

May 29, 1951

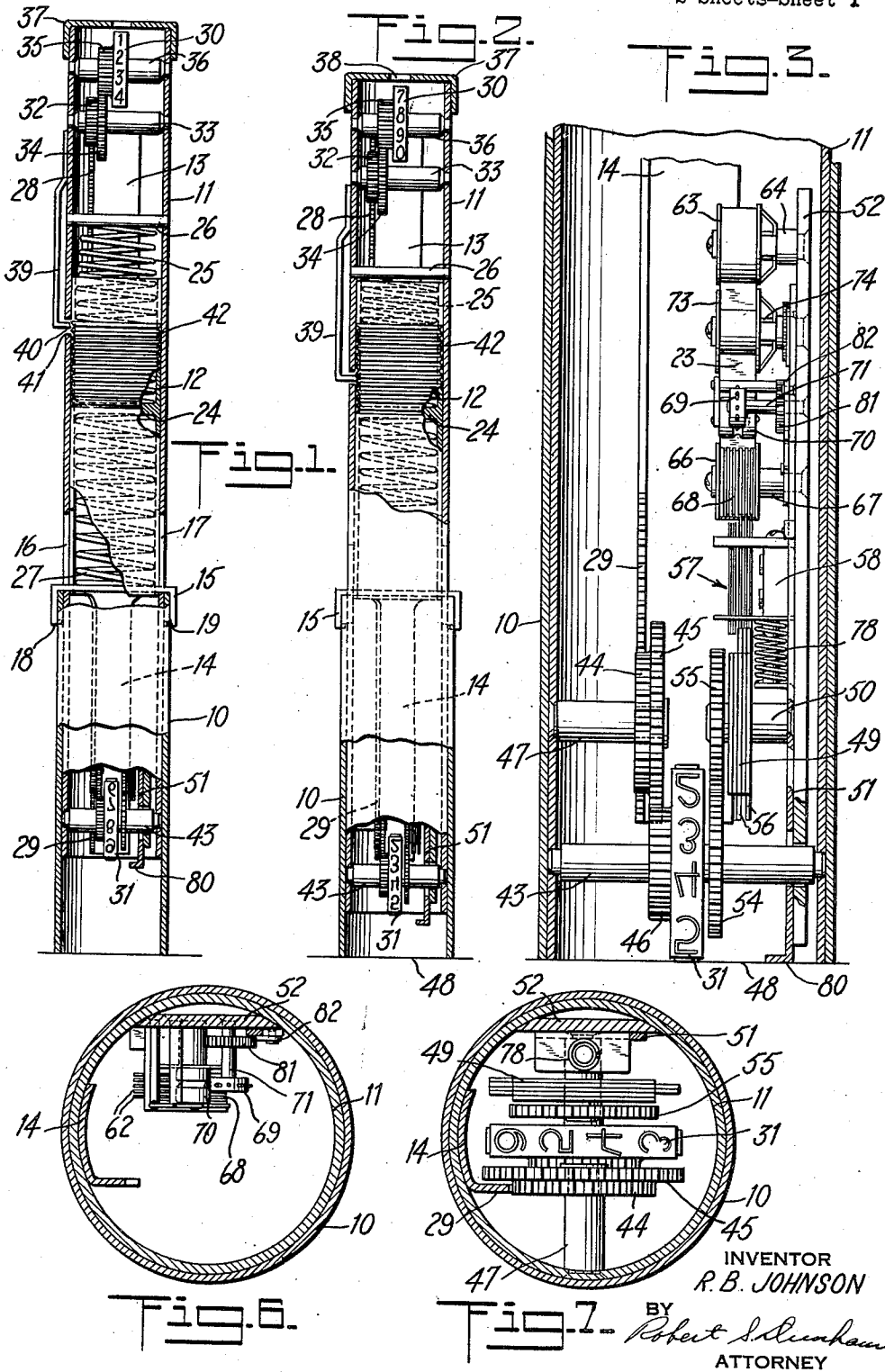
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2,554,707

