March 17, 1953 J. B. PILKINGTON 2,631,531

DRUM SERIES PRINTING MACHINE

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Fig. 1

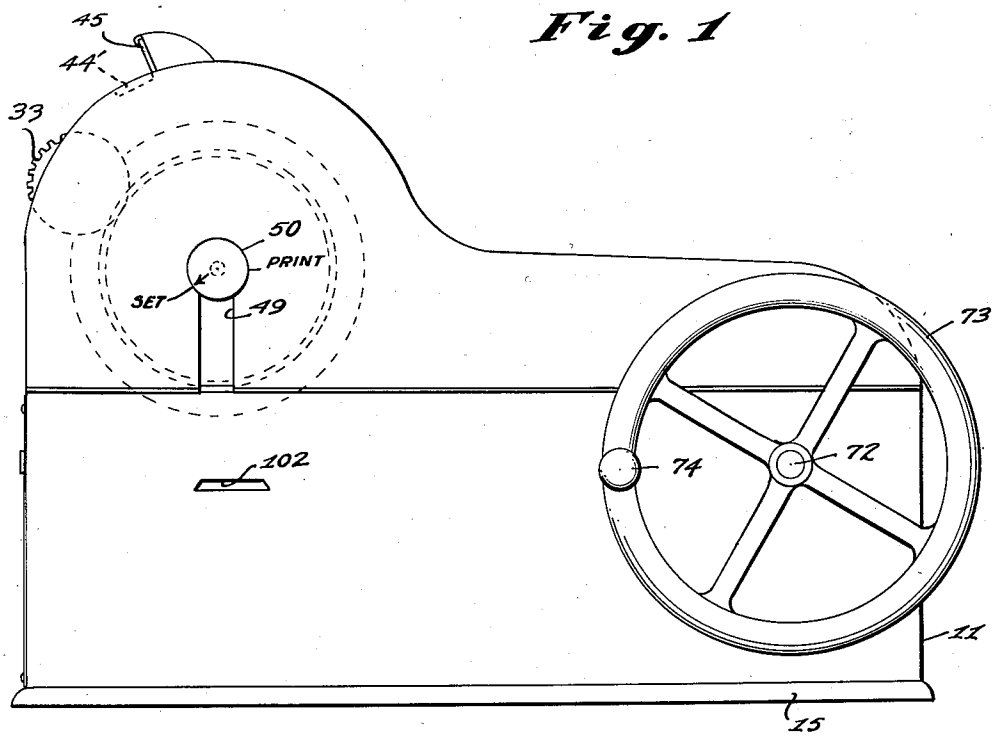
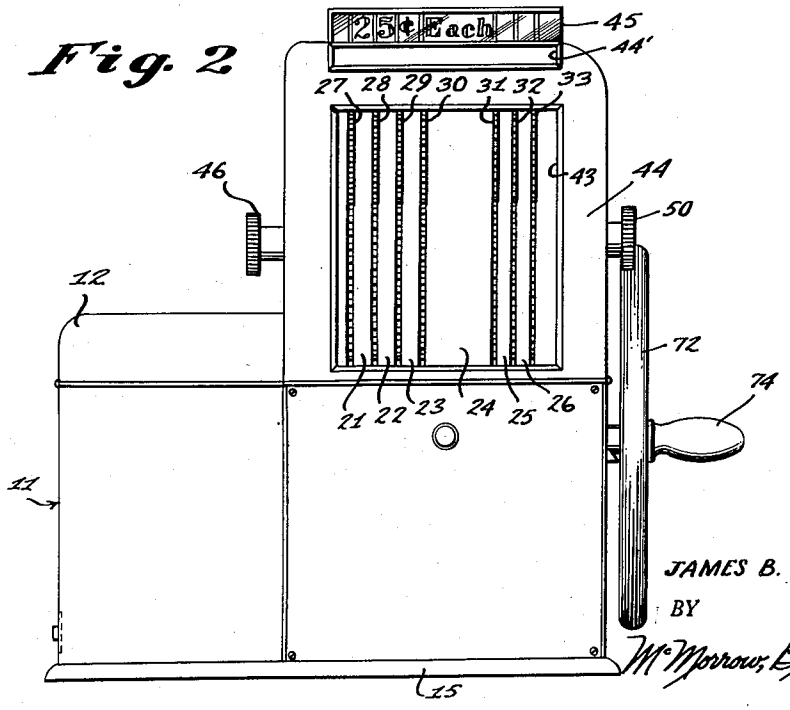



