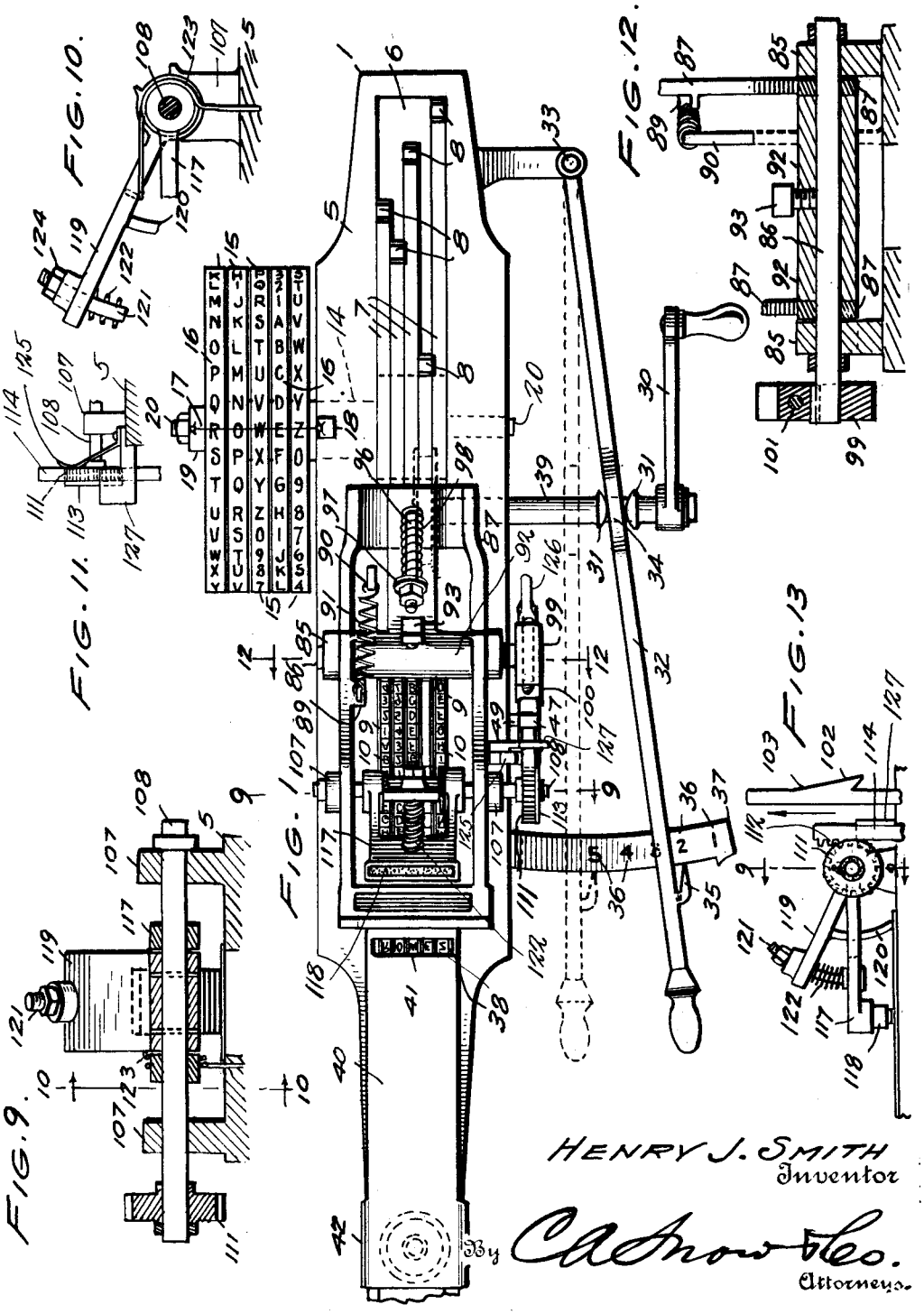
Dec. 29, 1931. H. J. SMITH 1,838,584

PRINTING MACHINE

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PRINTING MACHINE

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