Nov. 7, 1961 J. H. LEGO 3,007,400

PRINTING APPARATUS AND METHOD FOR ASSEMBLY

Filed Dec. 4, 1958 3 Sheets-Sheet 1

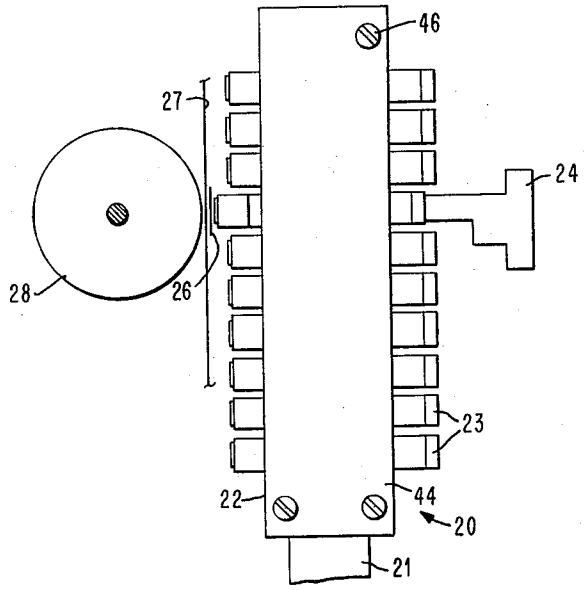

FIG. 1

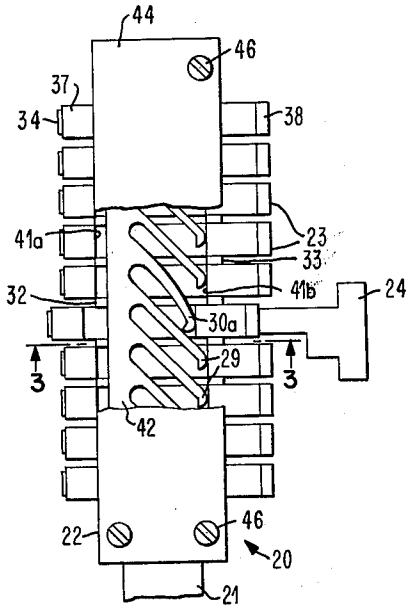

FIG. 2

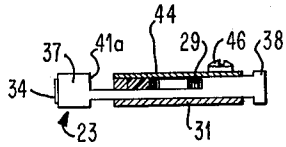

FIG. 3

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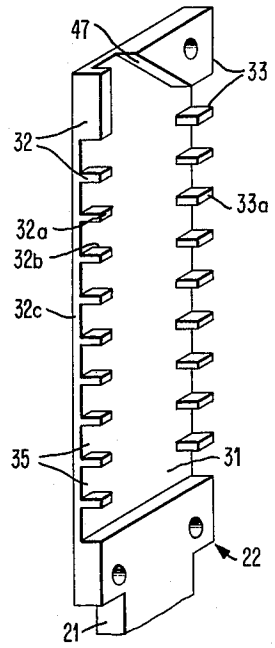

FIG. 4

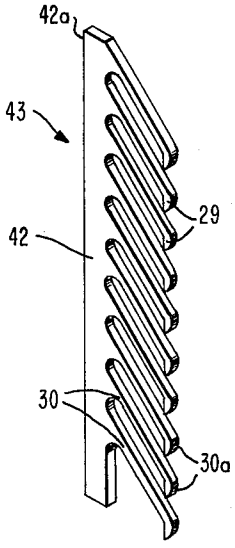

FIG. 5

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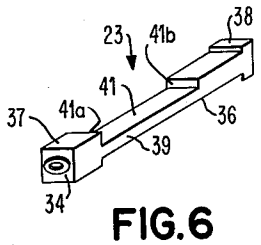