Fig. 2



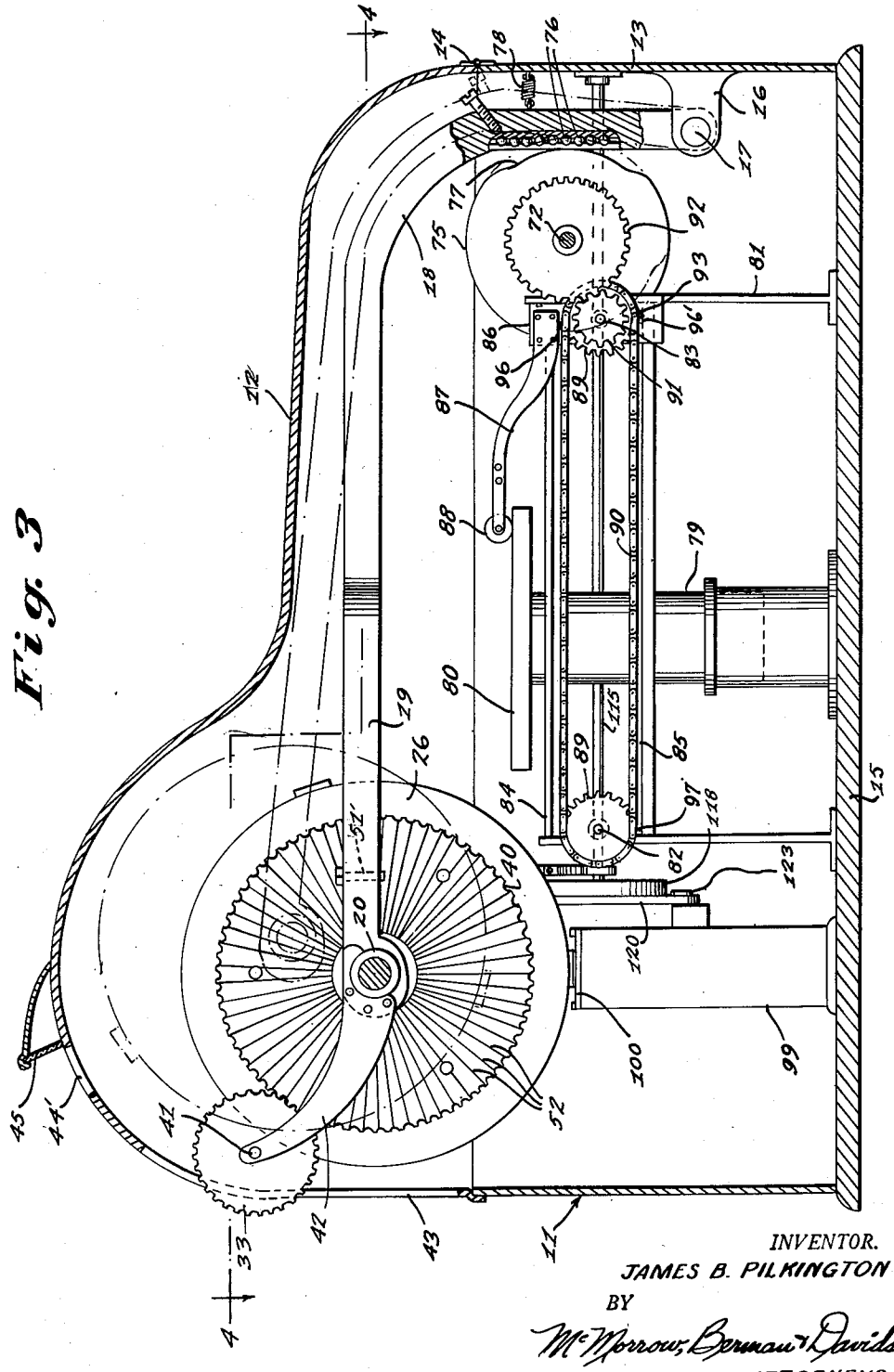

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Fig. 3



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Fig. 4

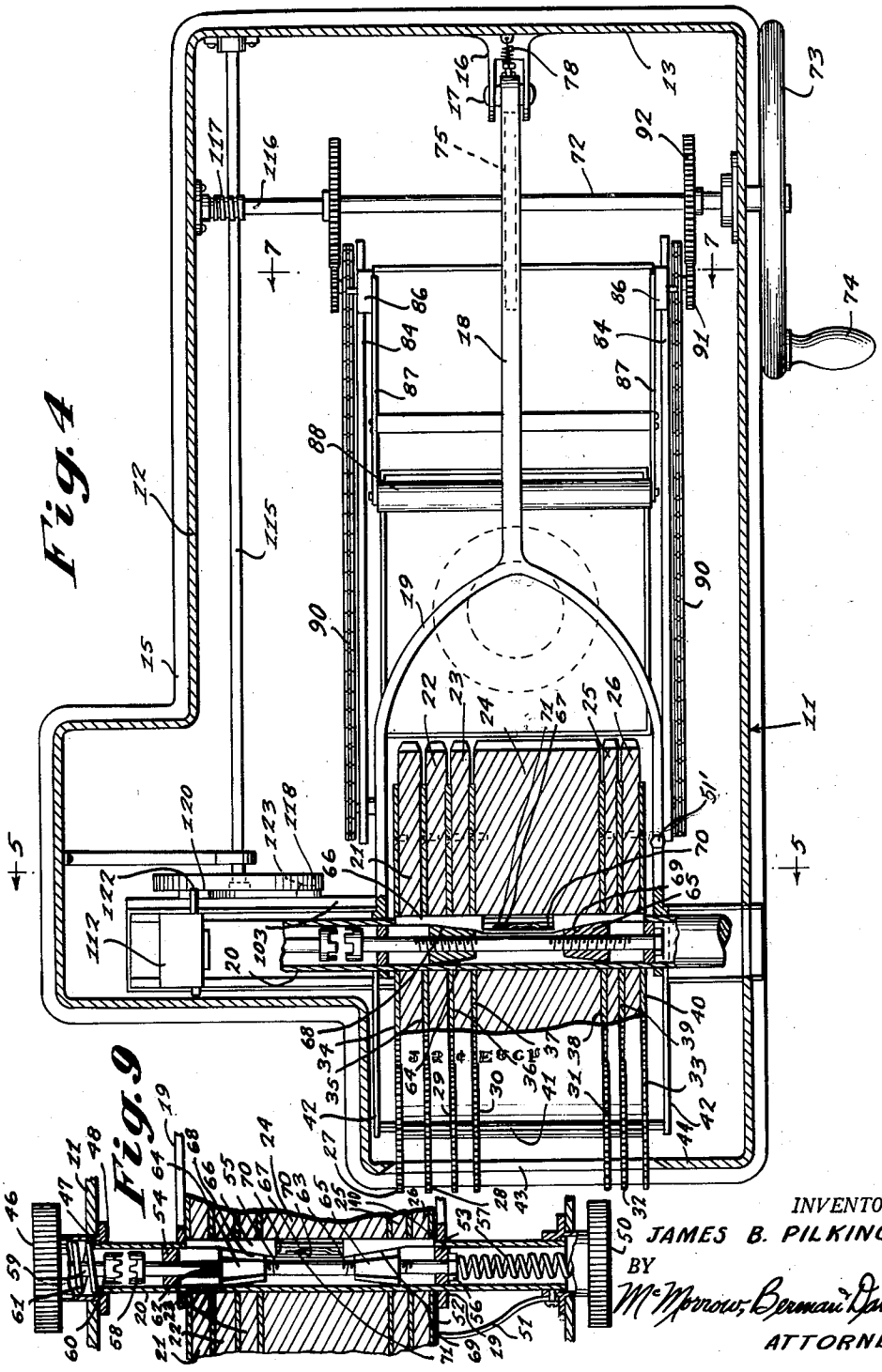


Fig. 9



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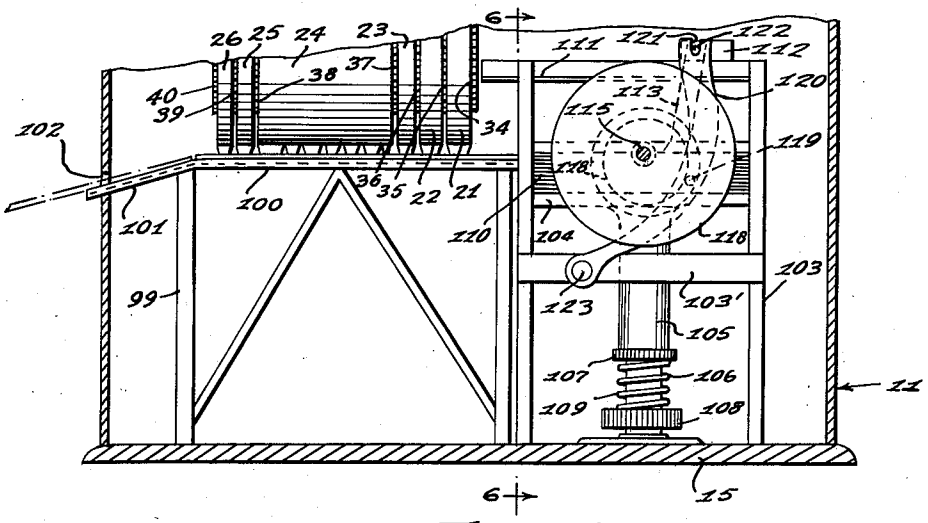



Fig. 5