PRINTING AND PUNCHING DEVICE

Filed Nov. 24, 1947

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

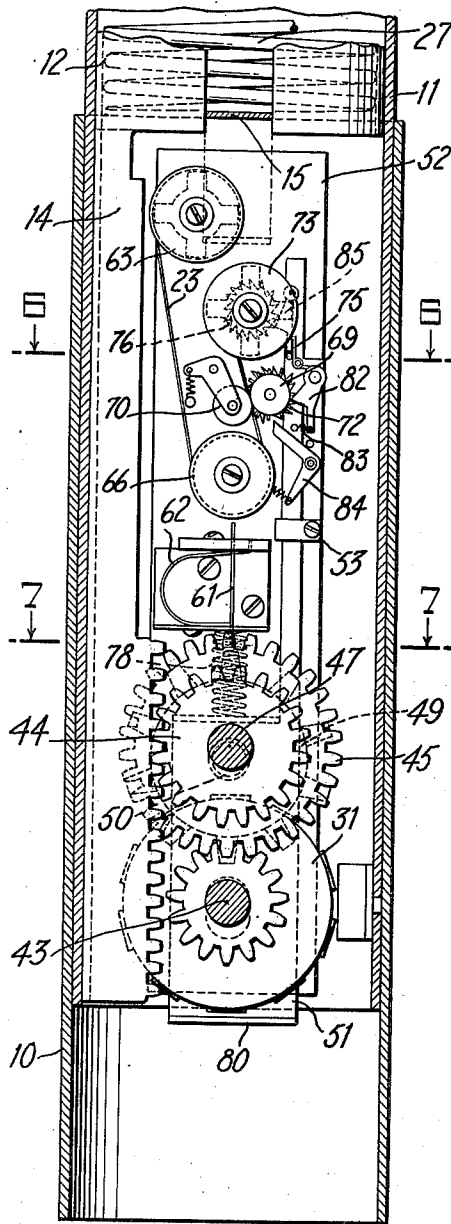


Fig. 5.

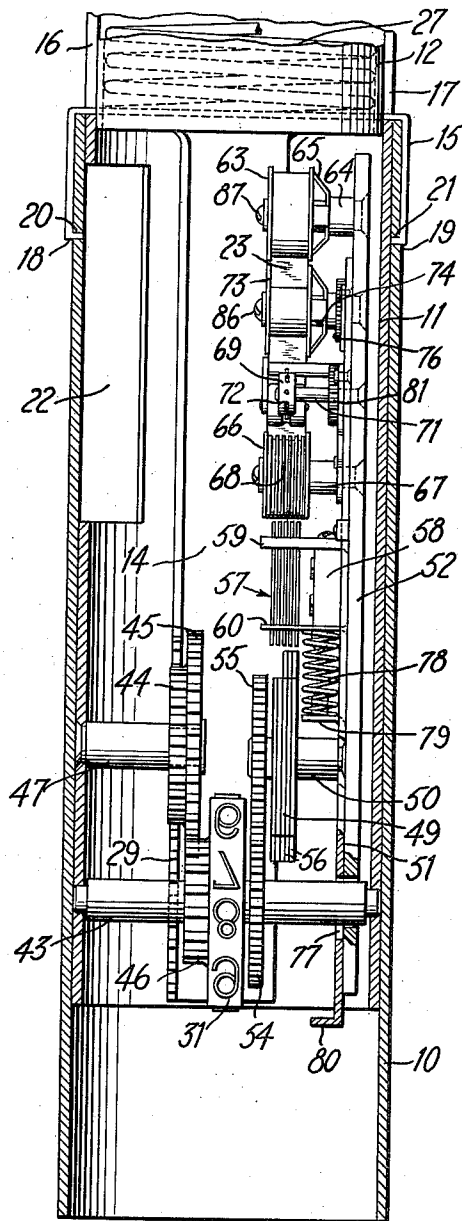


Fig. 4.

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PRINTING AND PUNCHING DEVICE

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13 Claims. (Cl. 101—19)

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This invention relates to recording devices, and, more particularly, to a device having marking mechanism or a record-punching mechanism, or both, and whereby any one of several characters may be selected at will and recorded.

Among the objects of the invention is to provide a recording device having a marking or printing wheel which is settable at will to record upon any desired surface and which includes mechanism for making and retaining a punched record of the character selected on the printing wheel upon operation of the device to effect printing.