FIG.6

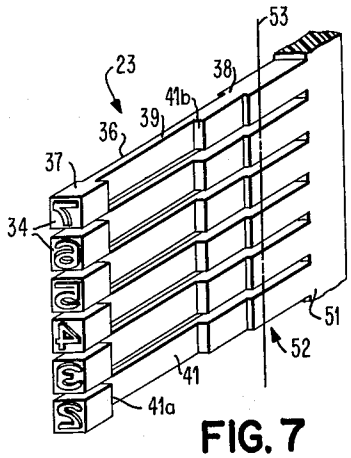

FIG. 7

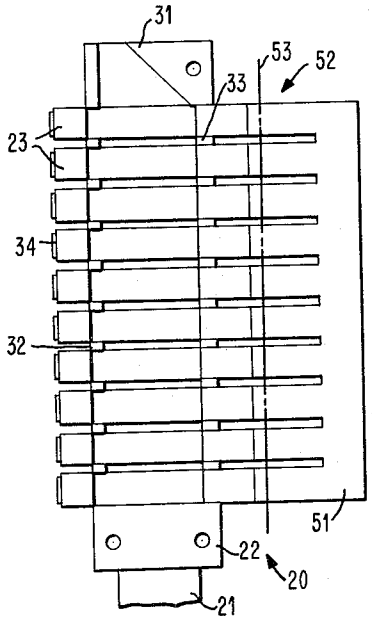

FIG.8

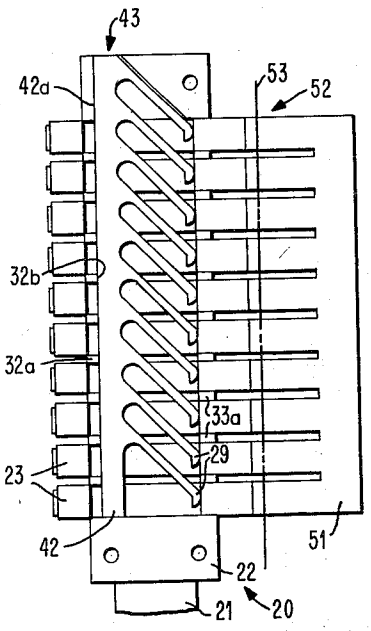

FIG.9

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PRINTING APPARATUS AND METHOD FOR ASSEMBLY

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Filed Dec. 4, 1958, Ser. No. 778,166
4 Claims. (Cl. 101—109)

The invention relates to type bar apparatus and method for assembling the same which are adapted for use in printing machines and record card controlled tabulating and accounting machines and, more particularly, to type bar apparatus and method for assembling the same wherein type elements are disposed within a type element carrier and biased in a particular position with respect to the carrier.

In the past, efforts have been made to provide type bar assemblies of the kind including a plurality of type elements disposed within a type element carrier and means for biasing said type elements in a "home" position with respect to the type element carrier which are less expensive, of simpler, construction, and more effective in operation. In attempting to achieve these objectives, type bar assemblies have been devised wherein the individual type elements are biased in the "home" position by a common biasing means. While this form of construction generally reduced the cost of the biasing elements and the cost for assembling the type bars, the resultant type bar assemblies were not as effective in operation as in the instance where the individual type elements are biased separately.

In the present invention, the effectiveness of operation has been preserved but the cost of the elements comprising the type bar assemblies and the method for constructing the same has been greatly reduced. The effectiveness of the operation of the type bar assemblies has been preserved by providing individual elements for biasing associated individual type elements. However, the individual biasing elements are commonly connected in a novel manner to facilitate easier assembly of the type bars and thereby greatly reduce their cost.

While the novel arrangement of the commonly connected individual biasing elements results in a substantial reduction of cost for the type bars, still greater savings are derived through a novel method for assembling the type bars. To further enhance the value of the novel arrangement of the commonly connected individual biasing elements, a novel method for assembling the type bars has been provided wherein the individual type elements are molded in a manner to be properly spaced from each other and so that they will be oriented in their respective positions as occupied in the type element carrier. The individual type elements are maintained in their pre-oriented positions by a common connecting strip. In this manner, the type elements are capable of being inserted into the type element carrier as a unit in a single step and still occupy their proper relative positions.

