

Dec. 31, 1929.

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1,741,992

QUICK SETTING DEVICE FOR BRUSH HOLDERS

Filed Sept. 30, 1926

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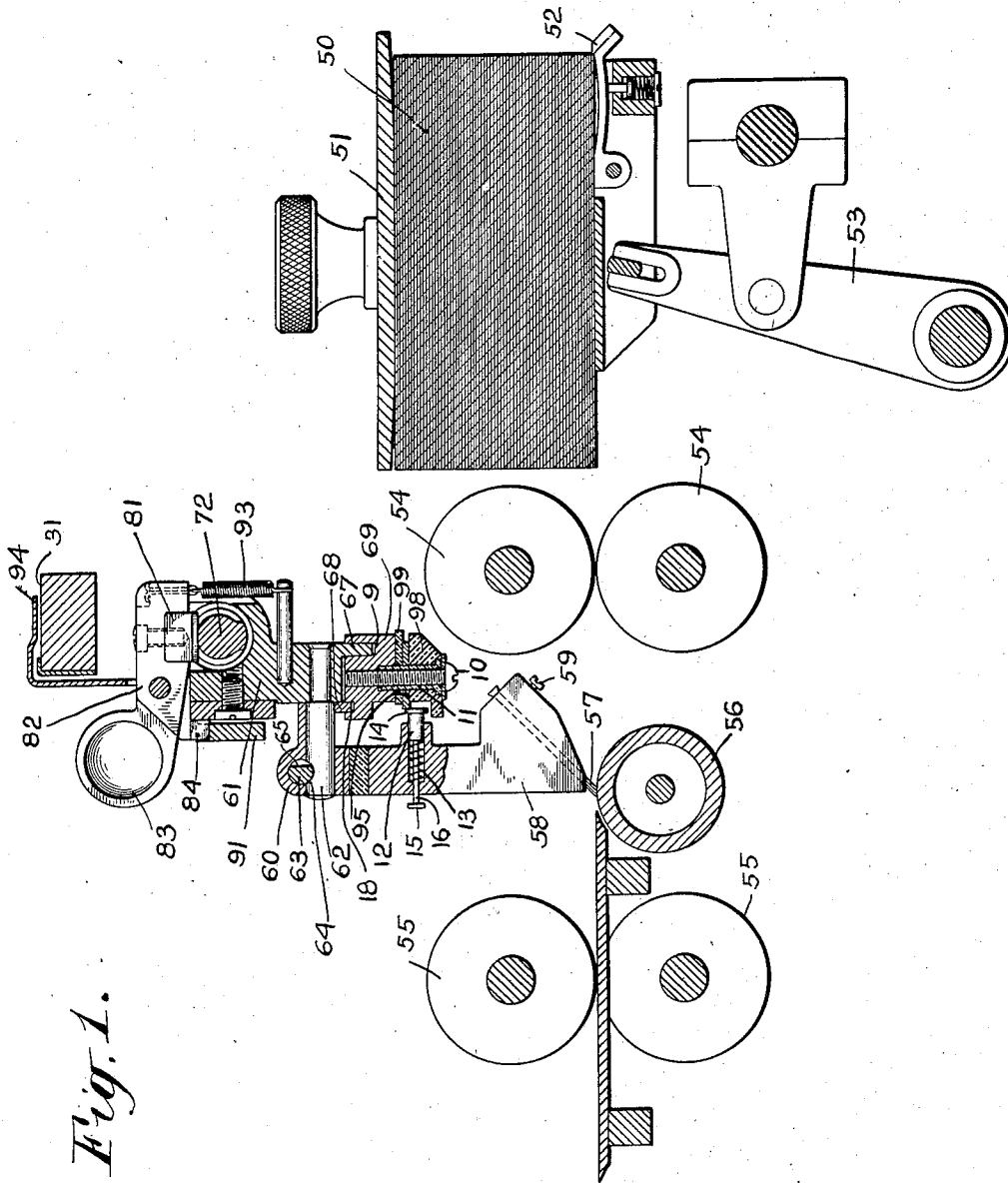


Fig. 1.

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Dec. 31, 1929.

