April 7, 1936. F. E. CURTIS 2,036,259

PRINTING MECHANISM

Filed Sept. 8, 1934 4 Sheets-Sheet 1

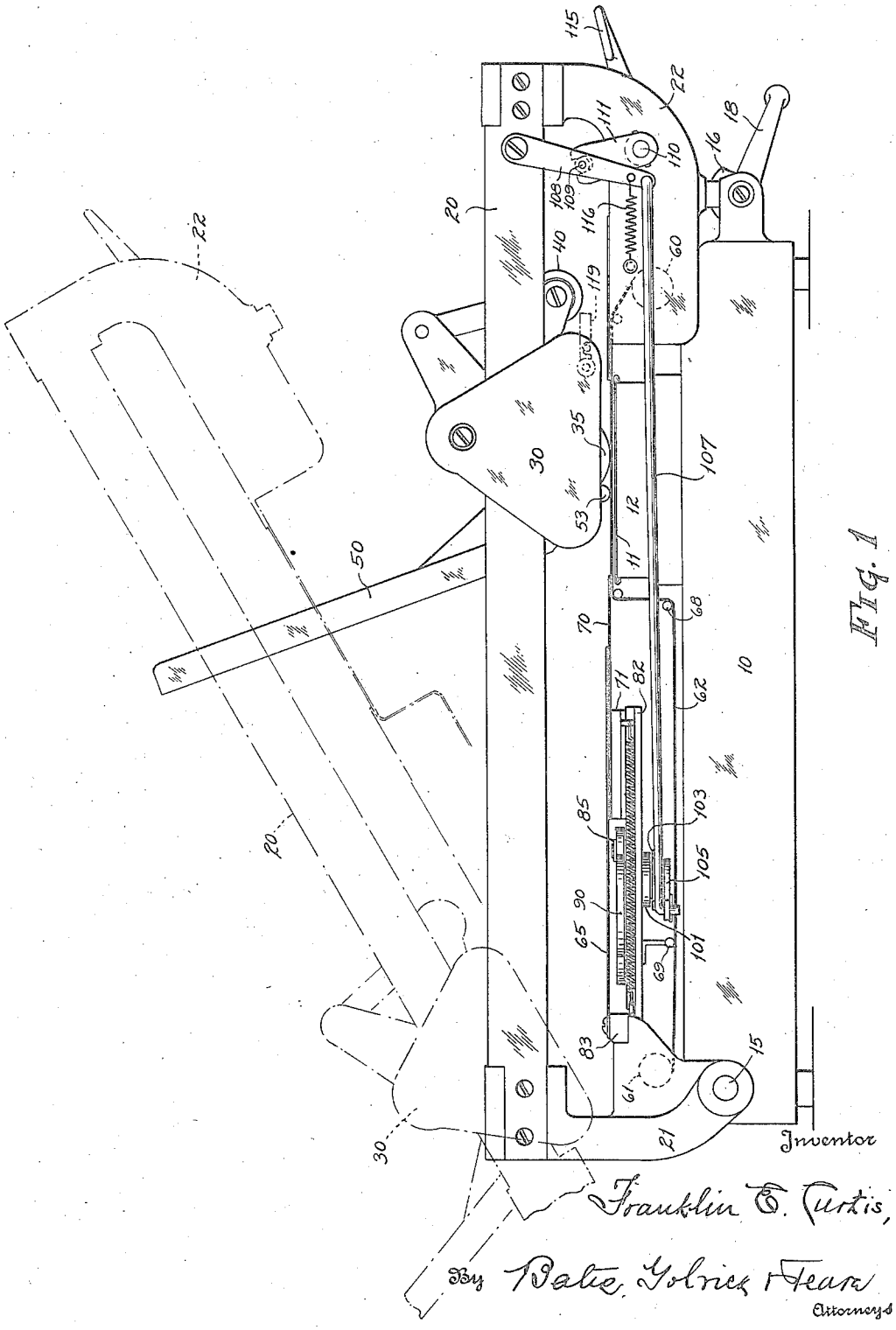