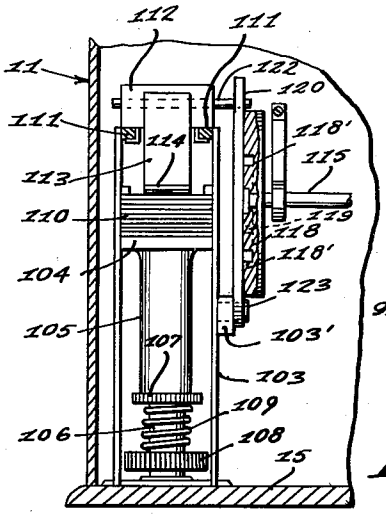



Fig. 6

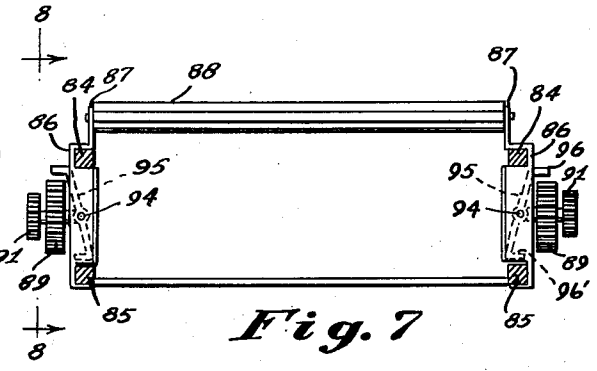



Fig. 7

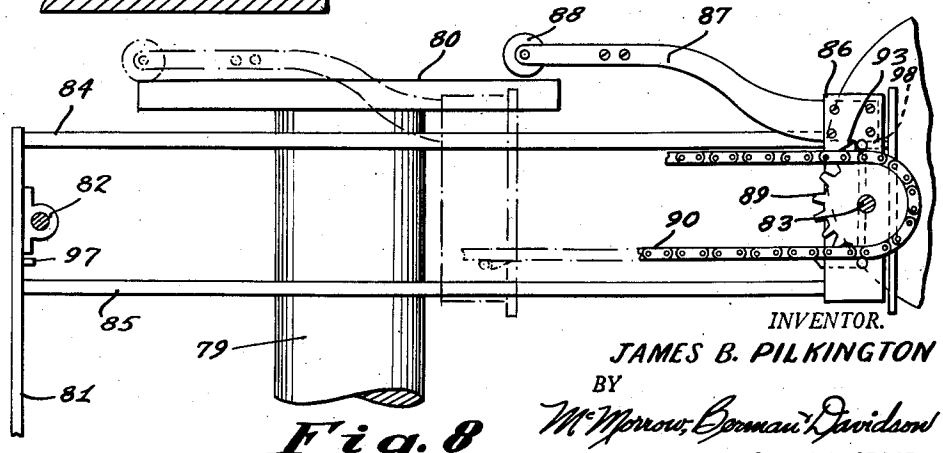



Fig. 8

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Patented Mar. 17, 1953 2,631,531

# UNITED STATES PATENT OFFICE

2,631,531

## DRUM SERIES PRINTING MACHINE

James B. Pilkington, Goldsboro, N. C.

Application February 3, 1948, Serial No. 5,971

4 Claims. (Cl. 101—110)

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This invention relates to sign printing machines and more particularly to a sign printing machine for use in mercantile establishments for printing price signs or markers for indicating the price of articles of merchandise.

