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E. RACZ

PRINTING MECHANISM

Filed Aug. 19, 1927

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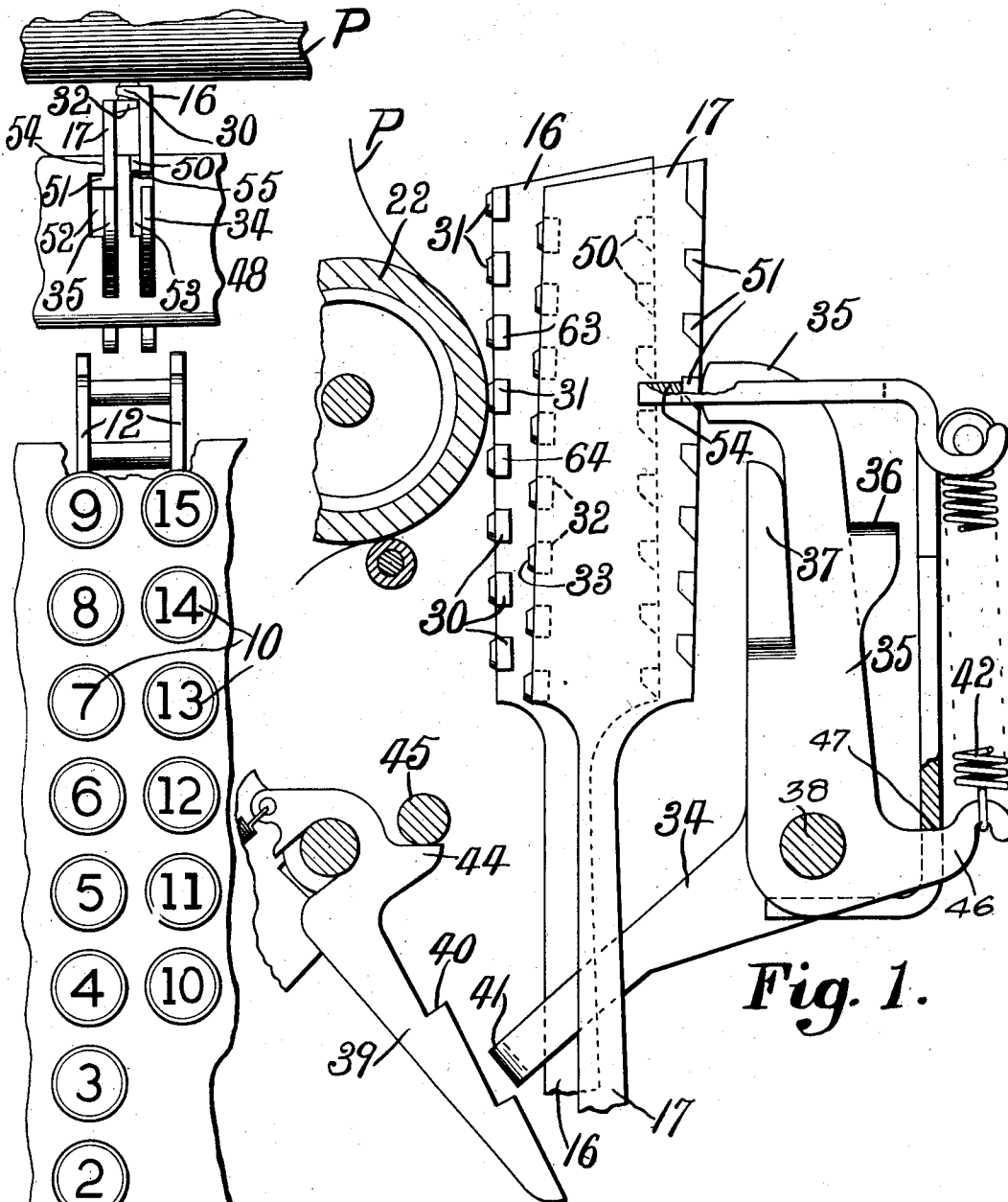


Fig. 2.

Fig. 1.