Another object of the invention is to provide a manipulative device having an indicator and recording mechanism which are settable simultaneously through pressure applied by an operator to thereby render effective for recording a selected character upon further application of pressure to the device.

Another object of the invention is to provide a manipulative device including three telescopic sleeves, one of the sleeves serving as a base or support for resting the device on a surface during a marking or printing operation, the second sleeve carrying an indicating wheel and a marking wheel and the third sleeves carrying actuators for said indicating and marking wheels, said sleeves being normally extended by the action of springs, said second sleeve being adapted to be telescoped with respect to the other sleeves for selecting a desired character on the indicating and marking wheels and said second and third sleeves being adapted to be telescoped with respect to said first sleeve for effecting a marking operation. A further object of the invention is to provide in a manipulative device of the kind described, punch-actuating mechanism selectively settable with the setting of the indicating wheel and actuatable for perforating a record corresponding to the selected character upon relative movement of the second and third sleeves with respect to the first or supporting sleeve.

Other objects of the present invention will be hereinafter set forth in the accompanying specification and claims and demonstrated by the drawings which show by way of illustration a preferred embodiment of the principle of the invention and the best mode in which I have contemplated applying that principle.

In the application of the invention illustrated in the accompanying drawings, the invention is embodied in a manipulative device having a printing wheel and a punch-actuator which are capable of being set to any one of a number of posi-

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tions which are representative of different grades or classes and then further operated to print the selected character and at the same time record the selected character in perforated form and in accordance with a code which is representative of the selected character. The device is provided with a record tape and tape-actuating mechanism. The selected character is impressed upon a tape which is advanced to space the recordings. The tape constitutes a permanent record of the several characters which have been printed by the device. The tape may be removed and preserved for future reference.

The device is useful for printing a rating on examination papers and for other applications such as in segregating different articles and packages by marking them according to class or route numbers. The records made on the tape provide a means by which the various recorded grades may be averaged and by which the papers of each grade or the articles of each class may be totaled by subsequently passing the tape through a machine for automatically reading and interpreting the perforations.

In the drawings:

Fig. 1 is a vertical view of a device embodying the invention, with parts broken away for more clearly showing the interior;

Fig. 2 is a view similar to Fig. 1 but showing the device when a character has been selected preliminarily to recording;

Fig. 3 is an enlarged view of the lower end of the device showing the printing and punching mechanism in recording positions;

Fig. 4 is an enlarged view of the lower end of the device as illustrated in Fig. 1;

Fig. 5 is a sectional view of the device illustrated in Fig. 4 as viewed from the left of Fig. 4;

Fig. 6 is a horizontal section on line 6—6 of Fig. 5, and

Fig. 7 is a horizontal section on line 7—7 of Fig. 5.

The device includes three telescopically slideable sleeves, a base or supporting sleeve 10, a manipulating sleeve 11 whose lower ends telescope within sleeve 10, and an inner sleeve 12 within sleeve 11 and which has upper and lower extensions or legs 13 and 14 respectively. Sleeves 11 and 12 are arranged for relative movement whereby a desired character may be selected.

The lower end of sleeve 11 is joined to the supporting sleeve 10 by a spring clip 15 which extends through the longitudinally extending slots 16 and 17 of the sleeve 11 and has resilient ends 18 and 19 which extend laterally to engage re-

cesses 20 and 21 in the supporting sleeve 10. The supporting sleeve 10 may be disconnected from the sleeve 11 by rotating the sleeves with respect to each other to thereby disengage the laterally extending ends of the clip 15 from their respective recesses 20 and 21. By removing sleeve 10 from the lower end of sleeve 11 an opening 22 is uncovered, Fig. 4. The opening 22 is provided in sleeve 11 for the purpose of gaining access to the recording tape 23 and tape-carrying spools as will be described hereinafter.

The manipulative sleeve 11 is provided with a shelf 24 which is fixed with respect to the sleeve and constitutes a seat for the lower end of a spring 25, Figs. 1 and 2. The upper end of the spring 25 bears against a pin 26 which is staked to the sleeve 11. The sleeves 11 and 12 are normally extended outwardly with respect to one another as illustrated in Fig. 1 by the action of spring 25.