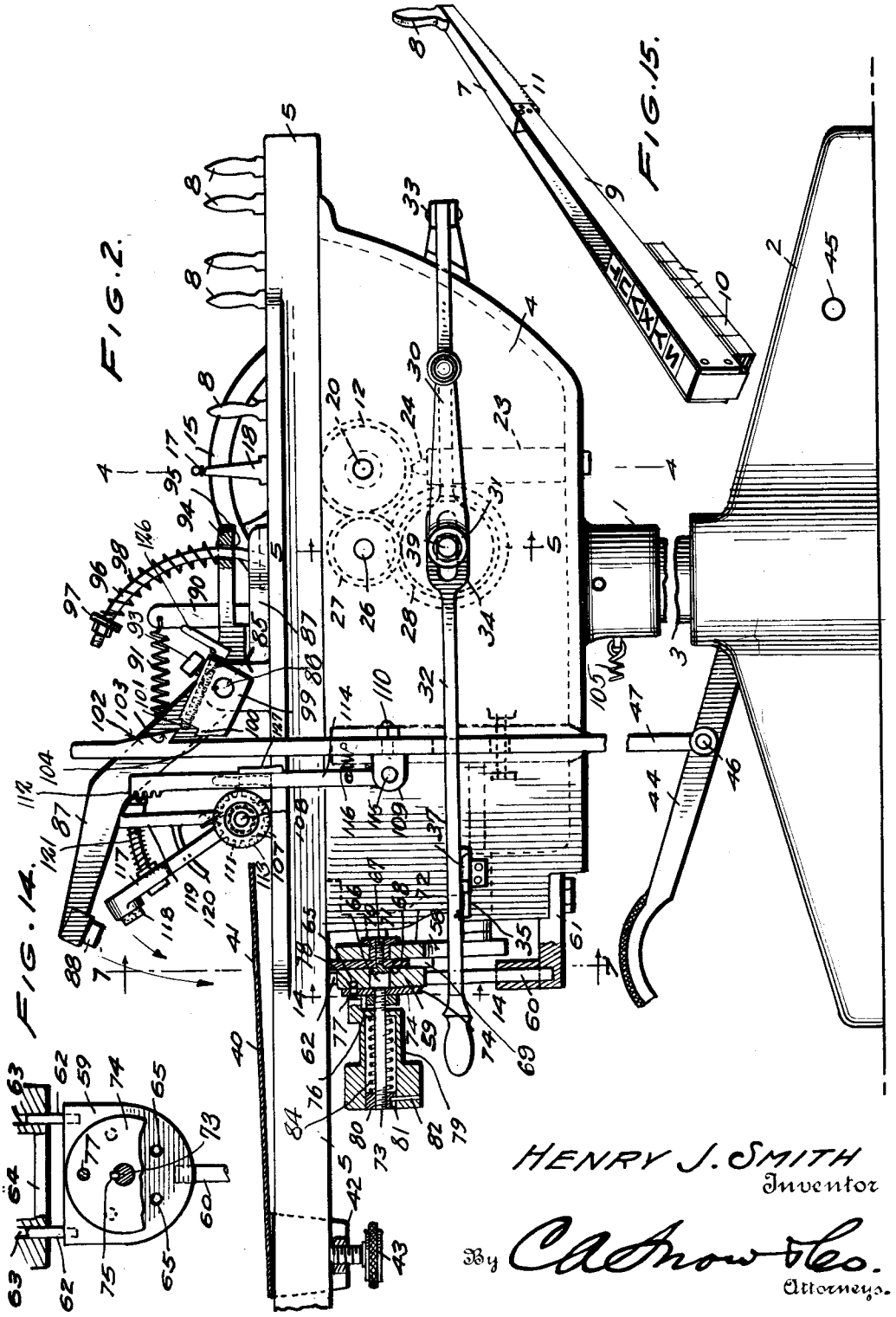


FIG. 2.

FIG. 15.

FIG. 14.

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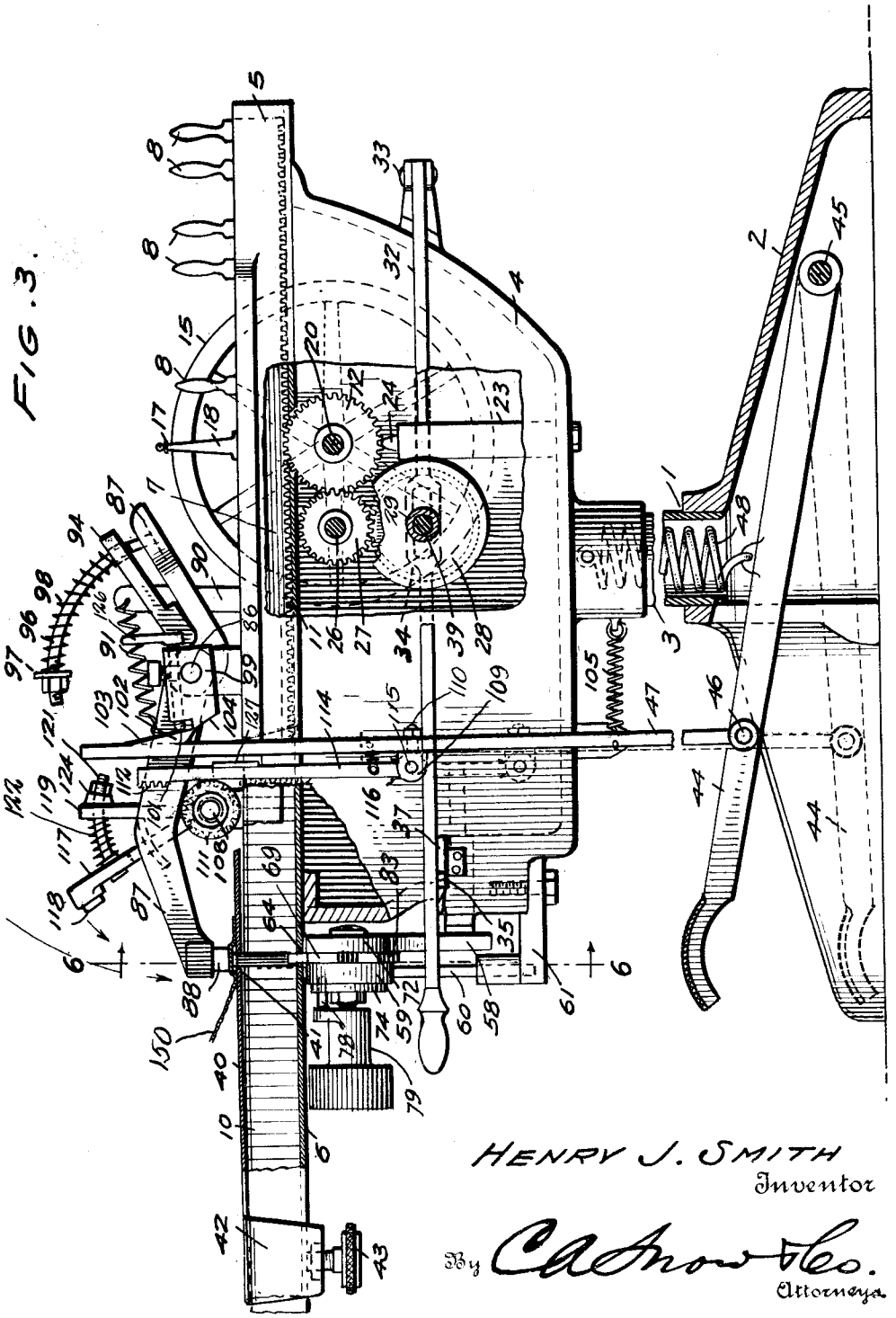
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FIG. 3.