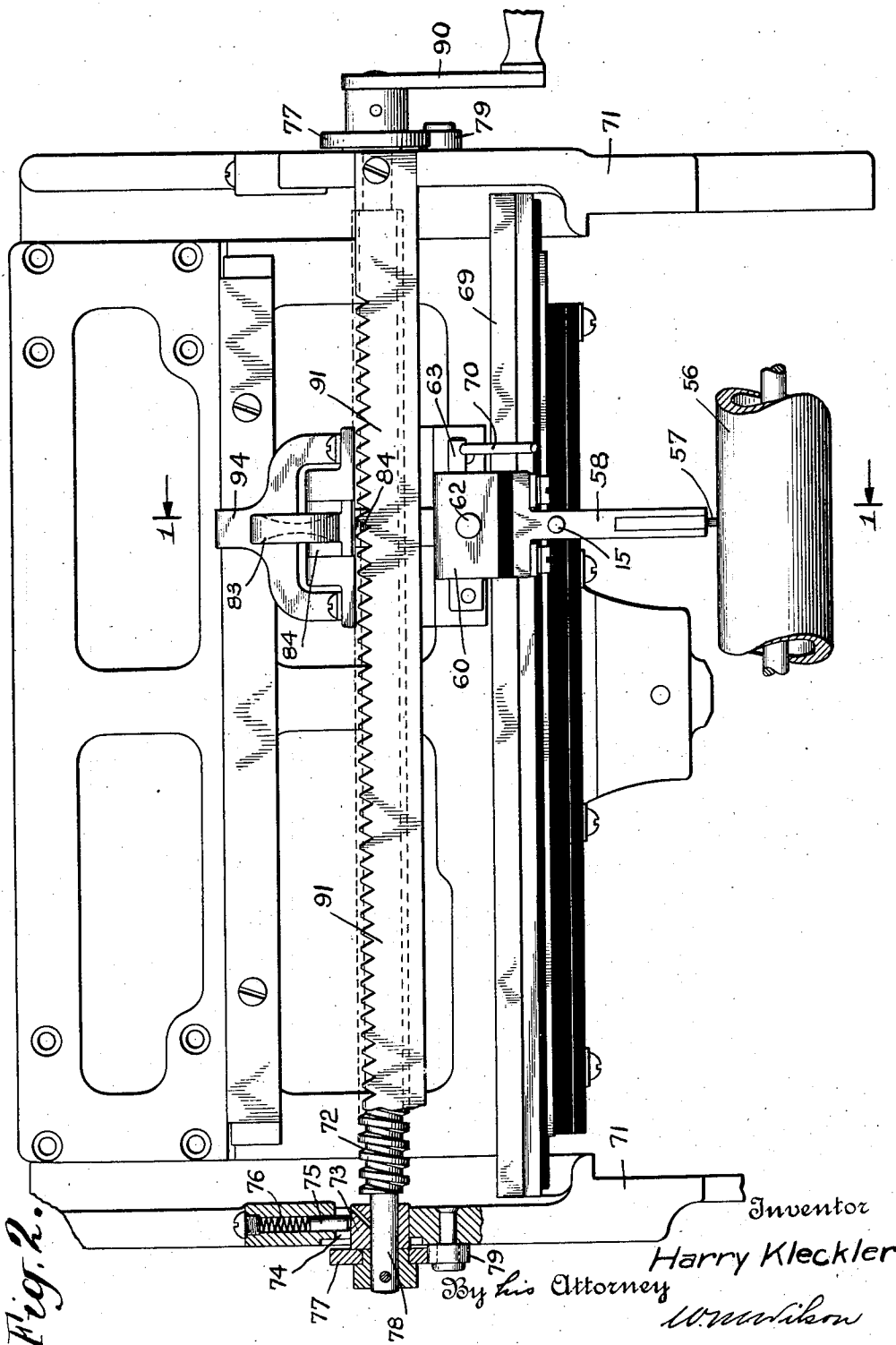
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