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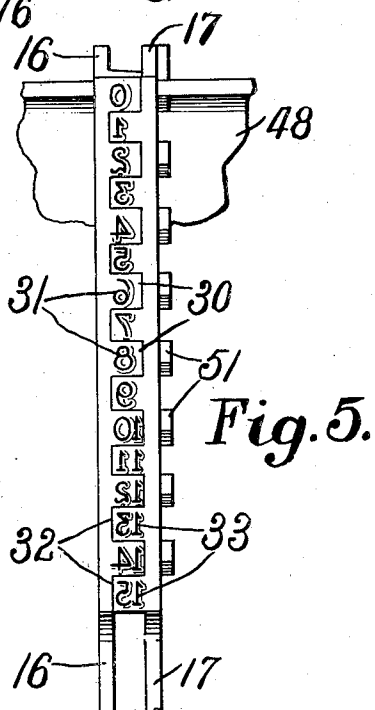
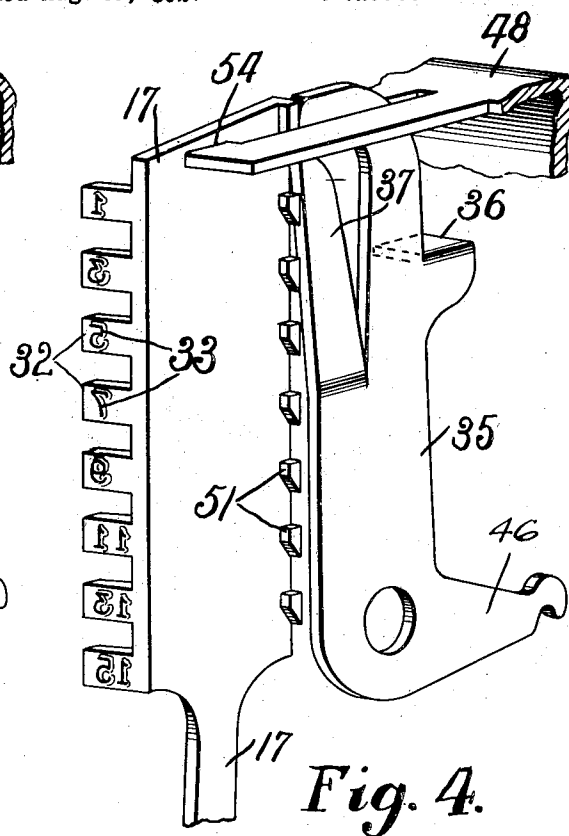
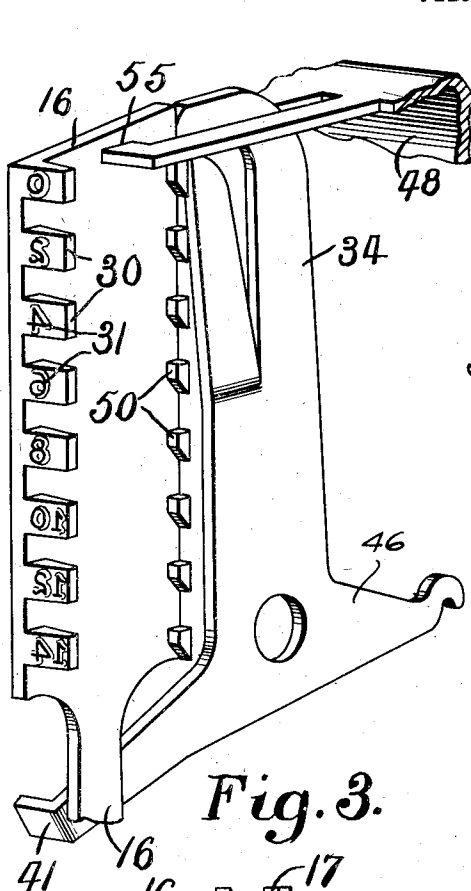
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