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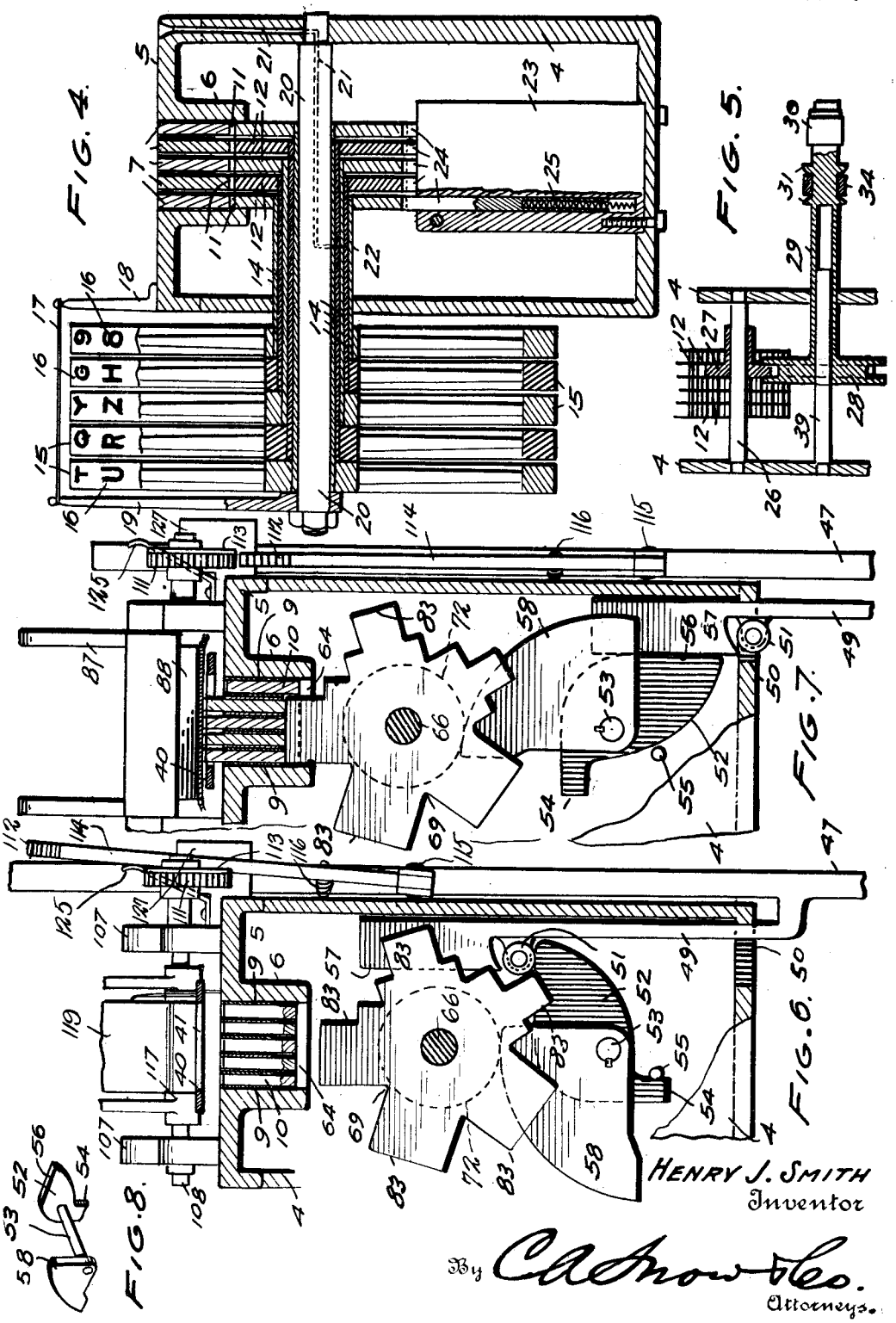


FIG. 4.