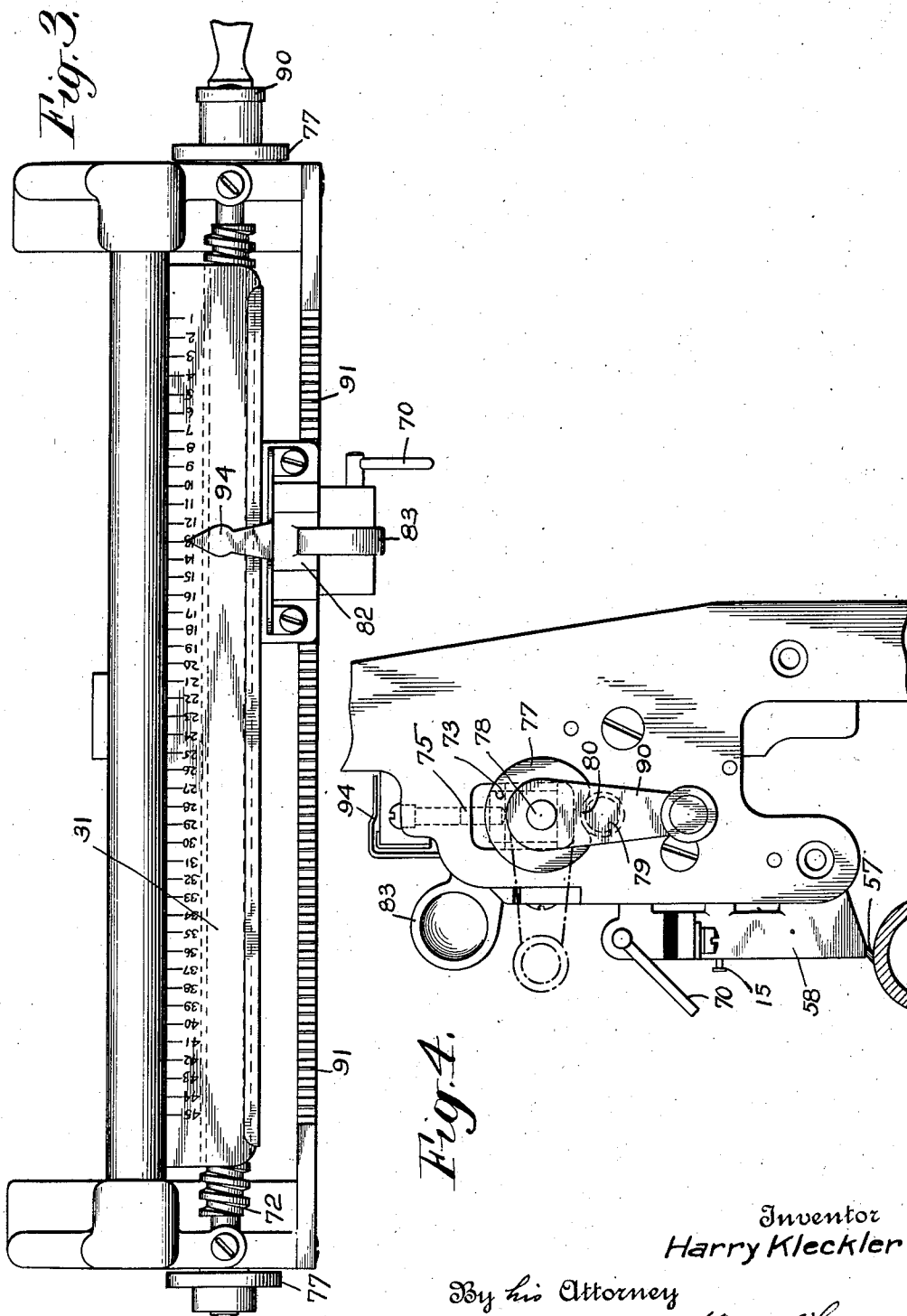
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UNITED STATES PATENT OFFICE