One end of a spring 27 within the sleeve 12 bears against the underside of the shelf 24 and the other end bears against the spring clip 15. Spring 27 normally holds and supports sleeve 12 in extended relationship with respect to sleeve 10.

The elasticity of each of the springs 25 and 27 is such that when manual force is applied to the sleeve 11 to move the sleeve with reference to the sleeve 12 for selecting a character, the sleeve 12 will remain sufficiently extended with respect to the sleeve 10 for permitting the selection of any of all of the available characters before the sleeve 12 is fully collapsed with respect to the sleeve 10 and recording is effected.

The inner sleeve 12 carries extensions or legs 13 and 14 at its upper and lower ends respectively. Legs 13 and 14 carry racks 28 and 29 from which the indicating wheel 30 and the printing wheel 31 are respectively operated. The indicating and printing wheels are mounted on the sleeve 11. When the sleeve 11 is moved relatively to the sleeve 12, the rack 28 drives a pinion 32 which is staked to a shaft 33. Shaft 33 is mounted in bearings in the sleeve 11 and carries a gear 34 which meshes with a pinion 35 on shaft 36 to which the indicating wheel 30 is attached. A cover 37 is provided at the upper end of sleeve 11 and has an opening 38 through which a selected indicia on wheel 30 may be observed.

For selecting a desired indicia the operator presses sleeve 11 downwardly against the action of spring 25 and this causes the relatively stationary rack 28 to rotate the indicating wheel 30 in proportion to the downward travel of the sleeve 11 with a respect to the sleeve 12. The sleeve 11 is provided with a spring finger 39 having a laterally extending lip 40 which may be pressed by the operator through an opening 41 in the sleeve 11. The inner sleeve 12 is provided on its exterior with a series of grooves 42 which correspond in number to the number of characters or indicia on the indicating wheel 30. When the sleeve 11 is pressed downwardly and the desired character appears at opening 38 the operator presses spring finger 39 to engage the lip 40 with a groove 42 corresponding to the character selected. This action has the effect of locking together sleeves 11 and 12 as shown in Fig. 2.

The printing wheel 31 is fastened to a shaft 43 which is mounted for rotation in the lower end of sleeve 11. As sleeve 11 is moved from its upper extended position, Fig. 1, to a selected lower position as illustrated in Fig. 2, the printing

wheel 31 is rotated a proportionate amount whereby a selected character is positioned in printing position. This is accomplished by a train of gears including a pinion 44, gear 45 and a pinion 46, the latter being staked to shaft 43. Pinion 44 and gear 45 are mounted on a stud shaft 47 which is supported by sleeve 11. As sleeve 11 descends during the character-setting operation, pinion 44 is rotated as it travels over the relatively stationary rack 29 on the lower leg 14 of the sleeve 12. The characters on the wheel 31 may be for either dry or wet marking. In the latter case an inking pad is suitably mounted on the sleeve 11 to apply ink to the characters on the wheel.

After the indicating wheel 30 and the marking wheel 31 have been set as previously described, printing may be effected upon a surface 48 against which the supporting sleeve 10 is pressed. With the sleeve 11 and the sleeve 12 locked together as illustrated in Fig. 2, the application of additional pressure on the sleeve 11 will cause the racks 28 and 29 to be carried downwardly against the action of spring 27 until the selected indicia on the printing wheel 31 is brought against the surface 48, as illustrated in Fig. 3.

The setting of the printing wheel also effects setting of a pin-box actuator 49 which is rotatably mounted upon a stud shaft 50, carried by a slide 51. Slide 51 is held against a plate 52 by a guide 53 which is fastened to the plate. The plate 52 is secured to the sleeve 11 by welding along its longitudinal edges. A gear 54, fixed to shaft 43, meshes with gear 55 which selectively positions the pin-box actuator 49, in accordance with the setting on the printing wheel 31.