With the type elements properly inserted into the type element carrier, the commonly connected individual biasing elements are inserted as a single unit so that the individual biasing elements become associated with the individual type elements to urge the same in the "home" position. After the commonly connected individual biasing elements are inserted, the cover for the type element carrier is attached to contain the type elements and biasing elements in place. To complete the type bar assembly, the common connecting strip is disconnected or severed from the individual type elements to leave the same free to be selectively moved or reciprocated relative to the type element carrier to effect a print impression.

Accordingly, a prime object of this invention is to provide an improved type bar assembly which is relatively inexpensive.

Another object of this invention is to provide an improved type bar assembly which is of simple construction.

Still another object of this invention is to provide a type bar assembly having individual type elements biased by individual biasing elements which are commonly connected.

The feature of providing an improved method for assembling type elements into a type element carrier is disclosed herein and is claimed in a copending division application Serial No. 806,827 filed April 16, 1959, now U.S. Patent No. 2,935,018, dated May 3, 1960.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of examples, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

FIG. 1 is a side elevational view of the type elements mounted within the type element carrier and showing one of the type elements displaced by a plunger toward a piece of paper interposed between an inked ribbon and platen,

FIG. 2 is a side elevational view of the type bar assembly with a portion of the cover plate broken away to expose the commonly connected spring elements,

FIG. 3 is a sectional view taken on the line 3—3 in FIG. 2,

FIG. 4 is a perspective view of the channel member of the type element carrier for containing the type elements,

FIG. 5 is a perspective view of the commonly connected spring elements,

FIG. 6 is a perspective view of one of the type elements,

FIG. 7 is a perspective view of the spaced commonly connected pre-oriented type elements ready for insertion into the type element carrier,

FIG. 8 is a side elevational view of the type elements positioned within the type element carrier as a first step in the assembly of the type bar, and

FIG. 9 is a side elevational view of the spring elements positioned to bias the type elements in the home position in the type element carrier as a second step in the assembly of the type bar.

Referring to the drawings, the invention is illustrated, by way of example, in FIG. 1 with a type element carrier **20** comprising a vertical bar **21** provided with a head element **22** fixed thereto at one end thereof and with individual type elements **23** mounted in the head element **22**.

The type element carrier **20** is adapted to be moved in a vertical direction to present any one of the individual type elements **23** at a printing position or in alignment with a selectively operable plunger **24**. When the plunger **24** is actuated, it engages the aligned type element **23** to carry the same forward from a home position into contact with an inked ribbon **26** to create an impression of the face of the type element **23** upon a piece of paper **27** disposed between the ribbon **26** and a platen **28**.

As the plunger **24** carries the aligned type element **23** forward, an associated spring element **29**, as seen in FIG. 3, is compressed so that, upon disengagement of the plunger **24**, the type element **23** is returned or restored by the associated spring element **29** to the home position.

The head element **22** of the type element carrier **20**, shown in greater detail in FIGS. 3 and 4, comprises a channel member **31** wherein opposite sides **32** and **33** of the channel member **31** have slots **35** to accommodate the type elements **23** in a manner to permit the same to slide therein.

The individual type elements 23, FIGS. 6 and 7, have a face portion 34 and an I-shaped body portion 36. Flanges 37 and 38 of the I-shaped body portion 36 generally serve to limit the degree of horizontal movement of the type elements 23 relative to the head element 22 of the type element carrier 20. A web portion 39 of the I-shaped body portion 36 is provided with a channel 41 having sides 41*a* and 41*b* to receive the associated biasing or spring element 29.