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QUICK-SETTING DEVICE FOR BRUSH HOLDERS

Application filed September 30, 1926. Serial No. 138,795.

The invention concerns analyzing mechanisms for record sorting machines and has for its principal object to increase the facility and insure accuracy of operation in the setting of such devices.

Another object of the invention is to provide an analyzing mechanism which can be quickly and accurately set to any desired analyzing position.

Another object of the invention is to provide a coarse and fine adjustment for the analyzing mechanism to permit it to be quickly and accurately set to any desired position.

Another object of the invention is to provide for accurately and automatically centering the analyzing mechanism in a selected analyzing position when it is manually moved to the vicinity of such a position thereby obviating tedious manual setting to the exact position.

Another object of the invention is to provide an improved brush holder construction permitting the brush holder to be readily removed from its supporting structure but to prevent accidental removal when the structure is in operation.

Another object of the invention is to provide an improved and novel system for energizing the brushes of an accounting machine.

Another object of the invention is to provide an improved analyzing mechanism supporting structure to permit movement of the structure into and out of operating position in a straight line.

Sorting machines are used to separate records into groups conforming to certain classification data on the records. The commonest form of records which are sorted by these machines consists of cards divided into columns each of which may represent a desired class of data and which may be perforated in selected positions to indicate particular data pertaining to the class. These perforations in the card columns represent possible classifications of the cards and it is often desirable to separate all cards of a given classification from a group or to arrange the cards in order according to a predetermined classification scheme. The function of the sorter is to thus separate or classify the record cards.

The majority of sorters now in commercial use analyze a single card column at a time only one analyzing element being provided which may be adjusted to cooperate with any desired card column. Sorters are of two general types, namely mechanical ones which analyze the perforations by moving a pin through the perforations to set a system of levers and electrical ones in which a brush makes electric contact whenever it encounters a perforation to close a control circuit. In either case the setup effected by the analyzing device selects a particular destination for the card depending on the position of its perforation. In other words, as the card passes the analyzing mechanism it automatically selects a discharge rack for itself corresponding to the classification represented by the position of its perforation. If the classification data includes more than one card column successive sortings are necessary to arrange the card according to the complete classification. This sorting mechanism is well known to the art and will not be described in detail, the present invention being limited to the analyzing device.

The invention is applicable to mechanical as well as electrical sorters although by way of example it is herein disclosed as applied to an electrical machine of the Hollerith type, in which the analyzing is done electrically by a conducting brush beneath which the cards are fed. As these machines are ordinarily provided with only one analyzing brush it is necessary to shift this brush into cooperative relationship with the different card columns which it is desired to analyze. The present invention provides for manually shifting the mechanism by means of a coarse or a fine adjustment and provides for accurately centering and positively holding the analyzing brush in position to search the desired card column. The fine adjustment consists of a feed screw which when operated feeds the brush supporting mechanism through small distances which can be very accurately adjusted owing to the differential action of the feed screw. The coarse adjustment permitting the brush supporting mechanism to be moved quickly through large distances con-

sists of a releasable connection to the feed screw so that the brush supporting device can be removed from operative connection therewith and quickly moved to the vicinity of a new position whereupon release of the disconnecting mechanism will permit the device to automatically reengage the feeding screw. The brush supporting mechanism is positively held in any of its analyzing positions by means of a tooth or projection thereon engaging with a dentated member whose teeth are so shaped as to accurately center the device to the nearest analyzing position.

The invention may be most clearly understood from the following detailed description which should be read in connection with the accompanying drawings in which the same reference characters refer to the same parts throughout the several views and in which

Fig. 1 is a diagrammatic illustration of record feeding mechanism with the analyzing brush and its supporting structure shown in section;

Fig. 2 is a front elevation of the analyzing section of the sorter;

Fig. 3 is a top plan view of the same and Fig. 4 is a side elevation.

Referring to Fig. 1, a group of record cards indicated at 50, which are to be sorted in accordance with the perforations in one of their columns, is shown in a card rack indicated generally at 51 with a suitable picker 52 and picker operating mechanism 53. The picker 52 when the machine is in operation is adapted to feed the cards one at a time to the feed rolls 54 and 55 of which the former feeds them to the analyzing mechanism and the latter removes them therefrom after they have been analyzed. The feed rolls are so spaced that the card is in continuous motion while it is being analyzed and after passing the analyzing brush it is continued in motion by additional feed rolls (not shown) until deposited in the proper discharge rack selected by the analyzing mechanism. This mechanism is well known in the art and needs no further description.

The analyzing mechanism located between the rolls 54 and 55 consists of a conducting cylinder 56 on whose surface rests a brush 57 mounted in a brush holder 58 by means of a set screw 59 permitting its ready removal and replacement. The brush holder 58 has an upper part 60 insulated from the brush holder proper and drilled to fit on a stud 62 attached to a brush holder support 61. The stud 62 is provided with a groove 64 with which a shaft 63 when in the position (shown in Fig. 1) cooperates to firmly lock the brush holder to the stud. The shaft 63 is rotatable by a handle 70 (Fig. 2) and is provided with a flat surface 65. When the shaft 63 is turned to present its flat surface to the stud 62 the brush holder may be freely removed from the supporting structure although by other

means to be hereinafter described such removal is prevented whenever the brush 57 is in contact with the cylinder 56.