The actuator 49 constitutes a code wheel having a plurality of discs with teeth 56 extending therefrom in predetermined sectors about the several discs. Any desired number of discs may be provided and the teeth may be arranged thereon in accordance with any desired code. For example, for recording ten ordinals, five discs may be used, one for each of five ordinals, each disc being divided into ten equal sectors. With the discs arranged in the order of ordinals 1, 2, 0, 1 and 5, the first disc may have teeth in sectors 1, 3 and 4 for recording a value of "one." The second disc may have teeth in sectors 2, 3 and 4 for recording a value of "two." The third disc may have teeth in all ten sectors to assure a continuous row of perforations in the tape whereby the tape may be driven and to record a value of "zero" in the sector which is devoid of teeth on the other discs. The fourth disc representing the value of "one" may have teeth in sectors 4, 6 and 9 and the fifth disc representing the value of "five" may have teeth in sectors 5, 6, 7, 8 and 9. Thus, when the actuator 49 has been set to record a code value for six, the third, fourth and fifth discs will present teeth in a common sector for engaging the three right hand pins in pin-box 57, as illustrated in Fig. 3.

The pin-box 57 is supported from a bracket 58 which is fastened to plate 52 and has two lugs 59 and 60 extending laterally therefrom. Each of the pins 61 has a U-bend 62, as best seen in Fig. 5, with one end anchored in lug 59 and its other end spring-pressed against lug 60. The pins are selectively actuated upwardly through holes in lugs 59 and 60 each time the

actuator 49 is raised as will be explained hereinafter

The tape 23 upon which the perforated record is made is drawn from a supply spool 63 which is mounted on stud shaft 64. The spool is frictionally restrained from over-rolling by a spider spring 65. Tape 23 is drawn from spool 63 and over a cylindrical platen 66 which is freely rotatable on stud shaft 67. The platen 66 has a groove 68 opposite each of the perforating pins 61 to permit the passage of the pins through the tape. From the platen 66 the tape passes between a tape-advancing roller 69 and a spring pressed roller 70. The tape-advancing roller 69 is fixed to a rotatable shaft 71 and has a series of radially extending pegs 72 which engage the series of "zero" perforations in the tape and extend through the tape into a circumferential groove in the spring pressed roller 70.

The perforated tape is collected on a spool 73 which is removably mounted on the stud shaft 74. Spool 73 is frictionally driven from a spring 75 which has fastened to it a ratchet wheel 76. The several stud shafts 64, 67 and 74, the spring-pressed roller 70 and the rotatable shaft 71 are mounted on plate 52.

As explained in the foregoing the pin actuator 49 is set in accordance with the setting of the indicating and printing wheels. When printing is to be effected the sleeves 11 and 12 together are moved downwardly with respect to the supporting sleeve 10 whose lower end is pressed against the surface 48 on which the printing is to be made. The code perforating operation is carried out as the selected character on the printing wheel comes into contact with surface 48 in the manner illustrated in Fig. 3. This is accomplished by the actuation of the slide 51 which is supported from the plate 52. The slide has an opening 77 for accommodating the shaft 43 whereby the lower end of the slide is guided. The length of the opening 77 is such as to determine the lower and upper limits of permissible travel of the slide.

The slide 51 is normally urged to its lowermost position, as best illustrated in Figs. 4 and 5, by a spring 78 which rests on a bracket 79, carried by the slide, and bears at its upper end against the lug 60. When the lower end of sleeve 11 is approaching its lowermost point of travel towards a printing surface 48, the foot 80 of the slide 51 is brought into contact with the surface, whereupon the slide is displaced upwardly against the action of the spring 78 as shown in Fig. 3. Slide 51 carries the pin actuator 49 upwardly and the previously positioned teeth 56 cause certain of the code pins 61 to be advanced through the tape. During this movement of the actuator the meshing relationship of gears 54 and 55 remains unchanged. The tape is advanced one step at a time each time the slide 51 is returned to normal position by spring 78 and following the perforating operation.

The tape-advancing roller 69 and the winding spool 73 are rotated during the restoring movement of slide 51. The tape-advancing roller 69 is mounted on shaft 71 which is driven through the ratchet wheel 81 by a pawl 82. Pawl 82 is pivotally mounted on slide 51 and held against the ratchet wheel by spring 83. A spring pressed stop member 84, pivotally mounted on plate 52, prevents retrogression of roller 69, but permits the step by step rotation of roller 69 by pawl 82, each time slide 51 descends. A pawl 85 is pivotally mounted on slide 51 and effects the

winding of the tape about spool 73 through the action of spring 75 each time the slide 51 descends.