A main object of the invention is to provide a novel and improved sign printing machine which is simple in construction, easy to operate and which is dependable in performance, the operation of the machine merely requiring that the printing elements thereof be set in a desired arrangement prior to the manual actuation of the mechanism.

A further object of the invention is to provide an improved sign printing machine which is compact in size, light in weight and which is automatic in operation to provide a sign printed as required as a result of merely setting the indicia wheels of the machine, rotating said indicia wheels simultaneously into printing position and rotating an operating crank following the aforementioned indicia-setting operations.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side elevational view of a sign printing machine constructed in accordance with the present invention,

Figure 2 is a front elevational view of the machine of Figure 1,

Figure 3 is an enlarged longitudinal cross sectional view taken through the machine of Figure 1,

Figure 4 is a horizontal cross sectional view taken on line 4—4 of Figure 3,

Figure 5 is an enlarged fragmentary detail across sectional view taken on line 5—5 of Figure 4,

Figure 6 is a detail cross sectional view taken on line 6—6 of Figure 5,

Figure 7 is a cross sectional detail view taken on line 7—7 of Figure 4,

Figure 8 is an enlarged detail cross sectional view taken on line 8—8 of Figure 7,

Figure 9 is a detail fragmentary cross sectional view taken axially through the printing drum supporting shaft of the machine of Figure 1.

Referring to the drawings, 11 designates a housing formed of suitable sheet material such as sheet metal or the like, said housing having a top portion 12 which is hinged to the main body of the housing at the top edge of the rear end wall 13 of said main body, as shown at 14. Said main body is generally rectangular in shape and is provided with a base plate 15.

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Rigidly secured to rear end wall 13 is a bifurcated bracket member 16 and pivotally secured to said bracket member between its arms by a pivot pin 17 is a right angled arm 18 extending upwardly and forwardly in the housing 11. The forward end portion of arm 18 comprises a yoke 19 and journalled in the forward ends of the yoke arms is a hollow shaft 20. Rotatably mounted on said hollow shaft 20 are a plurality of printing drum elements 21 to 26, having secured thereto the respective smaller disc elements 34 to 39, the end drum element 26 having secured to its outside surface an additional disc 40, the respective discs 34 to 40 being formed with gear teeth at their peripheries. Meshing with the respective toothed disc elements 34 to 40 are the respective toothed discs 27 to 33 rotatably mounted on a shaft 41 secured to forwardly extending arms 42, 42 carried by the respective arms of the yoke 19. Toothed discs 27 to 33 project through an opening 43 formed in the front wall 44 of the hinged upper portion 12 of the housing.

The printing drum elements 21 to 26 carry at their peripheral edges raised printing characters, and by rotatively adjusting the drum elements with respect to each other by means of the toothed discs 27 to 33, the characters may be juxtaposed so that a desired legend may be formed by the juxtaposed combination of characters at a predetermined peripheral portion of the combined drum elements, said peripheral portion being visible from the front end of the housing through a window 44' formed in the upper portion of the top housing element 12. Secured to said top housing element rearwardly adjacent window 44' is an upstanding mirror 45 angled forwardly as shown in Figure 3. The reflected mirror images of the juxtaposed printing characters may be viewed in the mirror 45, providing the same appearance as obtained when the legend is printed on a card.

Rotatably mounted on one end of hollow shaft 20 and extending through a vertical slot 49 formed in one of the side walls of top housing member 12 is a sleeved knob 46, the end of the shaft 20 being flanged at 47 and the sleeve portion of knob 46 being inwardly flanged at 48 to cooperate with flange 47 to prevent endwise removal of the knob. Rotatively mounted on the other end of shaft 20 and extending through another vertical slot 49 formed in the other side wall of top housing member 12 is a sleeved knob 50. Secured to the sleeve portion of knob 50 is a resilient finger element 51 which is engaged in one of a plurality of radial grooves 52 formed in the end disc element

40, thereby keying the knob 50 to said end disc element 40.

Secured inside hollow shaft 20 are apertured bearing discs 53 and 54 through which rotatively passes a rod member 55. The rod member 55 is formed with a head 56 at one end which is held in abutment with disc 53 by a coiled spring 57 bearing between head 56 and the sleeved knob 50. At its other end the rod member 55 carries a toothed clutch plate 58. Sleeved knob 46 carries an axial stud 59 having at its end a toothed clutch plate 60 adapted to interlock with clutch plate 58 when sleeved knob 46 is moved axially inwardly. A coiled spring 61 in knob 46 bears between the end flange 47 of shaft 20 and the interior end wall surface of said sleeved knob 46 and biases the toothed clutch plate 60 out of engagement with clutch plate 58.