FIG. 5.

FIG. 7.

FIG. 6.

FIG. 8.

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1,838,584

UNITED STATES PATENT OFFICE

HENRY J. SMITH, OF MINNEAPOLIS, MINNESOTA

PRINTING MACHINE

Application filed April 8, 1927. Serial No. 182,088.

This invention aims to provide a simple and effective printing mechanism adapted to be used primarily but not exclusively for marking goods that are to be washed in a laundry. More specifically, the invention aims to provide novel means for selecting the type which will print the desired legend; to provide novel means for raising the type to working position; to provide novel means for inking the type; to provide novel means for pressing the article on the type in order to get an impression; and to provide novel means whereby the article will not be smeared whilst it is being put in position to be printed upon by the type.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings:—

Figure 1 shows in top plan, a device constructed in accordance with the invention;

Figure 2 is a side elevation wherein some parts appear in section;

Figure 3 is a view similar to Figure 2, but with parts broken away to give a different sectional showing;

Figure 4 is a cross section on the line 4—4 of Figure 2 and disclosing a part of the mechanism whereby the type are selected;

Figure 5 is a sectional view on the line 5—5 of Figure 2;

Figure 6 is a section taken on the line 6—6 of Figure 3;

Figure 7 is a section taken on the line 7—7 of Figure 2 and showing the parts in a different position from that disclosed in Figure 6;

Figure 8 is a perspective view disclosing the cams of Figures 6 and 7, and the shaft that connects them;

Figure 9 is a section taken on the line 9—9 of Figure 1, this view having to do with the means whereby the garment to be imprinted is pressed on the type;

Figure 10 is a section on the line 10—10 of Figure 9;

Figure 11 is an elevation showing a portion of the means for actuating the inking mechanism;

Figure 12 is a section on the line 12—12 of Figure 1;

Figure 13 is a section taken through the inking mechanism whilst the same is in working position;

Figure 14 is a section on the line 14—14 of Figure 2;

Figure 15 is a perspective view showing one of the type holders.

In carying out the invention, there is provided a support, which, in Figures 1, 2 and 3, is denoted as a whole, by the numeral 1. The support 1 includes a foot 2 carrying a pedestal 3 on which is mounted a hollow head 4 carrying a top piece 5 supplied with a depressed longitudinal guideway 6. The device includes a plurality of type holders 7 mounted for longitudinal reciprocation in the guideway 6. One of the type holders 7 is shown in detail in Figure 15. The type holders 7 are provided with handles 8 which facilitate the mounting of the type holders in the guideway 6, and the removal of the type holders therefrom. The type holders 7 are not reciprocated by the handles 8, ordinarily, but by a mechanism which will be described in detail hereinafter. Each type holder 7 has an open part 9 in which the type 10 can be raised and lowered, individually, the type ordinarily resting on the bottom of the guideway 6, as shown in Figure 3.

Each type holder 7 has a rack 11. The racks 11 mesh with gear wheels 12 (Figure 3) on nested hollow shafts 14 (Figure 4), the shafts carrying indicating wheels 15 located outside of the head 4, characters 16 being inscribed on the edges of the wheels 15, the characters at 16 duplicating the characters of the type 10 that are in the type holders 7,

there being one indicating wheel 15 for each of the type holders 7. The characters 16 on the indicating wheels 15 are adapted to cooperate, as shown in Figure 1, with an index wire 17 connected at one end to a post 18 (Figure 4) on the hollow head 4, and joined at its opposite end to an upstanding bracket 19 on a shaft 20 whereon the hollow shafts 14 are suported rotatably, the shaft 20 being fixed at one end in one side wall of the hollow head 4. For the lubrication of the tubular shafts 14, one side wall of the head 4, and the shaft 20, are provided with a duct 21 which cooperates with openings 22 in the tubular shafts 14.

A brake mechanism is provided, whereby the indicating wheels 15 may be held in any position to which they may have been turned with respect to the index wire 17. Thus, there is a guide 23 in the bottom of the head 4, and in the guide 23, dogs 24 are vertically slidable, the dogs being pressed upwardly by compression springs 25. The upper ends of the dogs 24 engage with the gear wheels 12 with a sufficient hold so that the gear wheels 12, the shafts 14, and the indicating wheels 15, will not turn too readily; but there is no positive lock between the dogs 24 and the teeth of the gear wheels 12.