Fig. 1

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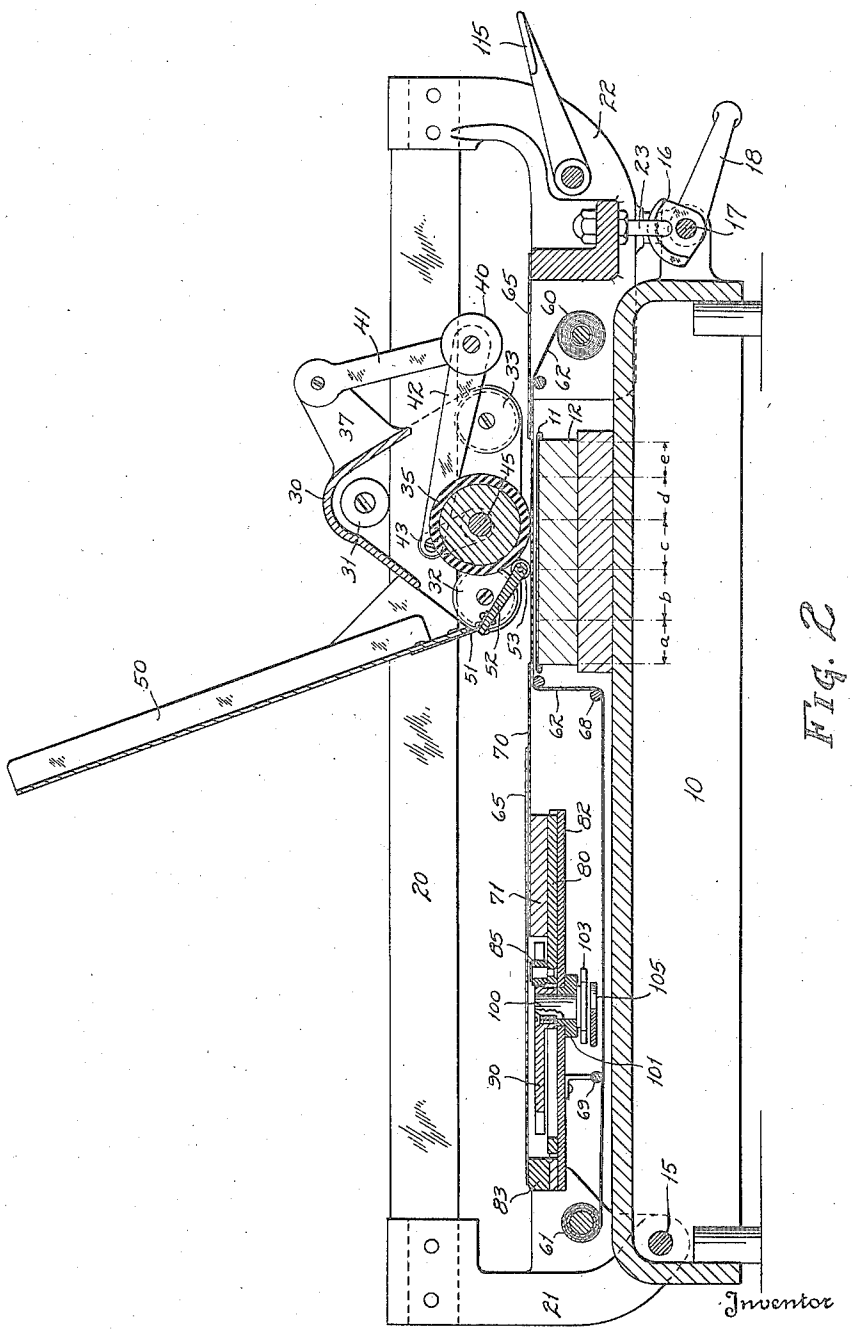



