Nov. 15, 1966 J. VASSE 3,285,605

CARD SUPPLY MAGAZINES

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Fig. 1

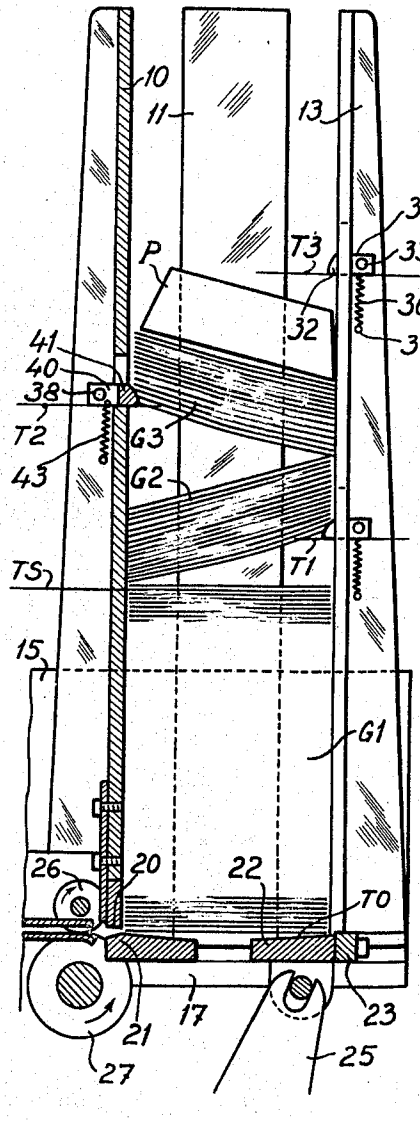


Fig. 3

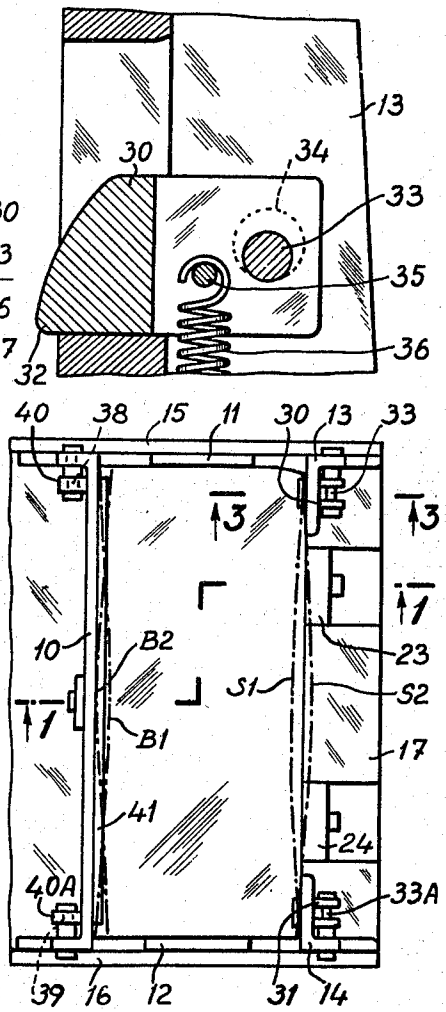


Fig. 2

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CARD SUPPLY MAGAZINES

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2 Claims. (Cl. 271—61)

The present invention relates to improvements in card supply magazines for record card machines such as sorting machines, collating machines, tabulators or other machines which process data recorded on punched cards, magnetic cards or any similar directly readable recording media.

The use of high-speed machines for processing data recorded on cards has led the designers to provide these machines with card supply magazines of large capacity in order to reduce the frequency of the operations of loading such machines.

In card supply magazines designed to contain cards stored in a vertical or slightly oblique stack, the pressure exerted by the cards in reserve on the cards situated at the bottom of the stack and in direct contact with the extraction mechanism impedes to a varying extent the sliding of the cards which are extracted from the magazine in relation to those which are retained therein.

With card extraction mechanisms of standard construction, a load of 2000 cards or even less is generally excessive and causes defective operation of the said mechanisms, resulting either in card supply failures or in "jamming," which results in more or less complete destruction of one or more cards and more or less prolonged stoppage of the machine.

