparatus so that the driving arm 12 is moved in a counter-clockwise direction, as viewed in Fig. 7, thus withdrawing the locating pins 11 from the locating holes TH in the tag. The plate 2 follows the driving arm 12 under the action of the spring 13, and the tag accordingly remains supported by the latches 22, 23 in the receiver which consists of the front and rear walls 29, 30 and an end wall 31, which is secured to the frame 101. The walls 29, 30 have curved lower ends 229, 230 which act as guards during movement of the plate 2 and parts movable therewith into and out of co-operation with the receiver. The fact that the locating pins have located the tag from the time that the tag is received by the reversing apparatus until it is released thereby in the card receiver, ensures that, irrespective of the lengths of the tags, all of the locating holes in the tags stacked in the receiver will be aligned with each other and as the tags stacked in the receiver are disposed with the sides thereof which were engaged by the plate 2 facing downwards, the stack can be removed from the receiver, inverted, and placed into a magazine so that the tags can be fed from the magazine in the order and side uppermost in which they were delivered to the card-reversing device.

As the card-reversing device returns to the starting position thereof illustrated in Fig. 3 the toothed rack 17 is again moved lengthwise to return the card-retaining arm 8 to the position thereof shown in Fig. 1 and when the plate 2 reaches the position thereof shown in Fig. 3 it is arrested by the stops 15, although the

driving arm 12 continues to move counterclockwise for a distance sufficient to ensure that the locating pins 11 are raised, as shown in Fig. 3, to a position at which the free ends of the pins do not protrude through the plate 2 to impede the passage of the next tag between the plate and the retaining arm 8. This continued movement of the driving arm 12, after arrest of plate 2 by stops 15, causes extension of the spring 13.

We claim:

1. Card-stacking apparatus comprising a receiver, latches located at the bottom of the receiver and spring-urged towards each other to retain cards in the receiver, a card-reversing device movable in an arcuate path to and from a card receiving position thereof in which it receives a card with one side thereof facing upwards, at least one locating element movable relative to said device to permit a card to be received by said device and to engage in a locating hole formed in the card, said locating element being also movable with said device after location thereby of a card relative to said device thereby to retain the card in the located position thereof during movement of the card by said device, and means movable relative to said device to effect movement of the locating element relative to the device and with the device to effect movement thereof in said arcuate path from the card receiving position thereby to turn over the located card and to move it between said latches for retention thereby in the receiver with said one side of the located card facing downwards and the locating hole therein aligned with the locating holes of the other cards supported in the receiver.

2. Card-stacking apparatus comprising a receiver, latches located at the bottom of the receiver and spring-urged towards each other to retain cards in the receiver, a rocking shaft, a plate freely pivoted on said shaft normally to be located above and parallel to the path in which a card is moved towards the receiver, a card-retaining member movable with and relative to said plate to retain a card in located position against the plate for movement thereby into the receiver, a driving arm secured to said shaft for movement therewith and for movement with and relative to said plate, at least one locating element carried by said driving arm and arranged by movement of the arm relative to the plate to permit a card to be received between the plate and card-retaining member and to engage in a locating hole formed in the card thereby to locate the card relative to the plate and retain it in said located position during movement of the card by the plate into the receiver, and means to effect rocking of said shaft to effect movement of the plate in an arcuate path to and from the card receiving position thereof, the movement of the plate from its card receiving position causing the located card to be turned over and moved between said latches for retention thereby in the receiver.

3. Apparatus according to claim 2, wherein the card-retaining member comprises a retaining arm supported by said plate for pivotal movement relative thereto in a plane parallel therewith, and including a pinion connected with the retaining arm to effect pivotal movement thereof, a toothed rack meshing with said pinion and supported for movement with a lengthwise movement relative to said plate, and a stationary cam co-operating with said rack thereby to cause pivoted movement of the retaining arm to and from the card retaining position thereof.

4. Apparatus according to claim 3, wherein the retaining arm is shaped partly to embrace a locating element when both the retaining arm and the locating element are in the active positions thereof.

No references cited.