Fig. 2

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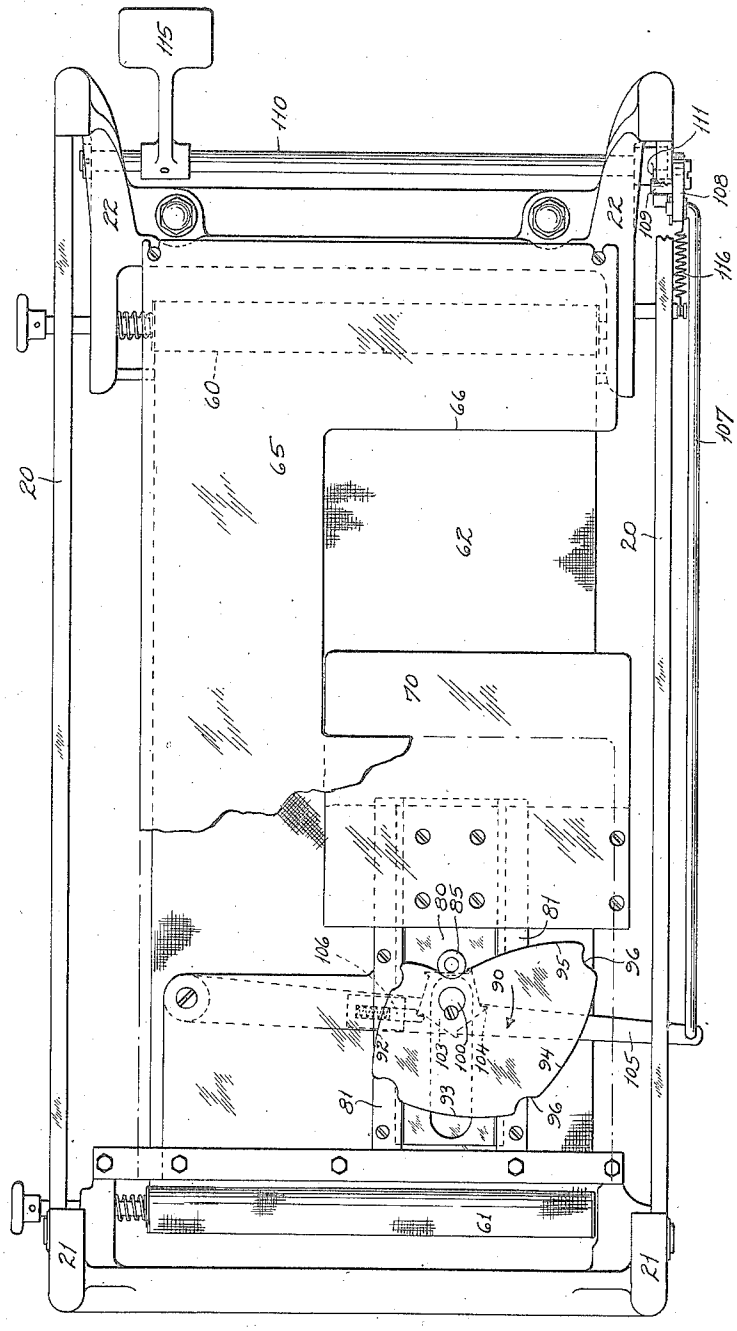



FIG. 3

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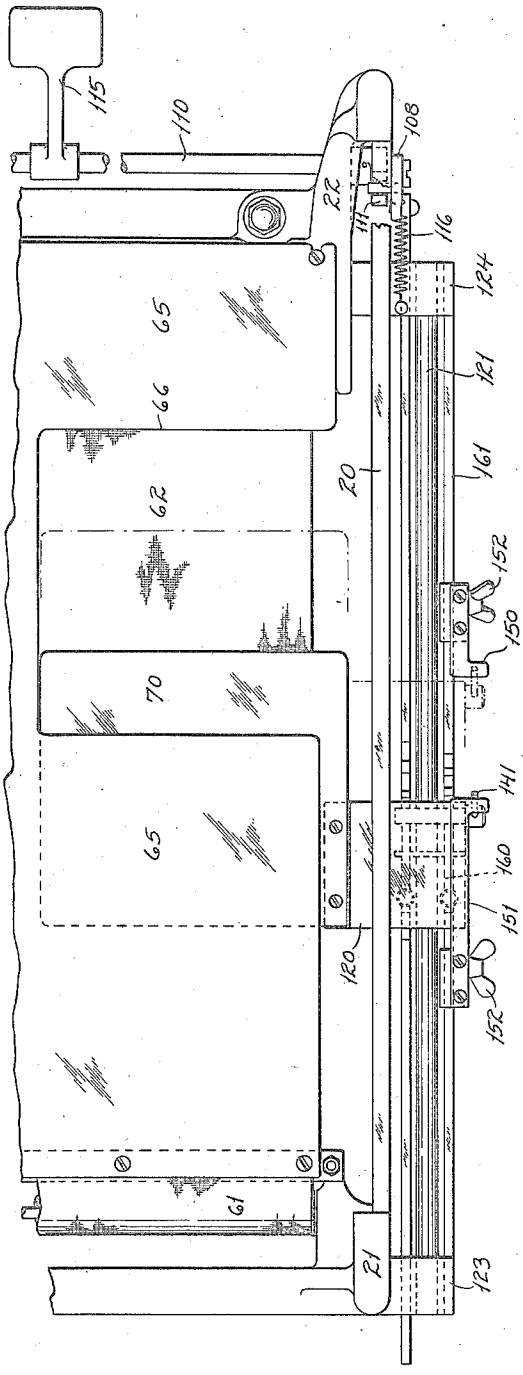