In order to obviate these disadvantages, various solutions have been proposed with the object of reducing the pressure to which the cards extracted from the magazine are subjected. For this purpose, large-capacity card magazines have been constructed, in which the stack of cards is horizontal or slightly inclined in relation to the horizontal, but in these magazines, and even in those having some inclination in the direction of feed advance of the cards, specially designed means must generally be provided to ensure that the cards progress regularly towards the extraction mechanism. However, in order to retain the advantages of reduced surface dimensions and ready loading during operation of the vertical or slightly oblique card magazines, vertical magazines have also been constructed, which are provided with card-retaining means for reducing to a predetermined maximum value the pressure exerted on the cards arriving at the extraction mechanism. Large-capacity magazines designed in accordance with this latter principle generally comprise a first magazine of small capacity, which is disposed immediately above the extraction mechanism, and a second magazine disposed above the first one, either in prolongation thereof, or offset in relation thereto, depending upon the card-retaining system employed. The card-retaining system is disposed between the first and second magazines and arranged to effect automatically the transfer of cards from the second magazine to the first under the control of a device which controls the level of the cards in the first magazine, in order to maintain a substantially constant card level in the said first magazine. The latter may generally receive a load limited to 600 or 800 cards, which rests directly on the extraction mechanism, while the second magazine may receive an additional load of 2000 to 3000 cards or more.

A slightly oblique large-capacity card supply magazine provided with card-retaining means consisting inter alia of separately driven grooved drums is known. Card magazines constructed with these retaining means are

entirely satisfactory in their operation, but the mechanism is complex, heavy and costly.

The present invention relates to simple and improved means by which the cards may be retained both in vertical or oblique card supply magazines of medium capacity (up to 2000 cards) and in card supply magazines of large capacity (3000 cards and more).

The invention also concerns retaining means which in the majority of cases are readily adaptable to vertical or oblique card supply magazines which have not been designed to operate with such retaining means, and by means of which it is possible either to increase the capacity of the magazines or very substantially to improve the operating conditions of the card extraction mechanisms of the said magazines regardless of their principle. Therefore, the embodiment of the invention which will be described by way of example in order to illustrate its principle has no limiting character and any modifications, adaptations, omissions or substitutions may be made in the described retaining means and their arrangement in a supply magazine, depending upon the circumstances and applications, without departing from the principle of the invention.

Card retaining means arranged and disposed in a supply magazine according to the present invention do not in principle comprise any moving mechanical part and automatically control the progress of the cards towards the extraction mechanism as cards are extracted from the magazine by the said extraction mechanism.

Card-retaining means designed in accordance with the present invention also ensure ample "ventilation" of the cards, that is to say, in the movement of the said cards towards the extraction mechanism they are separated from one another at least once by a retaining device, whereby the operating regularity of the said extraction mechanism is improved in practice.

Retaining means according to the invention may also be specifically adapted to ensure a correct retention of cards which have a pronounced longitudinal curvature, regardless of the direction of this curvature and the manner in which the cards are guided in the magazine.

Further advantages and features of the invention will be more readily apparent from the following description, with reference to the accompanying diagrammatic drawings, in which:

FIGURE 1 is a vertical section along the line **1—1** of FIGURE 2 through a medium-capacity vertical supply magazine,

FIGURE 2 *is* a plan view of the magazine of FIGURE 1, and

FIGURE 3 is a detail drawn to a larger scale and taken in section along the line **3—3** of FIGURE 2.

In the card magazine illustrated in FIGURES 1 and 2, the cards are guided by a vertical front wall **10**, lateral guides **11** and **12** and rear uprights **13** and **14** secured and assembled together by lateral plates **15** and **16** fast with the bed **17** of the machine. In the following description, those parts of the machine which need not be illustrated for an understanding of the invention will not be described. A stack of cards disposed in the magazine is shown in FIGURE 1 divided into three groups G1, G2 and G3 separated at least partially from one another by the action of retaining lugs disposed in the magazine at levels T1 and T2 above the base of the magazine, level T0. Retaining lugs **30** and **31** (FIGURE 2) are disposed at a level T3 (FIGURE 1). A weight P rests (FIGURE 1) on the group of cards G3, which is in the upper part of the stack, in order to ensure in principle the correct extraction of the last card by a knife-type extraction mechanism which is illustrated in section at the bottom of the card magazine (FIGURE 1). However, card extraction mechanisms, and more particularly pneumatical-

ly assisted mechanisms, are known in which the presence of a weight is unnecessary. The illustrated extraction mechanism (FIGURES 1 and 2) is a mechanism whose general arrangement is known. It comprises knives **23** and **24** secured to a slidable plate **22**. An adjustable throat knife **20** and a fixed throat plate **21** control the delivery of the cards one at a time. The cards of the group G1 and the cards of the group G2 partly rest (FIGURE 1) on the throat plate **21** and the cards of the group G1 also partly rest on the movable plate **22**, which is fast with the extraction knives. The movable plate **22** is mechanically coupled to a rocking lever **25** which is actuated in known manner by a cam, an eccentric or another device for the extraction of cards. Each time the knives of the extraction mechanism are reciprocated under the stack of cards by the action of the lever **25**, the card resting directly upon the knife plate is pushed through the throat and engaged between the card-driving rollers **26** and **27**, which engage them in the machine. While one card is being extracted from the magazine, the card situated immediately above it is retained in the said magazine by the throat knife **20** and may be extracted in the next movement of the knives.