The brush supporting structure 61 is supported on a feed screw 72 extending longitudinally of the machine frame 71 and journaled at each end in floating bearings 73 which are movable vertically but restrained horizontally in slots 74 in the machine frame. The bearings 73 are resiliently held at the bottom of the slots by small cylinders 75 urged downwardly by springs 76. The feed screw is thus normally held in its lowermost position but may be raised against the action of springs 76. A driving connection between the feed screw and the brush support 61 is provided in an element 81 mounted on a pivoted member 82 which is biased by a spring 93 to force its lower edge into the grooves of the feed screw threads. The pivoted member 82 is provided with a handle 83 through which it may be rotated against the force of the spring 93 and remove the element 81 from driving connection with the feed screw. Rigidly fastened to the machine frame 71 directly in front of the brush supporting mechanism is a dentated plate 91 with whose teeth a tooth 84 formed on the brush support 61 co-acts to hold the support in any analyzing position in which it is fed. Sufficient lost motion is provided between the feed screw and the brush holder support so that the tooth 84 will accurately seat itself in one of the teeth on the member 91 thus holding it firmly and centering it in an analyzing position.

The feed screw 72 has a cam 77 on each end thereof which as may be seen in Fig. 4 consists generally of a cylindrical surface with a small depression 80 therein. These cams cooperate with rollers 79 pivoted on the machine frame 71 and when the operating handle 90 of the feed screw is rotated the rollers acting on the cams 77 cause the feed screw 72 to rise against the action of the springs 76 and the screw in rising lifts the brush holder support 61 removing the tooth 84 thereon from the teeth of the plate 91. Rotation of the handle therefore causes the support 61 to feed along the feed shaft 72 and raises it out of locking position. A single revolution of the handle 90 will feed the brush holder and its support into a position permitting the tooth 84 thereon to engage the next tooth in the plate 91, and at the end of the stroke the feed screw 72 will be again lowered owing to the co-action between the depression 80 in the cam 77 and the rollers 79 permitting the tooth 84 to seat in the adjacent notch in the plate 91 and hold the brush supporting structure firmly at its new position. The feeding connection between the feed screw 72 and the supporting structure 61 may be removed by rocking the member 82 around its pivot by means of the handle

83 to carry the member 81 out of the grooves of the screw threads on the feed screw 72. When thus rocked, if the member 61 is raised at the same time to disengage the tooth 84 from the plate 91 the brush support 61 can be freely moved along the feed rod 72 and when released will automatically reengage the feed screw and accurately set itself in a new analyzing position. This arrangement permits the brush support to be fed slowly by the operating handle 90 or to be shifted quickly by hand to different parts of the feed screw thus providing for fine and coarse adjustment of the analyzing brush.

The brush holder support 61 is guided in its longitudinal movements by a member 69 which extends between and is supported by the end structures of the machine frame 71. This member is provided with a deep groove 9 into which fits an extending flange 67 on the brush support 61. The groove extends substantially the entire length of the member 69 and therefore guides the brush holder and brush support accurately throughout its entire longitudinal travel. The groove 9 is deep enough and the flange 67 long enough to maintain guiding connection regardless of whether the feed shaft 72 and consequently the brush holder is in its raised or lowered position. This groove and flange cooperating with the feed shaft and the slots 74 in the machine frame also assist in guiding the brush holder and its support in its up and down movement and prevent its rotation about the feed shaft 72. This guide mechanism causes the brush 57 to center on a straight axial line of the cylinder 56 and permits it to be removed from and applied to the cylinder in a direction normal to the surface thereof.

The brush 57 is energized from a long conducting plate or rail 95 which is fastened to the guide 69 and insulated therefrom by insulating members 98 and 99. The conductor and the insulating members are secured to the guide member by suitable screws 10 provided with insulating bushings 11. The brush holder 58, which is of conducting material and in electrical contact of the brush 57, carries a contact member 12 mounted in a shouldered aperture in the brush holder and forced into contact with the conducting rail by a spring 13. The contact 12 is provided with an enlarged head 14 to permit it to maintain contact with the conducting rail 95 in the raised as well as the lowered position of the brush holder. The contact may be yieldingly held out of engagement with the conducting rail by a hand button 15 at the end of a shank 16 which is integral with the contact 12 and extends through the brush holder. This construction insures a firm electrical connection between the energizing rail and the brush holder regardless of irregularities in the contacting edge of

the conducting rail and permits the energizing circuit to be temporarily broken at will and thereafter automatically reestablished.