Fig. 4

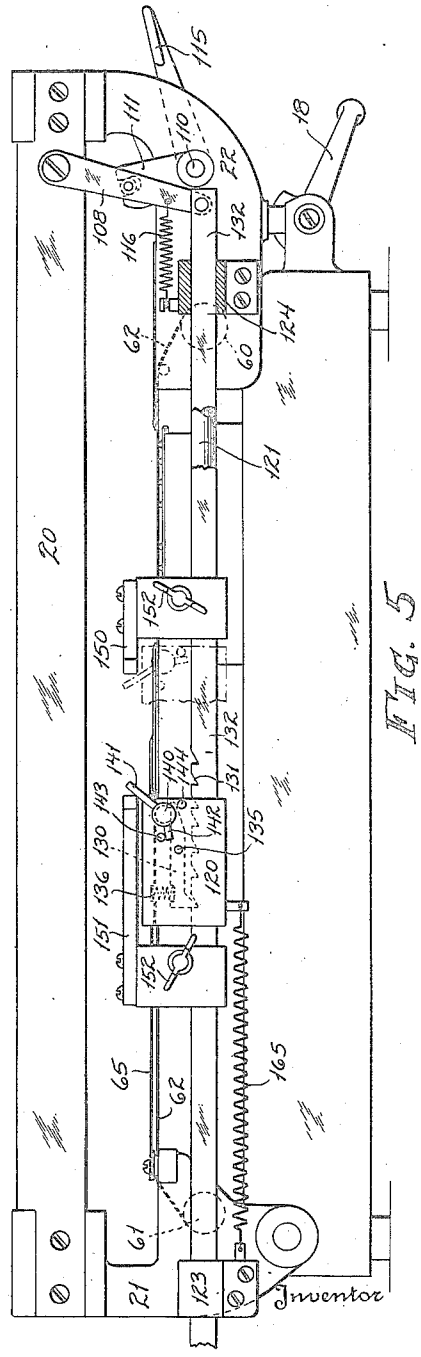



Fig. 5

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Patented Apr. 7, 1936 2,036,259

# UNITED STATES PATENT OFFICE

2,036,259

## PRINTING MECHANISM

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Application September 8, 1934, Serial No. 743,229

22 Claims. (Cl. 101—63)

This invention relates to a printing machine adapted to print impressions from a form which is successively changed. More particularly, the change in the form results from the successive elimination of parts thereof, which may be effected manually whenever desired, or, if preferred, automatically on each printing stroke.

My invention provides, for instance, for the entire printing on one impression of all matter on an embossed plate, electrotype, or other form, for one or more impressions; then all of the matter except a narrow region at the top or bottom; then on a later impression all of the matter except a wider region at the top or bottom, and so on till on the last impression only a comparatively narrow region adjacent the top or bottom is employed.

As a simple illustration of the use of my invention, I may mention printing from an address plate which carries not only an individual's name and address but data in regard to the nature of his business, followed by the name of the particular agent looking after that account. Then the first impression might be of the entire plate for the information of the home office and agent; the second impression (omitting the agent's name) might be for classifying names and addresses among different businesses, while a third (giving merely the name and address) could be used for addressing letters and envelopes to be sent to the party.

A more involved use of my invention is in the printing of forms in head offices of insurance companies, where it is desirable to have a plate for a permanent record of considerable data regarding the policy—for instance, the name and address of the policy holder and the local agent handling the policy; data concerning premiums and loan values; statement of options adopted for application of dividends and payment of the policy; names of beneficiaries; lists of other policies held, etc. Now some of this data is only of use in one department, other data in two departments, and so on. Accordingly, by arranging the data in the order of the frequency of use, one may print successively a form containing all the data; a form omitting for instance the list of other policies; a form omitting both the lists of other policies and the names of beneficiaries, and so on until eventually a form may be printed with little more than the address of the policy holder and agent. By these successive omissions, the record in each department is not encumbered with unnecessary data, and more space on a given card is left below the imprint for keeping of records, such, for instance, as the issuance and payment of premium loans.

My invention is well adapted for that type of manually operable printing machine having a flat bed and a traveling roller platen, such for instance, as shown in Patent No. 1,842,086, granted January 19, 1932, to Addressograph Company, as assignee of Emmett C. Hartley, and that is the type of machine in which the invention is illustrated in the drawings. However, it is to be understood that the invention has a wider adaptation and may be used with printing presses of other types.