As will hereinafter be shown, the card-retaining lugs may be adapted in their shape and arrangement to the dimensions, the configuration or the rigidity of the cards, and to the particular features of a magazine.

The retaining lug **30** illustrated in FIGURES 1, 2 and 3 comprises (FIGURE 3) a nose **32** which projects into the interior of the magazine and of which the shape, width and position are made such as to ensure, on the one hand, a good retention of the cards and on the other hand a regular escape of the cards, without damaging them. In order that cards deposited in the magazine may, if necessary, be manually withdrawn, the retaining lugs may be automatically retracted under the action exerted from the bottom upwards on the noses of the said lugs by cards lifted manually in the said magazine. In one embodiment of this condition, the lug **30** is mounted (FIGURE 3) on a pin **33** upon which it can rock. The pin **33** is secured to the upright **13** of the magazine by means of a bearing surface **34**, eccentric in the said upright, which permits, by rotation about its axis in one direction or the other, of varying the relative position of the pin **33**, which can then be locked in a chosen position which determines the amount of projection of the nose of the lug into the interior of the magazine and by means of which the extent of the retaining action exerted by the said lug on the cards can thus be adjusted. In order automatically to ensure the return into the retaining position of a lug which has been lifted under the action of cards withdrawn from the magazine, the lug **30** is provided with a spring **36** which is engaged at one end with a short rod **35** fast with the said lug and at the other end with a fixed dog **37** fast with the upright **13** of the magazine (FIGURE 1).

In a card magazine, the cards are guided at the front, i.e. on the throat side, where the cards are ejected, either by relatively narrow guide elements, for example similar to the uprights **13** and **14**, disposed at the rear of the described magazine, or by means of a wall which is either completely imperforate or imperforate only up to a certain level.

In FIGURES 1 and 2, there is illustrated a magazine provided at the front with a wall **10** which is imperforate over its entire height. This arrangement is fairly commonly found in forwardly inclined card magazines for affording a wide support for the cards. These considerations concerning the various ways in which the cards are guided in magazines are of no importance for the determination of the retaining means when the machine is employed only with sufficiently flat cards, but when it may be necessary to use cards having a considerable curvature in the direction of their length, it is advantageous, as will hereinafter be shown, to provide retaining means whose shape and arrangement are adapted to meet various requirements, owing to the inclination of the cards in the groups of cards retained by lugs. It will be assumed, that the cards are guided in a card magazine, at least from a level TS slightly below the mean upper level of the cards of the group G1, by narrow uprights similar to the uprights **13** and **14**, both at the front and at the rear of the magazine. In this case, the retaining lugs disposed at the front and at the rear at different levels in the magazine may all be of similar type to the lug **30** which has been described and ensure a good retention of the cards whether they be flat or curved in the direction of their length. If the retained cards are guided by an imperforate wall such as the wall **10** (FIGURES 1 and 2), it will be advantageous for the retaining lugs mounted on this wall to be shaped and arranged specifically to meet this requirement, for example as follows: at the level T2, in the imperforate wall **10** (FIGURES 1 and 2) is disposed a retaining lug **41** consisting of a bar which extends over almost the entire width of the magazine and which is provided at its ends with projections **40** and **40A** adapted to pivot about two adjustable pins **38** and **39** similar to the pins **33** and **33A** of the lugs **30** and **31** disposed at the rear of the magazine at the level T3. A spring **43** is engaged (FIGURE 1) with the projection **40** of the lug **41** and performs the same function as the spring **36** of the lug **30** (FIGURES 1 and 3). It is also possible to provide lugs which are automatically returned into position by their own weight. In order to facilitate the following explanation, it will be assumed (FIGURE 2) that the weight P (FIGURE 1) is omitted and that the group of cards (G3) which is retained (FIGURE 1) by the lug 41, is reduced to one or a few cards all having the same longitudinal curvature. It is fairly frequently observed that, either by the action of the relative humidity of the air on some of the cards, or as a result of deformations received as they pass through certain machines, it happens that record cards are appreciably curved longitudinally either in one direction or in the other, that is to say, they have a concave curvature in their upper face (readably record side) or a concave curvature in their lower face (back of the card). A transverse curvature, i.e. one affecting the smallest dimension of the cards, is much less troublesome and can at the very most make it necessary to provide a more pronounced projection of the lugs into the magazine. FIGURE 2 shows in plan view, in dash-dotted lines, the relative positions of the forward and rear edges of cards resting on retaining lugs, depending upon whether these cards are longitudinally curved so as to be concave on their upper face or concave on their lower face. It will be assumed, for example, that a card of the group G3 is concave on its lower face and is resting on the bar of the lug 41 at the level T2. In this case, the forward edge of the card, i.e. that edge of the card which is on the throat side in the magazine, will have a position represented by the line B2 (FIGURE 2), and it will then be the ends of the card that will rest on the ends on the bar of lug 41. In the contrary case, i.e. if the card is concave on its upper face, the line B2 (FIGURE 2) shows that it is the centre point of the forward edge of the card which rests on the centre point of the bar of the lug 41. It will be observed that equivalent card-retaining conditions may be provided by means of a number of lugs (of the same type as the lugs **30** and **31**) disposed in line at the level T2, one of these lugs retaining by each end the cards which are concave on their lower face and one or more other lugs being so disposed as appropriately to retain at their centre point the cards which are concave on the upper face. In order to examine the conditions under which longitudinally curved cards are retained by means of simple lugs mounted on narrow guiding uprights, there will be considered, for example, cards of the group G2 which are retained at the level T1 by lugs fast with the uprights