Rod member 55 is formed at 62 with left hand threads and at 63 with right hand threads. Threaded on the left hand threads 62 is a pyramidal hexagon nut 64 and threaded on the right hand threads 63 is a pyramidal hexagon nut 65. Said nuts 64 and 65 engage a shoe member 66 which is positioned in a longitudinal slot 67 formed in shaft 20, said shoe member extending substantially the entire axial length of the drum members 21 to 26 and having respective inclined flat inner surfaces 68 and 69 slidably engaged by respective flats of the nuts 64 and 65. The shoe member is formed with a recess 70 in which is positioned a bowed leaf spring 71 bearing between the recess 70 and the adjacent inner wall surfaces of shaft 20, thereby biasing the shoe member 66 inwardly. When knob 50 is held and knob 46 is moved inwardly to interlock clutch plate elements 60 and 58, and then knob 46 is rotated clockwise, rod 55 is rotated causing the nuts 64 and 65 to move toward each other and to force shoe member 66 outwardly. This frictionally locks the drum members 21 to 26 to the shaft 20. Unlocking of said drum members is accomplished by rotating knob 46 counterclockwise with said clutch plate elements 58 and 60 in interlocking engagement.

Journalled transversely in the rear portions of the side walls of the main body of housing 11 is a shaft 72 which projects outside the housing at one end. Secured to said external end is a wheel 73 provided with an operating handle 74. At its intermediate portion shaft 72 carries a cam 75 which engages the upstanding rear portion of the right angled arm 18, anti-friction rollers 76 being provided in arm 18 at the region of contact of cam 75 therewith. The cam 75 has a portion 77 of reduced radius. When the cam 75 presents the portion 77 against the rollers 76, the arm 18 is allowed to swing downwardly by gravity to the full line position shown in Figure 3. When the remaining peripheral portion of cam 75 is in engagement with arm 18, said arm is supported in an upwardly swung position, shown in dotted view in Figure 3. A spring 78 is connected between the arm 18 and the rear wall of the housing main body to cushion the downward swinging movement of arm 18.

Secured to the base 15 at its intermediate portion is a vertical support 79 adjustable in height which carries at its top end a horizontal inking pad 80. Designated at 81 is an upstanding frame carried by base 15 in which are journalled respective transverse shafts 82 and 83. At the upper portion of frame 81, and at each side thereof are vertically spaced longitudinal rails 84 and 85. Slidably engaged with said rails are respective blocks 86, 86 and secured to said blocks are forwardly extending arms 87, 87. Journalled to the ends of arms 87, 87 is an inking roller 88 which is engageable with the inking surface of pad 80. Secured to the end portions of the shafts 82 and 83 are sprocket wheels 89, 89 and engaged on said sprocket wheels are the respective sprocket chains 90, 90. The shaft 83 carries at its ends gears 91, 91 meshing with gears 92, 92, carried on the drive shaft 72.

The sprocket chains 90, 90 are each formed with an outwardly projecting lug 93. Each block 86 has pivoted therein at 94 a lever 95 formed with end projections 96, 96', said levers being swingable in suitable recesses formed in the blocks so that the levers may assume positions wherein the upper projections 96 extend outwardly from the blocks, as in Figure 7, or wherein only the lower projections 96' extend outwardly therefrom. Projecting from the frame 81 subadjacent shaft 82 are lugs 97 engageable with the lower projections 96' when the blocks 86, as they move forwardly, reach the forward end of frame 81, as will be subsequently described. Projecting from the frame 81 above and adjacent the shaft 83 are similar lugs 98 engageable with the upper projections 96 when the blocks 86, as they move rearwardly, reach the rear end of frame 81. The engagement of the lugs 97 and 98 with the respective lower and upper projections causes the levers 95 to be swung around their pivots 94 so that the engaged projections are pushed inwardly into housed positions in the blocks and the opposite projections on the levers 95 are moved into outwardly projecting positions.