As shown in the drawings, Fig. 1 is a side elevation of an approved embodiment of my invention; Fig. 2 is a vertical section of the same in a plane parallel to Fig. 1; Fig. 3 is a plan partially broken away; Fig. 4 is a partial plan of a modified embodiment of the invention; Fig. 5 is a side elevation of the embodiment of Fig. 4.

Referring to all of the figures, 10 designates a flat horizontal bed carrying the form, which, as shown, comprises a plate 11 mounted on a suitable support 12, resting on the bed. Pivoted to the bed at 15 is a frame composed of a pair of side bars 20 and cross members 21 at the rear and 22 at the front. Suitable means is provided for locking the front end of this upper frame to the bed. As shown, the upper frame has depending hook-like members 23, which are adapted to be engaged by camming ledges 16 on a rock shaft 17, pivotally mounted in the front end of the bed 10. A lever 18 operates the rock shaft and causes the cam ledges to engage the hooks 23 and hold the frame effectively in the position shown in Figs. 2 and 5 and in full lines in Fig. 1. When released, however, the frame may be tipped back into the position indicated in dotted lines in Fig. 1, to allow the ready installation of the form.

Slidably mounted on the side bars 20 of the hinged frame is a traveling carriage 30, which is shown as having rollers 31 engaging the upper edge of the respective bars and two rollers 32 and 33 engaging the lower edge. Mounted in the platen carriage 30 is a roller platen 35, which is adapted to coact with the plate 11 as the carriage is moved in one direction. I have shown a handle 40 secured to the carriage by which it may be reciprocated. This handle is mounted between a pair of arms 41, which are pivoted to a pair of ears 37, rigid with the carriage. A pair of links 42 connect the handle with a pair of arms 43, secured to an eccentric shaft 44 on which the roller platen 35 is mounted. This ec-

centric shaft is so arranged that the platen is in active position when the handle 40 is shoved rearwardly and is idle when it is drawn forwardly.

A sheet holder 50 may be fixed to the carriage in any suitable manner. Rigidly fastened to the bottom of the sheet holder may be a leaf spring member 51, having fastened to it a member 52, carrying a roller 53 adapted to coact with the platen roller.

Secured to the platen frame near the front and rear ends respectively are ribbon spools 60 and 61 between which extends an inking ribbon which, when the platen is down in its active position, overlies the form 11.

With the construction just described, when a sheet of paper or envelope is placed on the paper carrier and the carriage shoved rearwardly, the paper is fed by the platen 35 and roller 53, which are revolved due to the engagement of the platen with the form, so that the sheet becomes printed as the platen travels over the form. At the end of the rear stroke of the platen carriage the printed sheet lies exposed ready for removal. Then the carriage is returned by a pull on the handle 40, the platen being then idle by reason of the turning of the eccentric shaft 45. To support the sheet in the regions where it is not to be impressed, a shield 65 is secured to the hinged frame and extends horizontally from one end to the other, but is cut away at 66 for a region corresponding to the area of the entire form 11.

Coming now to the details of my invention, which I have shown as applied to a printing machine of the type above explained, I provide a movable shield 70 which is a thin, impervious, metallic sheet lying closely beneath the shield 65 and is adapted to project varying distances across the opening 66 and thus cover successive portions of the form, without interfering with the coaction of the platen with the uncovered portions. This shield 70 is shown as carried and operated in one manner in Figs. 1, 2 and 3 and by a different mechanism in Figs. 4 and 5, but in either case the operation is to periodically feed the shield 70 forwardly so that it covers successively increased portions of the form measured from the rear edge thereof.

As shown in Figs. 1, 2 and 3, the movable shield 70 (reinforced by a bracing strip 71) is carried by a block 80, slidably mounted between gibs 81 on a plate 82 secured to a cross-bar 83 carried by the hinged frame. The block 80 has an upwardly projecting pin on which is mounted a roller 85 coacting with a cam 90 having varying faces and adapted to shove the roller toward the front successive distances as the cam is periodically partially rotated in the direction indicated by the arrow in Fig. 3. As shown, the cam 90 has five faces—four of them—(91 to 94) being of successively increased radial distance, and the fifth being a returning face 95. At the beginning of each face is a recess, designated 96 in each instance, so that the shield may be effectively retained in any of its positions, to form a dwell for the roller 85.