Figures 5 and 3 show that a fixed shaft 26 is mounted in the head 4, a pinion 27 being mounted on the shaft 26 to rotate thereon and to slide therealong, it being possible to bring the pinion 27 into mesh with any one of the gear wheels 12. The pinion 27 meshes into and is slidable with a shrouded gear 28, having a long tubular hub 29 mounted to slide on a stub shaft 39 mounted in the head 40. A crank 30 or its equivalent, attached to the hub 29, constitutes means for rotating the gear 28. The hub 29 of the gear 28 has spaced shoulders 31. A lever 32 is fulcrumed at one end, as shown at 33, on the head 4 of the support 1, the lever 32 being provided intermediate its ends with a loop 34 which is received tiltably between the shoulders 31 on the hub 29, the hub passing through the loop 34 of the lever 32, as Figures 3 and 5 indicate. The lever 32 is supplied near to its free or handle end with a pointer 35 adapted to cooperate with numerals 36 on an arm 37 which projects horizontally from the head 4, there being as many of the characters 36 on the arm 37 as there are type holders 7 and indicating wheels 15.

A resilient shield 40 stands at an acute angle to the upper surface of the top piece 5, as shown in Figure 2, the shield having an opening 41 (Figure 1) through which the type, arranged as shown at 38, can print. The shield 40 is provided at its outer end with a yoke 42 receiving the end of the top piece 5 and held thereon by a set screw 43 which is threaded into the bottom part of the yoke.

A pedal 44 is fulcrumed at 45 (Figure 3) on the foot 2 of the support 1 and is pivoted intermediate its ends, at 46, to an upwardly extended operating member 47, in the form of a rod, both the pedal 44 and the operating rod 47 being raised by a retractile spring 48 housed in the pedestal 3 and connected to the pedestal and to the pedal 44. Figure 6 shows that the operating member 47 has an off-set finger 49 which slides through a hole 50 in the bottom of the head 4. There is a projection 51 (preferably a roller) on the finger 49, and above the projection 51, the finger 49 has a lateral enlargement 57, the inner edge of which is straight.

The roller projection 51 on the finger 49 is adapted to cooperate with a cam 52 on one end of a shaft 53 (Figure 8) that is journaled in the head 4. The cam 52 has a reduced part 54 which normally is engaged with a stop 55 on the head 4, as seen in Figure 6. The cam 52, which may be called a first cam, has a straight edge 56. When the roller projection 51 turns the cam 52 down into the position shown in Figure 7, the straight edge 56 of the cam cooperates with the straight inner edge of the enlargement 57 on the finger 49. Owing to this construction, when the pedal 44 is released, and when the parts 47 and 49 move upwardly, responsive to the spring 48 of Figure 3, the cam 52 remains for a while in the position shown in Figure 7, and the shaft 53 cannot turn until the inner edge of the enlargement 57 on the off-set finger 49 has been raised clear of the straight edge 56 of the cam 52.

On that end of the shaft 53 which is remote from the first cam 52 there is a second cam 58 which, as shown in Figures 3 and 2, is located outside of the hollow head 4, at one end thereof. The second cam 58 engages a roller disk 72, the mounting of which will now be described.

The device includes a slide 59, shown in outline in Figure 14, and appearing, also, in Figure 2. The slide 59 has a bottom finger 60 which reciprocates in a bracket 61 on head 4. The slide 59 has upstanding fingers 62 which reciprocate in passages 63 located near to an opening 64 (Figs. 14, 6 and 7) made in the bottom of the guideway 6 which is formed in the top piece 5. The slide 59 has seats 65, arranged in a circle, the seats corresponding in number to the type holders 7 and there being, therefore, in the present embodiment of the invention, five of the seats 65. A shaft 66 is rotatable for adjustment in the slide 59 and has a reduced end 67 forming a shoulder 68 against which a star wheel 69 is bound by a nut 70 of circular outline, the roller disk 72 (which cooperates with the cam 58) being journaled on the nut 70 between the star wheel 69 and a flange 71 on the nut. The shaft 66 has a long reduced end 73 on which a keeper disk 74 is held by a key 75 and a nut 76, the keeper disk being

located on one side of the slide 59, and the star wheel 69 being located on the opposite side of the slide. The keeper disk 74 has an opening 77 adapted to be alined with any of the seats 65 in the slide 59, when the shaft 66 and the keeper disk 74 are rotated. A latch pin 78 slides in the openings 77 of the keeper disk 74 and is adapted to be received in any of the seats 65 of the slide 59. The latch pin 78 is carried by a handle 79 which can both turn and slide endwise on the long reduced end 73 of the shaft 66. A nut 80 is threaded on the outer end of the part 73 of the shaft 76, and is received within the handle 79, the handle being adapted to rotate and slide longitudinally on the nut 80. The nut 80 has a groove 81 in which is received a stop pin 82 in the handle 79. Referring to Figures 6 and 7, the star wheel 69 is shown as provided with a plurality of arms 83 which are of different widths at their outer ends. A compression spring 84 abuts against the nut 80 and the inner end of the handle 79 and tends to move the handle to the right in Figure 2.