Spools 63 and 73 may be removed from their shafts through window 22 by removing screws 86 and 87 and the retaining washers whenever it is desired to remove and replenish the tape.

While the invention has been described in connection with one form of construction it is apparent that various changes may be made within the scope of the following claims as for example, the utilization of the principles involved in a marking or printing instrument exclusive of record punching mechanism, or the provision of a window through the manipulative sleeve through which may be observed a character of a series of characters inscribed on sleeve 12 for indicating the selected relationship of the two sleeves.

What is claimed is:

1. In a device of the class described, marking means, cooperating setting means constructed and arranged to set a selected character on said marking means, said setting means including two relatively movable members, one of said members carrying said marking means and the other of said members carrying an actuator for said marking means whereby said marking means is selectively settable for marking a character which is selected in accordance with the displacement of one of said members with respect to the other, locking means carried by said settable means and adapted to lock the two members together in any one of several adjusted positions with respect to each other, record advancing means and record punching means carried by said setting means, a punch actuator for actuating said punching means, said punch actuator being slideably mounted on said setting means and settable in accordance with the setting of said marking means and proportional to the relative displacement of said members, supporting means attached to said setting means and adapted to be placed against a marking surface to support said setting means, said supporting means including a spring normally effective for holding said setting means with said marking means and said punch actuator in non-functioning positions and adapted to be flexed to effect marking on a surface at the base of said supporting means, and means for moving said punch actuator to actuate said punch recording means on movement of said setting means relative to said supporting means.

2. In a device of the class described, a manipulative sleeve, an indicator and a recording device carried by said sleeve, a second sleeve telescopically fitting within said manipulative sleeve, means carried by said second sleeve for setting said indicator and said recording device, a third sleeve in telescopic engagement with said manipulative sleeve, means including a spring for normally supporting said second sleeve in extended relationship with reference to said third sleeve, means including a second spring for normally supporting said manipulative sleeve in extended relationship with reference to said second sleeve, said second spring being responsive to force for moving said manipulative sleeve relatively to said second sleeve for setting said indicator and said recording device in proportion to the amount of relative movement between said manipulative and second sleeves, and means for locking together said manipulative sleeve and

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said second sleeve in any one of several positions with respect to each other.

3. In a device of the class described, a manipulative sleeve, indicating and marking wheels carried by said sleeve, a second sleeve telescopically fitting within said manipulative sleeve, means carried by said second sleeve for setting said indicating and marking wheels, a third sleeve in telescopic engagement with said manipulative sleeve, means including a spring for normally supporting said second sleeve in extended relationship with reference to said third sleeve, means including a second spring for normally supporting said manipulative sleeve in extended relationship with reference to said second sleeve, said second spring being responsive to force for moving said manipulative sleeve relatively to said second sleeve for setting said indicating and marking wheels in proportion to the amount of relative movement between said manipulative and second sleeves, and means for locking together said manipulative sleeve and said second sleeve in any one of several positions with respect to each other.

4. In a device of the class described, a manipulative sleeve, an indicator, a marking wheel, a recording punch device, said indicator, marking wheel and recording punch device being carried by said manipulative sleeve, a punch actuator slideably mounted on said manipulative sleeve, a second sleeve telescopically fitting within said manipulative sleeve, means carried by said second sleeve for setting said indicator, marking device and punch actuator, a third sleeve in telescopic engagement with said manipulative sleeve, means including a spring for normally supporting said second sleeve in extended relationship with respect to said third sleeve, means including a second spring for normally supporting said manipulative sleeve in extended relationship with respect to said second sleeve, said second spring being responsive to force for moving said manipulative sleeve relatively to said second sleeve for setting said indicator, said marking wheel and said punch actuator in desired positions proportional to the amount of relative movement between said manipulative sleeve and said second sleeve, and means for locking together said manipulative sleeve and said second sleeve in any one of several positions with respect to each other so as to enable movement of said manipulative sleeve and said second sleeve relatively to said third sleeve against the action of said first spring for effecting marking by said marking wheel, and actuation of said punch actuator.