The spring elements 29, FIGS. 3, 5 and 9, are identical in shape and may be formed of resilient material such as the commercially available thermoplastic materials Lexan or Delrin. The spring elements 29 are parallel spaced from each other at an angle and commonly connected at one end 30 while free at the other end 30*a*. The spring elements 29 are commonly connected at the ends 30 by a tie member 42 which may be formed integral with the spring elements 29 to form a comb-shaped biasing member 43, as in FIG. 5. The individual spring elements 29 and common connecting tie member 42 are adapted to reside in the channels 41 of the associated type elements 23 positioned in the head element 22 of the type element carrier 20 so as to be either flush with or below the upper surfaces 32*a* and 33*a* of the sides 32 and 33 of the channel member 31, as in FIGS. 2, 3 and 9. While it is not critical that the type elements 23 and spring elements 29 and common connecting tie member 42 do not extend above the upper surfaces 32*a* and 33*a* of the sides 32 and 33 of the channel member 31, such an arrangement permits the use of a flat cover plate 44 to hold the spring elements 29 and common connecting tie member 42 within the channels 41 of the type elements 23. It also prevents the type elements 23 from dropping out of the slots 35 in the sides 32 and 33 of the channel member 31. The plate 44 may be secured to the channel member 31 by any suitable fastening means such as screws 46.

The channel member 31 may be closed at both ends to prevent longitudinal displacement of the common connecting tie member 42 for the spring elements 29. Alternatively, the channel member 31 may be closed at one end or the end connected to the vertical bar 21 and provided with an angular shaped plate 47 fixed to extend inwardly therefrom at the other end so as to be parallel with and lie adjacent to the spring element 29 at said other end, as in FIG. 4.

Under the arrangement of apparatus just described, each type element 23 will be individually biased in the home position by an associated spring element 29. With the type elements 23 disposed in the slots 35 in the sides 32 and 33 of the channel member 31, the spring elements 29, together with the common connecting tie member 42, are positioned so that the free end 30*a* of the springs 29 abut the side 41*b* of the channel 41 of the associated type element 23 and the outer edge 42*a* of the common connecting tie member 42 abuts the inner face 32*b* of the side 32 of the channel member 31. By this arrangement, the type elements 23 cannot be displaced from the head element 22 because, even through the spring elements 29 are urging the type elements 23 rearward, the flanges 37 of the type elements 23 engage the outer face 32*c* of the side 32 of channel member 31 to be restricted thereby from further rearward movement. In the instance when the plunger 24 carries the aligned type element 23 forward, the associated spring element 29 is compressed; however, the flange 38 of the type element 23 prevents overstressment of the associated spring 29 and the displacement of the type element 23 from the channel member 31. Upon the return of the plunger 24, the type element 23, which had been carried forward thereby, will be urged rearward to the home position by the associated spring element 29, which had been compressed as the type element 23 was carried forward by the plunger 24.

The type elements 23, described above, may be molded from any suitable material such as the same material that is used for molding the spring elements.

While the foregoing describes the novel structure of the type bar assembly which illustrates the present invention, the following describes a novel method for assembling the type bar.

The type elements 23 are molded in pre-oriented positions and commonly connected by a tie member 51, as shown in FIG. 7. After the individual type elements 23 are molded, they are maintained in their pre-oriented positions by the common connecting tie member 51. The type elements 23, which appear in their proper relative positions, are placed as a unit 52 into the channel member 31 of the head element 22 so that the faces 34 of the type elements 23 lie outwardly from the side 32 of the channel member 31, the body portions 36 of the type elements 23 reside in the slots 35 in the sides 32 and 33 of the channel member 31 and the terminal flanges 38 of the type elements 23 and common connecting tie member 51 lie outwardly from the side 33 of said channel member 31, as in FIG. 8.

With the type elements 23 properly positioned with respect to the head element 22 of the type element carrier 20, the spring elements 29 or biasing member 43 is placed as a unit into the channels 41 of the type elements 23 to become associated therewith and so that the free end 30*a* of each spring element 29 bears against the side 41*b* of the channel 41 in the associated type element 23 and the connecting tie member 42 abuts against the inner face 32*b* of the side 32 of the channel member 31. The type elements 23 are now individually biased by the individual spring elements 29; however, the type elements 23 are still commonly connected by the common connecting tie member 51. The cover plate 44 may now be positioned and attached to the channel member 31 of the head element 22 so that the type elements 23 and spring elements 29 are prevented from falling out of the type element carrier 20.