As seen in Figures 1 and 12, there are bearings 85 on the top piece 5, and in the bearings 85, a shaft 86 is mounted to rock. A lever 87, in the form of an open frame, extends between the bearings 85, and is fulcrumed intermediate its ends to swing on the shaft 86. At its forward end, the lever 87 is supplied with a resilient platen 88 adapted to cooperate with the type which have been positioned at the opening 41, of the guard 40, as shown at 38, and have been raised by the selected arm 83 of the star wheel 69, as shown in Figure 7. The end of the lever 87 which carries the platen 88 normally stands raised, and in the position of Figure 2, under the action of a retractile spring 91, one end of which is connected to a post 90 mounted on the top piece 5, behind the shaft 86, the other end of the spring being connected at 89 to the lever 87 in front of the shaft 86. A sleeve 92 is secured by a set screw 93 to the shaft 86 and is located between the side portions of the platen lever 87. The sleeve 92 has a rearwardly extended arm 94 provided with an opening 95 (Figure 2) in which is adapted to move, a curved finger 96 secured to the rear end of the lever 87 and carrying an adjusting nut 97, a compression spring 98 being mounted on the finger 96 between the adjusting nut and the arm 94.

A short crank arm 99 is secured to the outer end of the shaft 86 and has a shoulder 100 at its forward end. An adjustable kick-off 101 is mounted in the crank arm 99 above the shoulder 100, and may be in the form of a screw threaded into the crank arm 99 longitudinally thereof, and provided with a long handle 126 which enables a fine adjustment to be imparted to the kick-off screw. On the operating member or rod 47 there is a projection 102 which is beveled on its rear edge, as at 103, so as to cooperate with a beveled end edge 104 of the crank arm 99, the edges 103 and 104 sliding over each, when the rod 47 is raised to the position of Figure 2, by the spring 48 which is shown connected to the pedal 44 in Figure 3. The rod 47 is swung to the right in Figures 3 and 2, on its pivotal mounting 46, by a retractile spring 105 connected to the rod 47 and to the pedestal 3.

Bearings 107 (Figs. 9 and 1) are mounted on the top piece 5, and in them a shaft 108 is journaled for rotation. A pinion 111 is secured to the shaft 108 and has a side flange 113. The pinion 111 is adapted to cooperate with a rack 112 on a bar 114 having its lower end pivotally mounted at 115, for swinging movement in a direction at right angles to the shaft 108, on a bracket 109. The bracket 109 is pivotally mounted at 110, in the operating member 47, to swing in an axis at right angles to the shaft 108. In view of the foregoing, the bar 114 has two swinging movements, one in a plane parallel to the shaft 108, and one in a plane at right angles to the shaft 108. A somewhat stiff spring 116 is secured at one end to the bar 114, and at its other end to the operating member 47. This spring 116 has two functions. First, it tends to swing the bar 114 to the right in Figure 2, in a direction at right angles to the shaft 108, against a stop 127 on the frame work of the machine. Second, the spring 116 tends to swing the bar 114 in a direction parallel to the shaft 108 into such a position that the bar 114 is in the same plane with the pinion 111. The reason for this somewhat complicated movement of the bar 114, and for the aforesaid two-fold function of the spring 116 will be made more clearly manifest hereinafter, when the operation of the machine is explained.

A radius arm 117 (Figs. 1, 9 and 2) is mounted to swing on the shaft 108, and is U-shaped in top plan, as Figure 1 will show. The radius arm 117 carries an ink pad 118 which is adapted to cooperate with the type 38 (Figure 1) exposed through the opening 41 in the shield 40. A spring 123 is connected at one end to the top piece 5 (Figure 5) and is connected at its opposite end to a crank arm 119 which is secured to the shaft 108 between the side portions of the radius arm 117, as disclosed in Figure 9. The crank arm 119 has a depending projection 120. There is a curved finger 121 on the radius arm 117, and this finger 121 slides in the crank arm 119. A compression spring 122 surrounds the finger 121 and bears on the radius arm 117 and on the crank arm 119. An adjusting nut 124 holds the finger 121 in the arm 119. A spring 125 is mounted on the frame work of the machine and is so arranged that it will bear upon the bar 114, as the bar moves upwardly.

Selecting the type.—By means of the crank

30, the tubular hub 29, the gear 28, the pinion 27, and one of the gear wheels 12, the type holder may be shifted longitudinally. By swinging the lever 32 on its fulcrum 33 until the pointer 35 cooperates with the characters 36 of Figure 1, one after another, the shrouded gear 28 may be moved transversely, carrying with it the pinion 27, the pinion thus being moved into mesh with the gear wheels 12, one after another, the gear wheels cooperating with the racks 11 on the type holders 7. By the operation of the crank 30 and the lever 32, any selected set of numerals or characters 16 on the wheels 15 may be lined up under the index wire 17 as shown in Figure 1, and when the characters are thus alined, as aforesaid, the operator is assured that the type holders 7 have been moved lengthwise until the type 10 in the holders 7 which duplicate the lined-up characters 16 on the wheels 15 are themselves lined-up to print the desired legend, as shown at 38 in Figure 1.