The guide member 69 is provided with another groove 18 into which extends a projection 68 on the upper portion 60 of the brush holder. This groove and projection while permitting the brush holder to slide freely in response to setting operations prevents its removal from the stud 62 as long as the brush 57 is in contact with the cylinder 56. It is then impossible, regardless of the position of the locking shaft 63, to remove the brush holder from its support as long as it is in analyzing position. When the brush holder is raised vertically the projection 68 clears the slot 18 within the limits of the upward movement of the brush holder permitting the latter to be readily removed from its support 61 on release of the locking mechanism 63.

The analyzing positions of the brush 57 are fixed for cards of a given type as the brush must traverse the center line of possible perforations in a column. The present feeding mechanism is designed so that a single turn of the feeding handle 90 will feed the brush from the center line of one card column to the center line of the next adjacent one, and the teeth on the plate 74 are designed to accurately center the brush in proper analyzing position whenever the feed shaft 72 is released to the actions of the spring 76. The sloping sides of the tooth 84 coact with the sloping sides of the teeth in the member 91 serving to guide the tooth 84 to the bottom of the slot between adjacent teeth and accurately centering it. The teeth on the part 91 are designed so that when the tooth 84 is moved from one slot to the next adjacent one the brush 57 will move from the center line of one card column to the center line of an adjacent card column.

The position of the brush 57 is visually indicated by an index 94 mounted on the brush holder support 61 coacting with a scale engraved on a plate 31 on top of the machine casing. The present machine is designed to analyze cards having 45 columns and there are 45 graduations on the scale corresponding to the different card columns.

The present machine then provides a quick and accurate method of adjusting the analyzing brush to any desired card column. If it is desired to shift from one column to the next, it is merely necessary to turn the adjusting handle 90 one revolution whereupon the brush will be automatically centered for the adjacent column. This adjustment is used for columns either adjacent or close to each other in which one or several revolutions of the handle will quickly adjust the brush to its desired position as indicated on the scale on plate 31. When the analyzing brush is to be shifted from one card column to a

distant one the driving connection between the feed shaft 72 and the brush holder support 61 is removed by rocking the lever 82 through the handle 83. At the same time the brush holder may be raised to disengage the locking tooth 84 from the teeth of plate 91. The brush holder and its support may then be moved freely the entire length of its feed if desired and released at any desired point whereupon it will automatically lock itself in the nearest analyzing position and automatically resume driving connection with the feed screw 72. Owing to the compact arrangement of the device this entire group of operations can be readily performed with one hand.

The invention has now been described as applied to a complete operative embodiment of the same and it should be understood that the construction shown is intended in an exemplary sense only and that many modifications and rearrangements will readily occur to those skilled in the art. For example the invention is quite as applicable to a mechanical sorter as to an electrical one. I intend to be limited therefore only as indicated by the scope of the following claims.

I claim:

1. An adjustable analyzing device for accounting machines comprising an analyzing element, supporting means therefor and means for independently effecting a coarse and a fine adjustment of said element on its supporting means.

2. An adjustable analyzing device comprising an analyzing element, supporting means therefor, means for independently effecting a coarse and a fine adjustment of said element on its supporting means and means for positively locking said element in its adjusted positions.

3. An adjustable analyzing device comprising an analyzing element, a support therefor, a differential device for accurately adjusting said device on its support and releasable means operatively connecting said element to said differential device to permit manual adjustment of said element independently of the differential device.

4. An adjustable analyzing device comprising an analyzing element, a support therefor, a differential device for accurately adjusting said device on its support, yieldable means normally connecting said element to said differential device for driving action and means for temporarily disconnecting said element from said differential device to permit manual adjustment of said element independently of the differential device but permitting automatic reengagement of said device with said differential on release thereof.

5. An adjustable analyzing device comprising an analyzing element, a support therefor, an adjusting mechanism for adjusting said device on said support, locking means for

holding said element in any adjusted position and means controlled by said adjusting mechanism for positively releasing said locking means to permit free movement of the analyzing element to a new adjusted position.

6. An adjustable analyzing device comprising an analyzing element, a support therefor, an adjusting mechanism for adjusting said device on said support, locking means for holding said element in any adjusted position and means controlled by said adjusting mechanism for positively releasing said locking means during an adjusting operation and causing it to become positively effective at the termination of an adjusting operation.