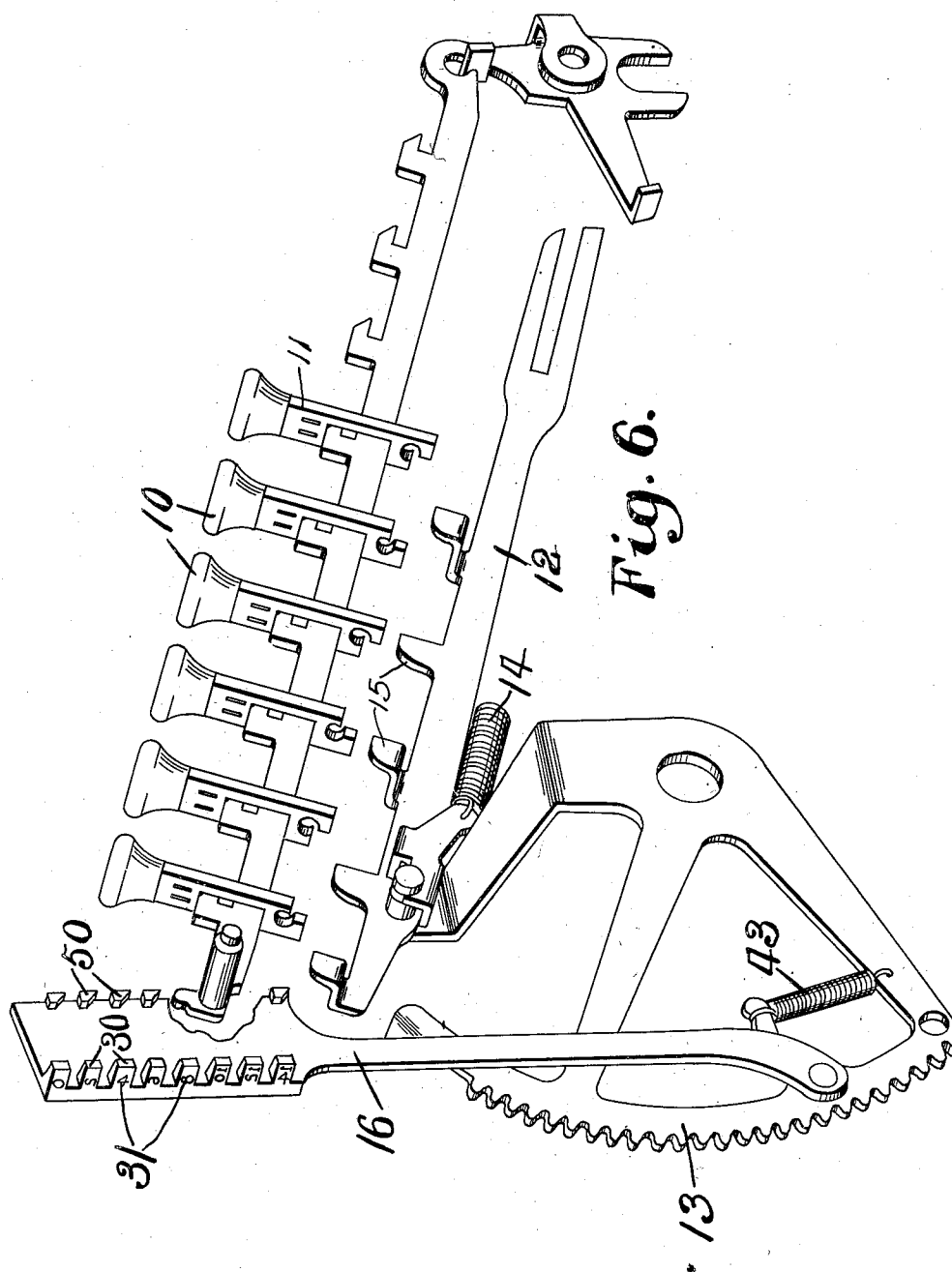
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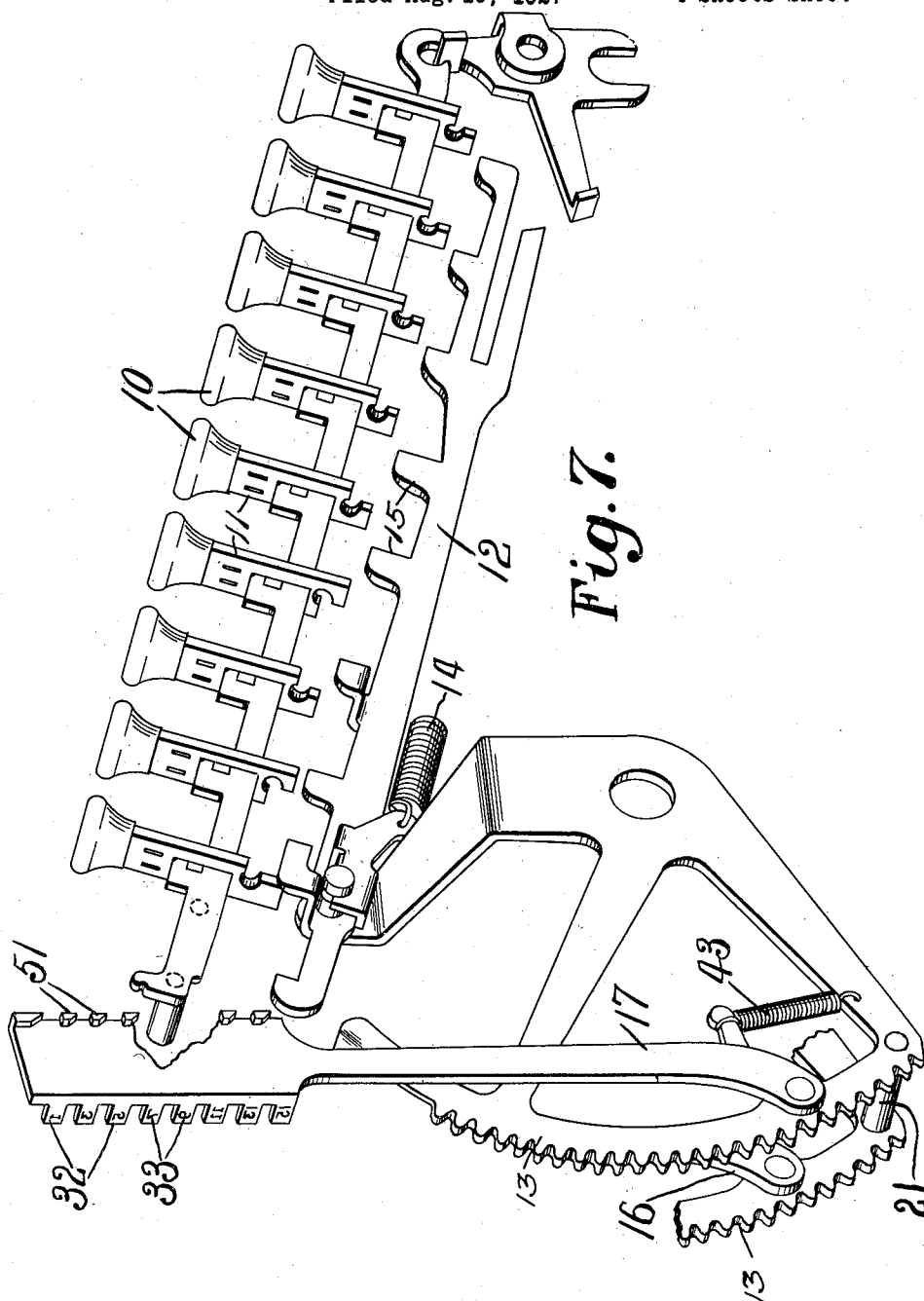
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UNITED STATES PATENT OFFICE.