Raising the type.—The operator pulls out the handle 79 until the stop pin 82 is at the inner end of the groove 81 in the nut 80. The latch pin 78 on the handle 79 then is still in the opening 77 of the keeper disk 74 but is not engaged in any seat 65 of the slide 59. The operator may turn the handle 79, the keeper disk 74, the shaft 66 and the star wheel 69 so that any one of the fingers 83 (Figure 6) may be uppermost, thereby enabling the operator to select the number of type which he wishes to have raised into printing position. This is true because the arms 83 of the star wheel 69 are of different widths across their outer ends. When the operator has selected the proper one of the arms 83 on the star wheel 69, and turned it uppermost, he then releases the handle 79, and the handle slides to the right in Figure 2, under the action of the compression spring 84, the latch pin 78 entering the selected one of the seats 65 in the slide 59. Noting Figure 14, it will be clear that the fingers 63 and 60 prevent the slide 59 from rotating about an axis represented by the shaft 66 and since the star wheel 79 is secured to the shaft 66, the shaft 66 being connected to the keeper disk 74, and the keeper disk being coupled to the slide 59 by the latch pin 78, the arm 83 on the star wheel which has been brought uppermost, and into working position, will remain in that position.

When the pedal 44 is swung downwardly, the operating member 47 (Figure 2) moves downwardly along with the finger 49 (Figure 8) the roller 51 on the finger 49 cooperates with the first cam 52 to shift the cam from the position of Figure 8, to the position of Figure 7, the shaft 53 being rotated, and the second cam 58 being raised into the position of Figure 7. The cam 58, cooperating with the roller 72, raises the slide 59 and the star wheel 69, and the selected arm 83 on the star wheel rises through the opening 64 in the bottom of the guideway 6, the selected number of type 10 in the open part 9 of the type holder 7 being raised through the opening 41 in the resilient shield 40.

Making the impression.—When the pedal 44 is moved downwardly, the rod 47 is moved downwardly, and the projection 102 on the rod 47 engages with the shoulder 100 on the crank arm 99 and rocks the shaft 86, motion being imparted to the sleeve 92 and to the arm 94 thereon, the arm 94 moving upwardly along the curved finger 96 on the rear end of the platen lever 87, the spring 98 being compressed and the lever 87 being tilted into the position of Figure 3 to bring the platen 88 down on the type. The spring 98 permits the platen lever 87 to press the platen 88 yieldingly on the garment 150 which is being printed upon, and there is no danger that the type will be shoved through the garment 150 by too strong an impression.

Assuming that the projection 102 on the rod 47 is engaged with the shoulder 100 on the crank arm 99, when the pedal 44 has been swung down into the position of Figure 3, the kick-off 101 in the crank arm 99, cooperating with the edge 103 of the projection 102 on the rod 47, shoves the rod 47 to the left in Figure 3, against the action of the spring 105, thereby clearing the projection 102 from the shoulder 100 on the crank arm 99, the springs 91 and 98 operating to restore the parts to the positions of Figure 2, with the platen 88 raised, as shown in that figure.

Inking.—When the operating member 47 moves upwardly along with the pedal 44, under the action of the spring 48 (Figure 3) when the pedal is released, the rack 112 on the bar 114 cooperates with the pinion 111, and the shaft 108 is rotated. When the shaft 108 is rotated, the crank arm 119 swings downwardly, the spring 122 being compressed, and the radius arm 117 being swung downwardly, the pad 118 being pressed on the type at 38 in Figure 1, yieldingly, owing to the provision of the spring 122. The function of the projection 120 is to depress the free end of the shield 40, so that the ink pad 118 will engage the type at 38 without smearing the shield. The spring 123 is a return spring that carries the arms 119 and 117 into the upwardly-swung position shown in Figure 2, after the rack 112 on the bar 114 is above and clear of the pinion 111, as shown in Figure 2. Reverting to Figure 7, it will be noted that the enlargement 57 on the finger 49 is in engagement with the straight edge 56 of the cam 52, for a time, whilst the operating member 47 is moving upwardly. It is during this interval that the rack 112 on the bar 104 cooperates with the pinion 111 to rotate the shaft 108, to swing down the arm 117, and

to bring the ink pad 118 into contact with the type.