The cam 90 is rigid with a vertical shaft 100, which is mounted in a bushing 101 carried by the bottom plate 82 to which the guide bars 81 are secured. Suitable ratchet mechanism is provided to give partial rotations in the same direction to the shaft. In this embodiment I have shown for this purpose, on the lower end of the shaft 100, a polygonal block 103 having as many faces as the cam 90, each face terminating in a projecting ledge 104. Pivoted to the frame plate 82 is a lever 105 carrying a spring-pressed dog 106 adapted to coact with any of the ledges 104, and thus turn the polygon a distance corresponding to one of its faces, for each actuation of the lever.

The lever 105 is shown as connected by a link 107 to a lever 108, the upper end of which is pivotally attached to the adjacent longitudinal bar 20 of the hinged frame. Mounted in the front cross member 22 of the hinged frame is a rock shaft 110 which carries a rock arm 111 having a forked engagement with a pin or roller 109 on the lever 108. An operating lever 115, in the form of a rock shaft with a widened end, is attached to the rock arm 110, and is given a tendency to stand in its uppermost position by a suitable spring, for instance a tension spring 116 attached to the lever 108 and to the frame member 22.

It results from the construction just described that when the operating lever 115 is depressed, the link 107 is drawn forwardly. This swings the lever 105 forwardly and by reason of the engagement of the pawl 106 with the ledge of the polygon 101 gives the shaft 100 a partial rotation. This delivers a corresponding turn to the cam 90, which forces the movable shield 70 forward one step.

As heretofore stated, the cam shown has five faces and there are five faces to the polygon, so that one depression of the manual lever 115 gives a fifth of a rotation to the cam and causes the face 91 to move past the roller 85, which is thus forced forwardly until it rests in the dwell 96 at the beginning of the face 92. This movement causes the shield 70 to cover the rearmost fifth of the form, which is the part indicated at *a* in Fig. 2.

In the next depression of the lever 115 the cam face 92 is caused to move past the roller 85, which thus rests in the dwell at the beginning of the face 93 and the parts *a* and *b* of the form are covered. The third depression of the lever causes the cam face 93 to be active and the shield 70 to cover the parts *a*, *b* and *c*, and the fourth depression makes the cam face 94 active and the shield cover the parts *a*, *b*, *c* and *d*. This leaves exposed merely the final portion of the form indicated by *e*. Following the printing thereof another depression of the lever 115 brings the decreasing cam face 95 into coaction with the roller 85 and thereupon springs 117 in Fig. 1 attached to the movable block 80 withdraw the shield 70 to initial position, as shown in Fig. 3.

In order that the shield 70 may overlie the inking ribbon 62, the latter is turned downwardly immediately at the rear of the form and in front of the foremost position of the slidable block 80 carrying the shield. If desired, the rear spool 61 could be supported by the hinged frame in this region, but I regard it as preferable to extend the region downwardly in a plane entirely below that of the movable slide and thence across guide rods 68 and 69, and thence to the spool 61.

I have described the manual operation by which successively increased portions of the form may be shielded according to the operation of the manual lever. However, if desired, this successive shielding of the form can be accomplished automatically by simply mounting on the platen carriage a member which may engage and actuate the lever 108 when the carriage comes to the forward end of its stroke. For this purpose, I have shown in Fig. 1, in broken lines, a bar 119 which may be secured to the carriage 30 at one

side and is offset inwardly sufficiently to abut the edge of the lever 108 when the carriage reaches the forward end of its stroke. With such a mechanism one impression will print the whole form, the next impression automatically all of the form but the rearmost fraction, the next impression automatically all but the rearmost two fractions, and so on. The bar 119 being readily removable, or adapted to be swung and retained in idle position, the machine may be converted from an automatic to a manual operation whenever desired.

In Figs. 4 and 5, I have illustrated a modified mechanism for carrying and operating the shield 70, which does not necessitate the detouring of the inking ribbon at the rear of the form. As shown in these figures, the inking ribbon extends in the usual manner from the front spool 60 to the rear spool 61, and is surmounted by the usual fixed shield 65. The removable shield 70 in this case lies over the rear portion of the ribbon and is secured at its ends to blocks 120 beyond the edges of the ribbon which are mounted on rods 121 secured to ears 123 and 124 projecting from the sides of the hinged carriage. Fig. 4 shows the construction at one side; the construction at the other side being identical in these particulars.