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PRINTING MECHANISM.

Application filed August 19, 1927. Serial No. 214,019.

This invention relates to a printing mechanism, particularly to a printing mechanism for use with calculating machines in which type bars are used to make impressions on paper held against a cylindrical platen.

The type bars in a device of this kind are indexed by being raised or lowered relative to the printing line of the platen and, when properly indexed, are driven to printing position by means of hammers or similar devices. The extent to which the type bars may be moved relative to the platen for indexing purposes is limited, with the result that the type on the face of the type bars are usually quite close together. One of the difficulties encountered is that of preventing the type immediately above and immediately below the one it is desired to use from smudging or making partial impressions on the paper. The construction usually employed is to space the type sufficiently far apart to prevent this but, of course, this increases the necessary indexing travel of the type bars which is undesirable. Generally speaking, the type are placed as close together as possible and the indexing movement is governed accordingly. It is frequently necessary to use more type on the type bar than are normally employed in a decimal system calculating machine, as, for example, when a machine must be used for calculating currencies in multiples greater than ten. Under these circumstances the problem of smudging the paper becomes acute because it is generally not desired to change the distance of travel of the type bars, yet at the same time each bar must carry more type than the number for which it was originally designed. The present invention is directed to a solution of this problem and it comprehends the provision of mechanism whereby, without increasing the amplitude of movement of the type bars, a large number of type may be employed without smudging the paper with impressions that are not wanted.