When drive shaft 72 is rotated counterclockwise, as viewed in Figure 3, the gears 91 rotate shaft 83 clockwise and lugs 93 of the sprocket chains 90, 90 engage the lower projections 96' of the blocks 86 and cause said blocks to move forwardly, carrying the inking roller 88 over the inking pad 80. At the same time cam 75 engages arm 18 and lifts it to the dotted line position of Figure 3. As the blocks 86, 86 approach the forward end of frame 81, the inking roller engages the printing characters at the bottom of the drum elements 21 to 26 and applies ink thereto. As the blocks 86, 86 reach for forward end of frame 81, lugs 97 push back the lower projections 96', 96' and cause the upper projections 96, 96 to emerge from the blocks. The lugs 93 of the chains are thereby freed from the lower projections 96', 96' and move around the forward sprocket wheels 89 into engagement with the upper projections 96, 96 of the blocks, thereby initiating the return movement of the roller 88. As the blocks 86, 86 approach the rear end of frame 81 the reduced portion 77 of cam 75 engages the arm 18, allowing the arm to swing downwardly for a printing stroke. At the same time, the upper projections 96, 96 of the blocks are engaged by the lugs 98 causing the upper projections 96, 96 to be pushed inwardly and causing the lower projections 96', 96' to emerge from the blocks. The sprocket teeth 93, 93 are thereby released from engagement with the upper projections 96, 96 and move around the sprocket wheels at the rear end of frame 81 into engagement with the lower projections 96', 96' in position for the next inking and printing stroke of the machine.

Secured to base 15 beneath the printing drums 21 to 26 in the transverse vertical plane of shaft 20 is a frame 99 having a channeled top member 100 defining a printing bed. Connected to one end of bed 100 is a downwardly inclined chan-

nel discharge chute 101 extending through a horizontal slot 102 formed in the side wall of the main body of housing 11. Mounted on base 15 adjacent the opposite end of bed 100 is an upstanding rectangular frame 103. Vertically slidable in frame 103 is a plate member 104 carried on a vertical sleeve 105. Sleeve 105 is telescoped over a vertical post 106 secured to base 15 and is provided with a bottom flange 107. Threaded on post 106 is an adjusting nut 108. Encircling post 106 and bearing between flange 107 and nut 108 is a coiled spring 109. Spring 109 biases plate 104 upwardly, said plate carrying the blank cards 110 stacked thereon.

Secured to the top end of frame 103 are a pair of transverse guide rails 111, 111, and slidably secured thereto is a block member 112. Depending from said block member is a foot element 113 provided at its end with a rubber friction shoe 114 engaging the top card in the stack 110.

Journalled longitudinally in the main body of housing 11 is a shaft 115 carrying a worm gear 116 meshing with a worm 117 carried on shaft 72. At its forward end shaft 115 carries a disc 118. Disc 118 is formed with an eccentric groove 118'. Secured transversely across frame 103 below disc 118 is a bar 103'. Pivotally secured to bar 103' at 123 is an arm 120 which carries at its intermediate portion a projection 119 which is slidably received in groove 118'. The top end of arm 120 is notched, as shown at 121 and rotatably receives a rearwardly projecting pin 122 carried by block 112. Rotation of shaft 72 is communicated to shaft 115 through the worm 117 and worm gear 116, producing rotation of disc 118. Each rotation of disc 118 produces an oscillation of arm 120 around the pivot pin 123 and reciprocates the sliding block 112. Each time block 112 reciprocates, a card is fed by foot 113 from the stack 110 onto the channeled bed 100, pushing the card previously positioned on the bed into the discharge chute 101, from which it slides out of the housing 11 through the slot 102.

In operation, the drum members 21 to 26 are set by means of the toothed discs 27 to 33 to provide a desired legend, as above explained, by referring to the viewing mirror 45. Knob 50 is then held stationary and knob 46 is pushed inwardly and rotated to lock the drum members to the shaft 20 in the manner previously described. Knob 46 is then released. Toothed disc 33 is then held stationary and knob 50 is rotated to align a pointed marker thereon with a "set" index mark on the adjacent surface of cover 12. Resilient finger 51 engages a radial groove 52 in disc member 40, whereby knob 50 is keyed to disc member 40 in this position. Disc 33 is then released and knob 50 is rotated counterclockwise, as viewed in Figure 1, through the angle required to bring the desired line of type over the bed 100. In this latter position the pointer on knob 50 is aligned with a "print" index mark on the adjacent surface of cover 12. Yoke 19 carries a set screw 51', which is engaged by finger 51 in said latter position to provide positive alignment of the desired line of type with the printing bed. Wheel 73 is then rotated through one turn counterclockwise, as viewed in Figure 1. As above described, this rotates shaft 72, causing the type to be inked by roller 88 and producing the downward printing stroke of the drum members 21 to 26. As the printing stroke is completed and the drum members are raised by the upward movement of arm 18, a fresh card is



fed onto the bed 100 by the reciprocation of foot 113. The printed card is pushed out of the slot 102 by said fresh card. When wheel 73 completes its cycle of rotation, all the other parts return to their starting positions.