To actuate the movable shield 70 in the embodiment of Figs. 4 and 5, I provide one of the blocks 120 with a movable pawl 130 which coacts with ratchet teeth 131 in a slidable bar 132 connected at its forward end to the lever 108 actuated by the rock shaft 111 on the rod 110 carrying the manual lever 115, the same as in the formerly described construction. The pawl 30 is pivoted at 135 and is normally pressed downwardly by a spring 136. On the other side of the pivot, extending across the pawl, is a flattened shaft 140 carrying an operating rock arm 141 and a stop arm 142 operating between a pair of pins 143 and 144 on the block 120. I secure to the rod 121 on that side of the machine a pair of adjustable stops 150 and 151, the same being locked in place by clamp screws 152.

Now, with the construction just described, when the lever 108 is swung forwardly, either by depression of the manual lever 115 or automatically by engagement of a member on the platen carriage, the bar 132 is drawn forwardly, which causes the rearmost notched tooth 131 to engage the pawl 130 and draw the block 120 forwardly, which thus moves the shield 70 forwardly a fraction of the total form. At the end of such stroke a detent pawl 160, similar to the pawl 130, drops into the corresponding notch of the stationary bar 161 and retains the block in that position until the movable bar 132 returns to rearmost position under the influence of the spring 116.

Now, on the next stroke of the lever 108, the second tooth 131 engages the pawl 130 and feeds it forward so that the shield 70 covers the second fraction of the form and is there retained by engagement of the detent pawl 160 with the second tooth of the stationary rack 161, and so on for each fraction of the movement.

At the end of the final forward movement of the shield 70 in Figs. 4 and 5, the operating lever 141 of the flattened shaft 140 engages the stop 150. This turns the shaft 140 so that its rounded portion is across both pawls 160 and 130, thus shoving downward on the tails of those pawls and raising the noses thereof so that the block 120 is free from both rack bars 132 and 161. Thereupon, the spring 165 returns the block 120 and shield 70 to initial position. When it comes into that position the lever 141 of the platen shaft 140 engages the stop 151 and thus turns the shaft to bring its flattened portion into coaction with the pawl tails, whereupon the pawl noses are depressed by their springs and are thus again active.

In the embodiment of Figs. 1, 2 and 3, the movable shield progresses by a distance corresponding to one-fifth of the total form. In Figs. 4 and 5, I have shown seven teeth on the controlling ratchet bars and thus they progress by steps corresponding to one-seventh of the form. The fraction fed for each actuation may be varied, as desired, by substituting different cams and polygons in the first embodiment and different rack bars in the second form.

I claim:

1. In a printing machine, the combination of a bed and platen, a form adapted to be mounted on the bed, a shield adapted to extend over part of the form, and means for causing relative movement between the shield and form by successive increments.

2. In a printing machine, the combination of means for supporting the form, a shield, and means for causing cumulative relative movement between the shield and form whereby different portions of the form are successively covered while other portions are left uncovered.

3. In a printing machine, the combination of means for supporting the form, a shield, and means for causing cumulative relative movement between the shield and form by a series of steps, each of an extent comprising a fraction of the face of the form.

4. In a printing machine, the combination with means for supporting the form, a movable shield carried by the machine and adapted to overlie a portion of the form, and means for moving the shield by a series of steps to cover progressively increased areas of the form.

5. In a printing machine, the combination of means for supporting the form, a shield movably mounted in the machine, mechanism for moving the shield by a series of successive increments over part of the form, and a traveling roller platen adapted to travel across the form and the overlying portion of the shield to print areas of successively varying extent.

6. In a printing machine, the combination of a flat bed adapted to support a form, a traveling roller platen movable parallel with the bed, a thin shield adapted to overlie a portion of the form, mechanism for moving the shield progressively over the form by a series of cumulative increments, and a manual device for operating said mechanism.

7. In a printing machine, the combination of a bed adapted to support a form, a platen adapted to coact with the form, a shield adapted to overlie a portion of the form, mechanism for moving the shield over the form by a series of cumulative increments, and automatic means for operating said mechanism consequent upon the movement of the platen.

8. In a printing machine, the combination of means for supporting a form, an inking ribbon adapted to overlie the form, a thin shield mounted in the machine and adapted to overlie that portion of the ribbon which is over the form, means for causing relative movement between the shield and ribbon-covered form by a series of cumulative increments, and a platen adapted to bear on the exposed ribbon and shield.