The object of the invention is to provide an improved printing mechanism for calculating machines.

A more particular object is to provide an improved printing mechanism in which characters may be printed on paper held by a cylindrical platen by means of type bars carrying a relatively large number of type without smudging the paper.

Other objects and advantages of the invention will hereinafter appear.

An embodiment of the invention is shown in the accompanying drawings in which:

Fig. 1 is a sectional side elevation showing the position of the type bars while an impression is being made;

Fig. 2 is a partial plan view with some of the parts broken away to show the relative position of the type bars while making an impression;

Fig. 3 is a perspective view of one of the type bars and its hammer;

Fig. 4 is a perspective view similar to Fig. 3 showing the companion type bar and hammer to that illustrated in Fig. 3;

Fig. 5 is a front elevation of the faces of the type bars showing how they mesh with one another;

Fig. 6 is a perspective view of one of the type bars and the indexing mechanism therefor;

Fig. 7 is a perspective view similar to Fig. 6 showing the companion type bar to that illustrated in Fig. 6.

The invention is illustrated in connection with the calculating machine known generally as the Burroughs portable and the construction illustrated is that particularly applicable to calculations in India currency but it is to be understood that the invention may be used with other types of machines and for other currency systems. The pertinent portions of the calculating machine will be described very briefly as it is not necessary, for an understanding of the present invention, to go into all the details of the calculating machine which is on the market and easily available for inspection.

The calculating machine has a plurality of banks of amount keys 10 provided with stems 11 which act as stops for positioning stop bars 12 connected to toothed actuator segments 13. When the amount keys are depressed and the machine operated, the stop bars 12 are released for forward movement under the action springs 14, their forward movement being limited by contact of one of their stops 15 with the particular key stem or stems that have been depressed. In this way the stop bars and actuator racks are differentially positioned in accordance with the amount keys that have been depressed in setting up an item on the machine.

The type bars, such as the bar 16 of Fig. 6 and bar 17 of Fig. 7, are connected to their respective actuator segments and are thus

differentially positioned with the segments. In the standard decimal system machine, each bank has nine keys and each type bar has ten numerals, there being one more numeral on the type bars than there is number of keys in order that "0's" may be printed at the proper time when no key is depressed. The parts are proportioned so that these ten numerals are just sufficiently far apart to permit clear printing of each and the amplitude of movement of the type bar is arranged accordingly.

It frequently happens that a machine of this kind must be adapted for currency systems or other calculations in multiples greater than ten as, for example, in India currency where 16 annas make one rupee. This requires sixteen type on one of the type bars instead of ten and, unless the machine is to be changed entirely to increase the travel of the type bars, which would mean increased travel for all the type bars, these sixteen type must be mounted within the space usually provided for ten. Under ordinary conditions, this would put them so close together that clear printing would become very difficult if not impossible. The problem has been solved in the present invention by a novel mechanism which will now be described.

In order to provide the necessary number of amount keys for annas two banks must be employed, one having keys from 1 to 9 inclusive and the other keys from 10 to 15 inclusive. Each of these banks of keys has its stop bar 12 and each stop bar has its actuator rack but the two actuator racks are connected together by the cross shaft 21 illustrated in Fig. 7. The result of the interconnection of these parts is that both actuator racks are positioned whenever an amount key is depressed in either of the two banks illustrated in Fig. 2. The stops on the two stop bars 12 are arranged to give sixteen positions to the two actuator racks. Only one of the actuating racks is employed to rotate a counter pinion, such rack having its teeth spaced to engage a sixteen tooth counter pinion. The other rack is idle except as it serves to connect together the differential mechanisms of the two banks of keys.

The actuator rack for the short bank of keys carries the type bar 16 and that for the long bank the type bar 17. Since the actuator racks for these two bars are locked together, the bars are indexed together relative to the platen 22 carrying the piece of paper P.

The upper end of the type bar 16 is provided with a series of laterally projecting lugs 30 carrying type 31 and the type bar 17 has a series of similar lugs 32 projecting in the opposite direction and carrying type 33. The two series of lugs mesh with one another in staggered relation as shown in Fig. 5. In the machine illustrated, each bar has eight

lugs and the type carried by the bars are such that when the two are meshed together the numbers read from "0" to "15" inclusive.