7. An adjustable analyzing device comprising an analyzing element, a support therefor, an adjusting mechanism for adjusting said device on said support, locking means for holding said element in any adjusted position, means for constantly urging said locking means to locking position and means controlled by said adjusting mechanism for releasing said locking means during an adjusting operation to permit free movement of the element to its new position.

8. An adjustable analyzing device comprising a support, an analyzing element mounted thereon for longitudinal movement thereof, movable supporting members for said support to permit lateral movement of said element and locking mechanism for said element to hold it against longitudinal movement said mechanism comprising operating means to render said locking mechanism effective in one position of said support and to release it in an alternative position.

9. An adjustable analyzing device comprising a support, an analyzing element mounted thereon for longitudinal movement thereof, yieldingly movable supporting members for said support biased to a normal operative position and a locking device for said element comprising releasing mechanism operated by the movement of said supporting member from normal operative position.

10. An adjustable analyzing device comprising a movable analyzing element, a feed screw therefor, and driving connections between said feed screw and movable element comprising means for releasing the driving connection to permit movement of the element independently of the feed screw.

11. An adjustable analyzing device comprising a movable analyzing element, a feed screw therefor and driving connections between said feed screw and element comprising means for releasing the driving connection to permit movement of the element independently of the feed screw and means for yieldingly holding said connections in driving position.

12. An adjustable analyzing device comprising a support, an analyzing element mounted thereon for longitudinal movement

thereof, and movable supporting members for said support to permit movement of said element out of analyzing position while it is being adjusted.

13. An adjustable analyzing device comprising a support, an analyzing element mounted thereon for longitudinal movement thereof, movable supporting members for said support to permit movement of said element out of analyzing position while it is being adjusted and means for normally biasing said element into analyzing position.

14. An adjustable analyzing device comprising a movable analyzing element, a feed screw therefor, driving connections between said element and the feed screw, and laterally movable bearings for said screw to permit movement of said analyzing element out of analyzing position during feeding operations.

15. An adjustable analyzing device comprising a movable analyzing element, a feed screw therefor, driving connections between said element and said feed screw, laterally movable bearings for said screw to permit movement of said element out of analyzing position during feeding operations and means for yieldingly urging said element to analyzing position.

16. An adjustable analyzing device comprising a movable analyzing element, a feed screw therefor, driving connections between said element and said feed screw, laterally movable bearings for said screw to permit movement of said element out of analyzing position and means operated by said feed screw to move said element out of analyzing position during feeding operations.

17. An adjustable analyzing device comprising a movable analyzing element, a feed screw therefor, driving connections between said element and said feed screw, laterally movable bearings for said screw to permit movement of said element out of analyzing position and means operated by said feed screw to move said element out of analyzing position during feeding operations and returning it thereto at the termination of such operations.

18. An adjustable analyzing device comprising an analyzing element movable longitudinally to a plurality of analyzing positions and movable laterally out of operative analyzing position, a feed screw for said element, driving connections between said element and said feed screw, laterally movable bearings for said screw to permit lateral movement of said element while maintaining driving connection and means operated by said screw in longitudinally feeding said device for moving it laterally between analyzing positions.

19. An adjustable analyzing device comprising an analyzing element mounted for longitudinal and lateral movement; a stationary guide member provided with a slot for

restraining said element to its longitudinal path and a telescoping connecting means between said element and said guide for maintaining guiding cooperation therebetween on lateral movements of said element, said connecting means including a member fast to said element and projecting into said slot.

20. An adjustable analyzing device comprising an analyzing element mounted for longitudinal and lateral movement, a common stationary guide member for restraining said element to its longitudinal and lateral paths and a telescoping connecting means between said element and said guide member for maintaining guiding cooperation therebetween.

21. An adjustable analyzing device comprising an analyzing element mounted for longitudinal and lateral movement, a common stationary guide member for restraining said element to its longitudinal and lateral paths, said guide member comprising a guiding surface and a coacting projection on said element of sufficient length to engage said surface in any lateral position of said element.

22. An adjustable analyzing device comprising an analyzing element mounted for longitudinal and lateral movement with means for limiting the lateral movement, a guide member for restraining said element to its longitudinal and lateral paths provided with a groove and a projecting flange on said element engaging in said groove, said groove and flange having dimensions in the direction of lateral displacement of said element sufficient to maintain guiding cooperation throughout the extent of lateral movement of said element.

In testimony whereof I hereto affix my signature.

HARRY KLECKLER.