In order to set the drums 21 to 26 to provide the desired row of printing characters, shaft 72 is first rotated to elevate the arm 18 by the action of cam 75 to the dotted line position of Figure 3. This may be employed as the starting position of the printing cycle.

The lugs 97 and 98 are spaced sufficiently from the chains 99 to provide clearance for the projections 93 while being still engageable with the respective inwardly movable projections 96' and 96 carried by the blocks 86.

While a specific embodiment of a sign card printing machine has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a sign card printing machine, a support, an arm mounted upon said support, a tubular shaft journalled upon said arm, a plurality of coaxially arranged printing drums rotatably mounted upon said tubular shaft, a gear secured to the side of each printing drum, individual driving gears rotatably mounted upon said arm and operatively engaging the gears secured to the sides of said printing drums for rotating the discs independently into selected adjusted positions, a radially shiftable brake shoe secured to the tubular shaft and frictionally engaging all of said printing drums, a rod member mounted in said shaft for movement axially of said shaft, a clutch element on one end of said rod member, axially shiftable elements mounted on said rod member intermediate the ends of the latter and engaging said brake shoe for moving the same radially outwardly into clamping engagement with all of said printing drums to lock the same in selected adjusted positions upon said tubular shaft, and a complemental clutch element movably supported in the end of said tubular shaft adjacent said first named clutch element and shiftable into engagement with the latter for shifting the axially shiftable elements.

2. In a printing machine, a tubular shaft, a plurality of coaxially arranged printing drums rotatably mounted on the shaft, a gear affixed to the side of each printing drum, individual driving gears operatively engaging the gears secured to the drums for separately rotating the drums, a brake shoe connected to said shaft for radial inward and outward movement with respect to the latter and frictionally engaging all of said drums, a rod member mounted in said shaft for movement axially of said shaft, a clutch element on one end of said rod member, axially movable actuators mounted on said rod member intermediate the ends of the latter and engaging said shoe, and a complemental clutch element movably supported in the end of said tubular shaft adjacent said first named clutch element and shiftable into engagement with the latter to thereby cause the radial outward movement of said shoe and locking engagement of the latter with said drums.

3. In a sign printing machine, an arm, a tubular shaft rotatably supported in said arm, a plurality of coaxially arranged printing drums ro-

tatably mounted upon said shaft intermediate its ends, a gear secured to the side of each printing drum, individual driving gears rotatably mounted upon said arm and operatively engaging the gears secured to said drums for separately rotating said drums, a brake shoe connected to said shaft for radial inward and outward movement with respect to the latter and frictionally engaging all of said drums, a rod member mounted in said shaft for movement axially of said shaft, axially movable elements mounted on said rod member intermediate the ends of the latter and engaging said shoe, a clutch element on one end of said rod member, and a hand actuable clutch element movably supported in the end of said shaft adjacent said first named clutch element and shiftable into engagement with the latter to thereby cause a radial outward movement of said shoe and locking engagement of the latter with said drums.

4. In a sign printing machine, an arm, a tubular shaft rotatably supported in said arm, a plurality of coaxially arranged printing drums rotatably mounted upon said shaft intermediate its ends, a gear secured to the side of each printing drum, individual driving gears rotatably mounted upon said arm and operatively engaging the gears secured to said drums for separately rotating said drums, a brake shoe connected to said shaft for radial inward and outward movement with respect to the latter and frictionally engaging all of said drums, a rod member mounted in said shaft for movement axially of said shaft, axially



movable elements mounted on said rod member intermediate the ends of the latter and engaging said shoe, a clutch element on one end of said rod member, a hand actuable clutch element movably supported in the end of said shaft adjacent said first named clutch element and shiftable into engagement with the latter to thereby cause a radial outward movement of said shoe and locking engagement of the latter with said drums, and hand actuable means connected to the other end of said shaft for axial movement and bearing against the other end of said rod.

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