The type bars are driven into printing position by means of hammers illustrated in Figs. 1, 3 and 4. The type bar 16 is actuated by the hammer 34 and the type bar 17 by the hammer 35. The hammer 35 has an offset lug 36 engaging behind the rear edge of the hammer 34 so that when the hammer 35 is driven forward it carries the hammer 34 with it. The hammer 34 also engages behind the bent lug 37 on the hammer 35 so that when the hammer 34 goes forward it carries the hammer 35 with it. In other words, the two hammers move together at all times.

Each hammer is pivoted to a shaft 38 (Fig. 1) and is moved to firing position by means of a cocking latch 39 having a shoulder 40 engaging an offset lug 41 on the hammer 34. There may be a cocking latch for each hammer controlled by the actuator rack for its bank, but it is not absolutely necessary to have a cocking latch for both banks since the hammers are locked together and one latch will serve for both. Accordingly, only one has been illustrated and the tail piece on the other has been cut off, it being understood that the other would operate in the same way if used.

When a key is depressed in one of the two banks and the machine operated, the cocking latch 39 is released by its actuator rack and it moves to a position where the shoulder 40 engages behind the lug 39. Operation of the machine draws the latch 39 upwardly and this retracts the hammer 34 (Fig. 1), which carries the hammer 35 with it, in a clockwise direction against the tension of springs 42 of which there is one for each hammer. During this clockwise movement of the hammers, the type bars 16 and 17 move clockwise with the hammers under the influence of the springs 43 (Figs. 6 and 7) of which there is one for each type bar. The hammers are fired when the parts have moved a sufficient distance to cause the lug 44 on the cocking latch 39 to engage a tripping shaft 45 which causes a clockwise rotation of the cocking latch to disengage the shoulder 40 from the lug 41. This releases the hammers which then fly forward under the influence of the springs 42 and carry the type bars with them. The position of the parts at the time the hammers are fired is illustrated in Fig. 1 for one indexed position of the type bars. The forward or counterclockwise movement of the hammers is stopped by the engagement of tail pieces 46 with the abutment edges 47 on the comb plate 48 in which the hammers move. Each hammer is stopped short of a position where the type of its type bar will contact the paper. However, unless otherwise obstructed, the type bars will fly forward

by momentum and make their impressions after which they will be retracted against the hammers by the springs 43.

In the construction shown, both of the 5 hammers 34 and 35 are fired at the same time and they drive the two type bars 16 and 17 forward together but provision is made for permitting only one of the type bars to go forward sufficiently far to make an impression 10 on the paper. The type bar 16 carries a series of spaced lugs 50 on its inside surface near the rear and the type bar 17 carries a similar series of spaced lugs 51 on its inside surface near the rear except that the lugs 51 are stag- 15 gered in relation to the lugs 50 as will be clear by referring to Fig. 1. The type bars move through slots 52 and 53 in the comb plate 48 (Fig. 2). The forward end of the slot 52 is partly closed by a projection 54 and the forward 20 end of the slot 53 is partly closed by a projection 55. These projections are in position to engage the respective lugs 50 and 51 on the type bars 16 and 17 when these type bars are indexed so that their lugs are oppo- 25 site the projections. Inasmuch as the lugs on one type bar are staggered with relation to the lugs on the other, it will be obvious that, in any indexed position of the type bars, one of the lugs on one of the bars will be 30 opposite its stopping projection on the comb plate while the projection on the comb plate for the other bar will be opposite the space between the lugs on that bar. Accordingly, when the two bars are driven forward to- 35 gether, one of them will be stopped short of the platen by the engagement of one of its offset lugs with its limiting projection on the comb plate. As illustrated in Fig. 1, the type bars are indexed so that one of the lugs 40 51 on the bar 17 strikes the projection 54. The type bar 17 is thus held retracted while the bar 16 moves forward to printing position as illustrated. The result is that the type 31 on the bar 16 is free to make a clear 45 impression because the two types 61 and 62 immediately above and below it which are carried by the type bar 17 are held retracted where they cannot possibly contact the paper. The next adjacent types, namely 63 and 64, 50 are spaced sufficiently far from the type 31 so that no smudging occurs with the result that a clear and distinct impression of the type 31 is obtained without interference from any of the other adjacent types.