13 and 14. The forward edge of these cards rests completely or partly on the forward portion of the stack of cards of the group G1, while the rear edge of the cards of the group G2 rests on the lugs (FIGURES 1 and 2). In the case of cards which are concave on their lower face, the rear edge of the cards takes the form illustrated in plan view by the line S1 (FIGURE 2), while in the case of cards which are concave on their upper face the line S2 shows that these cards advance through the space between the uprights 13 and 14 and that in both cases the ends of the cards rest correctly on the retaining lugs fast with the uprights.

The operation of the whole retaining arrangement will readily be appreciated on reference to the diagrammatic drawing of FIGURE 1. As cards are extracted by the extraction mechanism disposed at the bottom of the magazine, the upper level of the cards of the group G1 descends and cards of the group G2 leave the retaining dogs disposed at the level T1 and join the cards of the group G1 thus automatically retaining the upper level of the stack of cards of this group at a constant level. In the same way, the upper level of the cards of the group G2 descends and cards of the group G3 leave the lugs, or the lug, of the level T2 and join the cards of the group G2, and so on in the case of the cards of the following groups. Magazines of very large capacity can thus be constructed. By way of example, for a vertical magazine of medium capacity for record cards having standard dimensions and rigidity, the level T1 may be situated about 150 millimetres above the level T0 of the knife plate and the distances between successive retaining levels T1–T2 and T2–T3 may be about 50 millimetres, the retaining lugs projecting about 2 millimetres into the interior of the magazine.

In the constructional example which has been described, the first retaining level T1 is shown above the knives in FIGURE 1, but it is obvious that the first retaining level may equally well lie above the throat, the lugs of the other levels also being offset, depending upon whether it is considered preferable to load the throat side more than the knife side or vice versa. Likewise, in the case of card magazines inclined in the direction of the feed advance of the cards, or in the opposite direction, the card-retaining levels may be irregularly offset from one another in order, for example, to impart to cards of the different groups an appropriate inclination in relation to the vertical.

I claim:

1. A magazine for the supply of record cards, wherein a stack of cards is guided by a front guide means and a rear guide means, these means being substantially vertical above the base of the magazine, which comprises an extraction mechanism for advancing the cards one at a time in the direction of their smallest dimension or width, and comprising in addition at least two lug devices, each comprising one or more lugs projecting into the interior of the magazine, a first one of these lug devices being situated in one of the said guide means on a retaining line parallel to the said base and above a chosen upper level to limit a lower stack of cards, and the second one of the said lug devices being disposed in the other one of the said guide means above the first lug device so as to retain an approximately predetermined quantity of cards, said magazine being characterized in that each lug of each lug device is urged by a spring against a fixed bearing member to project into the interior of the magazine in such manner that an action exerted upwardly on that portion of the said lug which projects into the magazine, by cards manually lifted in the said magazine in order to be extracted therefrom, forces out of the magazine the said portion of the lug normally projecting into the magazine, which portion is thereafter returned to its normal position under the action of the said spring.

2. A magazine for the supply of record cards according to claim 1, wherein each lug of each lug device is pivotally mounted on a lug pin which is secured to an upright for guiding the stack of cards by means of an eccentric cylindrical bearing surface, by means of which the relative position of the lug pin can be modified and the distance to which the said lug projects into the interior of the magazine may thus be modified, the said magazine comprising in addition locking means for securing the said lug pin in a predetermined angular position.

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