The spring 116 tends to hold the bar 114 against the stop 127. The spring 116, moreover, tends to swing the bar 114 in a direction parallel to the shaft 108 and to bring the bar 114 into the same plane with the pinion 111, before the bar 114 has risen far enough so that the spring 125 of Figure 11 engages the bar. As the bar 114 moves upwardly, its rack 112 cooperates with the pinion 111. About the time that the rack 112 begins to engage the pinion 111, the bar 114 engages the spring 125 of Figure 11. The tendency of the spring 125 is to swing the bar 114 on the pivot element 110, in a direction parallel to the shaft 108; but the spring 125 cannot swing the bar 114 as aforesaid, whilst the rack 112 is engaged with the pinion 111, because the rack rests against the side flange 113 of the pinion 111. So soon, however, as the rack 112 is well clear of the pinion 111, as the bar 114 approaches the limit of its upward travel, then the side flange 113 on the pinion 111 no longer engages the side of the rack 112. The spring 125 now comes into play and swings the rod 114 on the pivot element 110, in a direction parallel to the axis 108, until the rack 112 is not in the same plane with the pinion 111. The rack 112 and the pinion 111 are shown in this position in Figure 8. When the pedal 44 carries the operating member 47 downwardly, and with it the bar 114, the rack 112 does not engage the pinion 111; but at length, the bar 114 descends far enough so that the spring 125 has no influence on it. By this time, the rack 112 is down below the pinion 111, and the spring 116 asserts itself to swing the bar 114 on its pivotal mounting 110 into the same plane with the pinion 111. The rack 112 and the pinion 111 are now so arranged with respect to each other that when the bar 114 is carried upwardly, the inking operation will be repeated in the manner hereinbefore described.

Remarks.—The function of the shield 40, when in the raised position of Figure 2, is to prevent the garment 150 from being soiled by the inked type as the garment is being placed in position to be printed upon. All of the type shown at 38 in Figure 1 will be brought into proper position above the arm 83 of the star wheel 69 (Figures 6 and 7) if care is taken to have the thickness of each type piece bear the proper relation to the distance between the teeth in the racks 11 on the type holders 7. The shield 40 holds down all of the type saving those that are exposed at 38 in Figure 1, and even though the type in the different rows, considered lengthwise of the holders 7, happen to stick together, only the type in the selected transverse line, shown at 38, will be raised. The kick-off screw 101 and its handle 126 are of importance, the handle permitting a fine adjustment of the kick-off screw. By adjusting the kick-off screw 101 it is possible to regulate the mechanism so that the printing pressure will be exactly suited to the kind of fabric which is to be marked.

What is claimed is:—

1. In a device of the class described, a plurality of type holders mounted for right-line sliding movement and provided with racks, gear wheels meshing with the racks, a pinion, means for mounting the pinion for translatory movement, and a shrouded gear cooperating with the pinion, to impart rotation and translatory movement thereto, and means for mounting the shrouded gear for translatory movement.

2. In a device of the class described, a plurality of type holders mounted for right-line sliding movement and having racks, gear wheels meshing with the racks, a pinion, means for mounting the pinion for rotation, and for translatory movement, whereby the pinion may be made to cooperate with any of the gear wheels, a gear meshing with the pinion and cooperating with the pinion to impart translatory movement thereto, means for mounting the gear for rotation and for translatory movement, said means embodying a shaft, means on the shaft for imparting rotation thereto, a lever and a fulcrum therefor, and means for connecting the lever operatively with the shaft to impart translatory movement to the gear and the pinion.

3. In a device of the class described, a plurality of type holders mounted for right-line sliding movement and provided with racks, shafts supported for rotation, gear wheels on the shafts and meshing with the racks, indicating wheels on the shafts, an index cooperating with the indicating wheels, a guide, and spring-pressed dogs slidable in the guide and coperating with the gear wheels to act as a brake thereon.

4. In a device of the class described, a plurality of type holders mounted for horizontal right line sliding movement and provided with racks, printing mechanism cooperating with the type holders, gear wheels meshing with the racks; means for operating the type holders independently of the printing mechanism, a plurality of rotatable dials corresponding in number with the type holders, and pinions rotatable with the dials and meshing with the racks, the dials having characters so located as to indicate at all times which type in the type holders are in printing position; reference means wherewith the characters on the dials cooperate, means for mounting the type in the type holders in such position that a vertical sliding movement can be given to the type during the printing operation, the teeth of the racks corresponding in thickness and spacing to the thickness of the type in the holders, and handles on the

type holders whereby the type holders can be operated directly and without recourse to the dials.

5. In a device of the class described, a plurality of type-holders mounted for right line sliding movement, mechanism for imparting right line sliding movement to the type-holders, one at a time, said mechanism embodying a shaft mounted for rotation and for longitudinal sliding movement and a rotatable member carried by the shaft, a lever and a fulcrum therefor, the lever being operatively connected with the shaft to impart longitudinal sliding movement thereto, and to bring the rotary member into operative relation to the type-holder to be advanced, and means for indicating the position of the rotatable member with respect to each type-holder, said means being operated by the lever.

6. In a device of the class described, a plurality of type-holders mounted for right-line sliding movement, mechanism for imparting right line sliding movement to the type-holders, one at a time, said mechanism embodying a shaft mounted for rotation and for longitudinal sliding movement and a rotatable member carried by the shaft, means for imparting longitudinal movement to the shaft to bring the rotary member into operative relation to the type-holder to be advanced, and means for indicating the position of the rotatable member with respect to each type holder, said indicating means being actuated by the means for imparting longitudinal movement to the shaft.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

HENRY J. SMITH.