5. In a device of the class described, a manipulative sleeve, an indicator, a recording punch device, said indicator and recording punch device being carried by said manipulative sleeve, a punch actuator slideably mounted on said manipulative sleeve, a second sleeve telescopically fitting within said manipulative sleeve, means carried by said second sleeve for setting said indicator and punch actuator, a third sleeve in telescopic engagement with said manipulative sleeve, means including a spring for normally supporting said second sleeve in extended relationship with respect to said third sleeve, means including a second spring for normally supporting said manipulative sleeve in extended relationship with respect to said second sleeve, said second spring being responsive to force for moving said manipulative sleeve relatively to said second sleeve for setting said indicator and said punch actuator in desired positions proportional to the amount of relative movement

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between said manipulative sleeve and said second sleeve, and means for locking together said manipulative sleeve and said second sleeve in any one of several positions with respect to each other so as to enable movement of said manipulative sleeve and said second sleeve relatively to said third sleeve against the action of said first spring, and means constructed and arranged to operate said punch actuator into cooperation with said punch recording device.

6. In a device of the class described, three telescoping members slidably engaged and normally held in extended relation with respect to each other by resilient means, a marking device carried by the first of said members, means carried by the second of said members for setting said marking device to mark a character whose selection is determined by and proportional to the relative displacement between said first and second members, the tension in said resilient means being partially overcome when said first and second members are moved relative to each other for setting said marking device, and locking means for engaging the first and second of said members after the same have been displaced with respect to each other for the selection of a character on said marking device, said locking means including an element carried by the first of said members and an element carried by the second of said members and engageable by the other element, said first and said second of said members, when locked together, being displaceable as a unit with respect to said third member for effecting marking by said marking device when the extending effect of said resilient means is overcome by manipulative effort.

7. In a device of the class described, a pair of slidably engaged members, resilient means for normally holding said members in extended relation with respect to each other, a marking device carried by one of said members and means carried by the other of said members for moving said marking device proportionally to the movement of said members with respect to each other against the action of said resilient means, a recording device carried by one of said members, said recording device including punching mechanism and punch-selecting means, means for setting said punch-selecting means proportionally to the movement of said members with respect to each other, means for holding said pair of members in an adjusted position at which said marking device and said punch-selecting means are displaced to predetermined positions, a base member slidably engaged with one of said pair of members, resilient means normally holding said base member in extended relation with respect to said pair of members, said last-named resilient means being adapted to be overcome to collapse said pair of members with respect to said base member for effecting marking by said marking means when said base member is pressed against a surface, and means carried by said base member for actuating said punch-selecting means to operate said punching mechanism following engagement of said base member with the surface against which the base member is pressed.

8. In a device of the class described, a manipulative member, a recording device carried by said manipulative member, said recording device including punching mechanism and punch-selecting means, a second member slidably engaged with said manipulative member, means carried by said second member for setting said punch-selecting means, a third member slidably engaged

with said manipulative member, means including a spring for resiliently extending said second member with respect to said third member, means including a second spring for resiliently extending said manipulative member with respect to said second member, said second spring being responsive to force for moving said manipulative member relative to said second member for setting said punch-selecting means proportional to the displacement of said manipulative member with respect to said second member, means for locking together said manipulative member and said second member against the action of said second spring after said punch-selecting means has been set by displacement of said manipulative member with respect to said second member, and means for actuating said punch-selecting means to actuate said punching mechanism during displacement of said locked-together manipulative member and second member relative to said third member against the action of said first spring.

9. A device according to claim 8 including dial means settable proportional to the relative displacement between said manipulative member and said second member and in accordance with a selected position of said punch-selecting means.

10. A device according to claim 9 in which said dial means includes elements for marking characters.

11. A device according to claim 8 in which said punch-selecting means is carried by a slide mounted on said manipulative member and said

punching mechanism comprises a plurality of punches which are selectively actuated by said punch-selecting means.

12. A device according to claim 8 in which said punch-selecting means includes a plurality of rotatable disks mounted on a slide which is carried by said manipulative member and said punching mechanism comprises a plurality of punches which are supported by said manipulative member, and including recording-tape supporting means mounted on said manipulative member.

13. A device according to claim 8 in which said manipulative member, said second member and said third member comprise sleeves which are telescopically engaged with respect to each other and are normally held in extended positions by said first and second springs.

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