With the cover plate 44 properly secured to the channel member 31, the individual type elements 23 may become physically disassociated from each other by severing the common connecting tie member 51 therefrom along the line 53. The flanges 38 of the type elements 23 extend to the common connecting tie member 51; hence, when severing the type elements 23 from the common connecting tie member 51, the cut is made so as to leave a proper flange 38 for each of the type elements 23. After the type elements 23 are disconnected from the common connecting tie member 51, the type bar is completely assembled and ready for use, as shown in FIG. 1.

From the above, it is seen that a type bar assembly has been provided with a novel structure for biasing the type elements in the home position relative to the type element carrier.

Further, it is seen that the type bar assembly so described is relatively inexpensive and effective in operation.

Also, it is seen that a novel method of assembly has been provided to further reduce the cost and time of assembling the type bar.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A type bar assembly comprising: a type element carrier having a base and spaced apart slotted side members extending at right angles therefrom; a plurality of type elements, each having a type face, a body portion and a terminal end slidably disposed in said slotted side members to span the spacing therebetween and extend out-

wardly therefrom, said body portion of said type elements being provided with a central channel having opposite side walls and flanges inwardly adjacent to said type face and terminal end to restrict relative movement of the type elements relative to said type element carrier; and a plurality of spring elements, each having two ends with one of the ends thereof commonly connected and the other end being free, said spring elements adapted to be positioned within said channel of said type elements so that the commonly connected ends of the spring elements abut one of the slotted side members of the type element carrier and the free ends abut one of opposite side walls of said central channel to bias the type elements in a home position.

2. A type bar assembly comprising: a comb-shaped biasing member having a plurality of spaced a part spring elements connected to project from a common member; a plurality of type elements, each being recessed to accommodate said common member and one of said spring elements; and a type element carrier adapted to contain said type elements and said biasing member so that each type element is biased in a predetermined position relative to the type element carrier by said one of said spring elements accommodated thereby.

3. A type bar assembly comprising: a comb-shaped biasing member having a plurality of spaced apart spring elements fixed parallel to each other and at an angle to project from a common member; a plurality of type elements, each being provided with an open channel having opposite side walls; and a type element carrier adapted to slidably contain said plurality of type elements in a manner that the type elements are parallel longitudinally spaced from each other and to contain said biasing member so that the common member thereof is restrained against movement and the spring elements engage one of the side walls of said opposite side walls of the channel in

said type elements to urge the associated type elements in a predetermined position relative to said type element carrier.

4. A type bar assembly comprising a type element carrier; a plurality of type elements slidably disposed in said type element carrier; and biasing means for biasing each type element of said plurality of type elements in a home position relative to said type element carrier, said biasing means comprising a composite structure of a common connecting member and a plurality of spring elements connected at one end to said common connecting member and free at the other end, said plurality of spring elements being so disposed relative to said common connecting member as to be capable of deflection in the plane of said composite structure, said composite structure being oriented relative to said type element carrier and said plurality of type elements so that said common connecting member abuts against said type element carrier and the free end of each spring element of said plurality of spring elements abuts against an associated type element whereby, upon axial movement of said type elements, said spring elements are deflected in the plane of said composite structure and thereafter return said type elements to said home position.

References Cited in the file of this patent

UNITED STATES PATENTS

423,576	Shucker	Mar. 18, 1890
950,029	Roberts	Feb. 22, 1910
1,150,801	Alexander	Aug. 17, 1915
1,810,089	Schmutz	June 16, 1931
2,076,713	Ford	Apr. 13, 1937
2,606,491	Wockenfuss	Aug. 12, 1952
2,619,900	Stuivenberg	Dec. 2, 1952
2,730,945	Anderson	Jan. 17, 1956
2,802,418	Carver et al.	Aug. 13, 1957