9. The combination of a flat bed adapted to

carry an upwardly facing form, a frame hinged to the bed adjacent its rear end and adapted to be tipped up therefrom at the front end, means for latching the frame to the bed in a position parallel therewith, a traveling carriage mounted on the frame carrying a roller platen, an inking ribbon mounted on the hinged frame, a movable shield mounted on the hinged frame and adapted to overlie a portion of the ribbon where it overlies the form, and mechanism for moving the shield progressively by a series of cumulative steps.

10. The combination of a bed adapted to carry a form, a frame pivoted to the bed and adapted to be raised therefrom or held parallel therewith, a platen carriage slidable on the frame, a roller platen carried by the carriage and adapted to coact with the form, an inking ribbon carried by the hinged frame and adapted to overlie the form, a movable shield carried by the hinged frame and adapted to overlie various portions of the ribbon where it overlies the form, and mechanism carried by the hinged frame for successively moving the shield.

11. The combination of a bed adapted to carry a form, a thin shield adapted to overlie variable areas of the form, mechanism acting on the shield for successively progressing the shield across the form in one direction, means for retaining the gain made by the shield in each step, and means for finally releasing the shield and returning it to initial position.

12. The combination of a flat bed adapted to carry a form, a thin shield adapted to overlie variable areas of the form, means beyond the form carrying the shield, mechanism acting by cumulative increments on the shield-carrying means for successively progressing the shield across the form.

13. The combination of a bed adapted to carry a flat form, a traveling platen adapted to coact with the form, a shield adapted to overlie a portion of the form, a slide beyond the form carrying the shield, and mechanism acting on the slide to move the shield across the form, and means for operating said mechanism automatically consequent upon the movement of the platen.

14. The combination of a flat bed adapted to carry a form, a shield adapted to overlie a portion of the form, a manual lever, connecting mechanism between the lever and shield arranged to feed the shield successively in the same direction for successive actions of the lever, whereby the shield may cause the exposure of successively varying portions of the form.

15. The combination of a bed adapted to carry a form, a platen to cooperate with the form, a shield adapted to overlie a portion of the form, mechanism acting on the shield to successively progress the shield across the form to successively cover fresh areas of the form without uncovering the area previously covered by the shield.

16. The combination of a bed adapted to carry a form, a shield adapted to overlie a portion of the form, ratchet mechanism for feeding the shield step by step in one direction, and means for operating the ratchet mechanism.

17. The combination of a bed adapted to carry a form, a slidable shield adapted to cover a portion of the form, a cam acting on the shield and adapted to move it by successive increments, and mechanism for operating the cam.

18. The combination of a flat bed adapted to carry a form, a flat shield adapted to extend across the form, a cam adapted to coact with a member connected to the shield, said cam having successive faces of increased radius associated with dwells corresponding to each face, and mechanism for giving successive partial rotations to the cam.

19. The combination of a bed adapted to carry a form, a movable shield adapted to overlie part of the form, a rotary cam having several faces at successively increased distances from the axis and adapted to act on the shield, mechanism for giving successive partial rotations to the cam to cause it to move the shield by successive steps across portions of the form.

20. The combination of a bed adapted to carry a flat form, a flat thin shield adapted to overlie a portion of the form, a slide carrying the shield, a reciprocable rack, a pawl carried by the slide adapted to engage the rack, mechanism for operating the rack to feed the slide and shield, and detent mechanism for retaining the gain made by such feed, whereby on a succeeding stroke the shield may be fed in the same direction from the region where the detent mechanism retained it.

21. In a printing machine, the combination of a bed adapted to support a flat form, a thin flat shield adapted to extend across the form variable amounts, a spring tending to withdraw the shield, and mechanism acting on the shield to feed it by successive steps in the same direction across the form against the action of the spring, there being means for holding the shield in each fed position and for releasing it from the final position, whereby the spring may return it.

22. The combination of a bed adapted to carry a flat form, a frame pivoted to the bed and adapted to be raised therefrom or held parallel therewith, a platen carriage slidable on the frame, a roller platen carried by the carriage and adapted to coact with the form, an inking ribbon carried by the hinged frame and adapted to overlie the form, a thin flat shield slidably carried by the hinged frame and adapted to overlie various portions of the ribbon where it overlies the form, and be engaged by the platen as it rolls across the form, ratchet for moving the shield over the form by successive steps, means for holding the shield in each successive position, and means for returning the shield to initial position when released.

FRANKLIN E. CURTIS.