55 This construction permits sixteen type to be mounted within the space previously occupied by ten and enables clear printing to be obtained with a larger number of type without increasing the extent of travel of the type 60 bar. The number of type employed may, of course, be varied to suit the requirements. The invention is not only advantageous for adapting the printing mechanism of a decimal system machine for the printing of num- 65 bers in a system having multiples greater

than ten, but is also useful in an ordinary decimal system machine in that the distance of travel of the type bars in such a machine can be shortened over what is ordinarily required and yet clear, distinct printing can be 70 obtained.

It is to be understood that the structure shown is for purposes of illustration and that variations can be made in it without departing from the spirit and scope of the inven- 75 tion as defined by the appended claims.

I claim:

1. In a printing mechanism of the class described, impression making means having portions movable relative to each other toward impression making position, means for indexing said impression means relative to a printing line, means for driving said impression means to impression making position, and means governed by the indexing of 80 the impression means and acting positively to prevent one of said portions of the impression means from moving to impression making position while the other moves to said position. 85 90

2. In a printing mechanism of the class described, impression making means having portions movable relative to each other toward impression making position, means for indexing said impression means relative to a printing line, means for driving both of said portions of said impression means toward 95 impression making position, and means governed by the indexed position of the impression means for stopping one of said portions 100 of the impression means short of impression making position while allowing the other to move to said position.

3. In a printing mechanism of the class described, the combination with a cylindrical 105 platen, of a type bar comprising two parts movable relative to each other toward the platen, each of said parts carrying type which alternate with the type of the other in a direction at right angles to the printing line of 110 the platen, means for indexing said type bar, means for driving said bar toward the platen, and means governed by the indexed position of the type bar for preventing one of said type bar parts from striking the platen when 115 the driving means acts to move the bar for this purpose.

4. In a printing mechanism of the class described, the combination with a cylindrical platen of a type carrier comprising two bars 120 movable toward said platen, means for simultaneously indexing said bars relative to the printing line of the platen, means for driving said bars against the platen, and means governed by the indexing of the bars 125 for preventing one of them from striking the platen when the other is moved to strike it.

5. In a printing mechanism of the class described, the combination with a cylindrical 130

platen, of a type carrier comprising two bars movable toward said platen, means for simultaneously indexing said bars relative to the printing line of the platen, means for simultaneously driving said bars toward said platen, and means governed by the indexed position of the bars for preventing one of them from striking the platen when they are both driven toward the platen.

6. In a printing mechanism of the class described, the combination with a cylindrical platen, of a type carrier comprising two bars movable toward said platen, each bar carrying type which alternate with the other in a direction at right angles to the printing line of the platen, means for indexing said bars simultaneously, means for driving said bars toward the platen simultaneously, each of said bars having a series of spaced lugs projecting therefrom, and stops for engaging the lugs, the lugs on one bar alternating in position with those on the other whereby, in one set of indexed positions of the bars the lugs on one bar will engage their stop when the bars are moved toward the platen, and, in another set of indexed positions, the lugs on the other bar will engage their stop.

7. In a printing mechanism of the class described, the combination with a cylindrical platen of a type carrier comprising two bars movable toward the platen, each bar having a series of lateral projections carrying type, the series on one bar alternating with that on the other and the two being meshed with one another, means for indexing said bars relative to the printing line of the platen, means for driving said bars toward the platen, each of said bars having a series

of spaced lateral lugs, and a stop for each bar for engaging the lugs thereof, the lugs on one bar alternating in position with those on the other whereby when the bars are driven toward the platen, the lugs on one bar will strike their stop in one set of indexed positions of the bars while the other bar will be free to move past its stop, and in another set of indexed positions the first bar will be free while the lugs on the second will strike their stop.

8. In a printing mechanism of the class described, a platen, means carrying a series of types in alignment, means for indexing said carrying means to index the types relative to the printing line of the platen, means for driving all of said types toward impression making position, and means controlled by the indexing of the type carrying means for positively and automatically preventing the types immediately adjacent the indexed type from reaching impression making position.

9. In a printing mechanism of the class described, a platen, means carrying a series of types arranged in alignment, means for indexing said type carrying means relative to the printing line of the platen, means for driving said type carrying means toward said platen to carry its types to impression making position, and means for automatically preventing the types immediately adjacent the indexed type from reaching impression making position.

In testimony whereof, I have subscribed my name.

ERNEST RACZ.