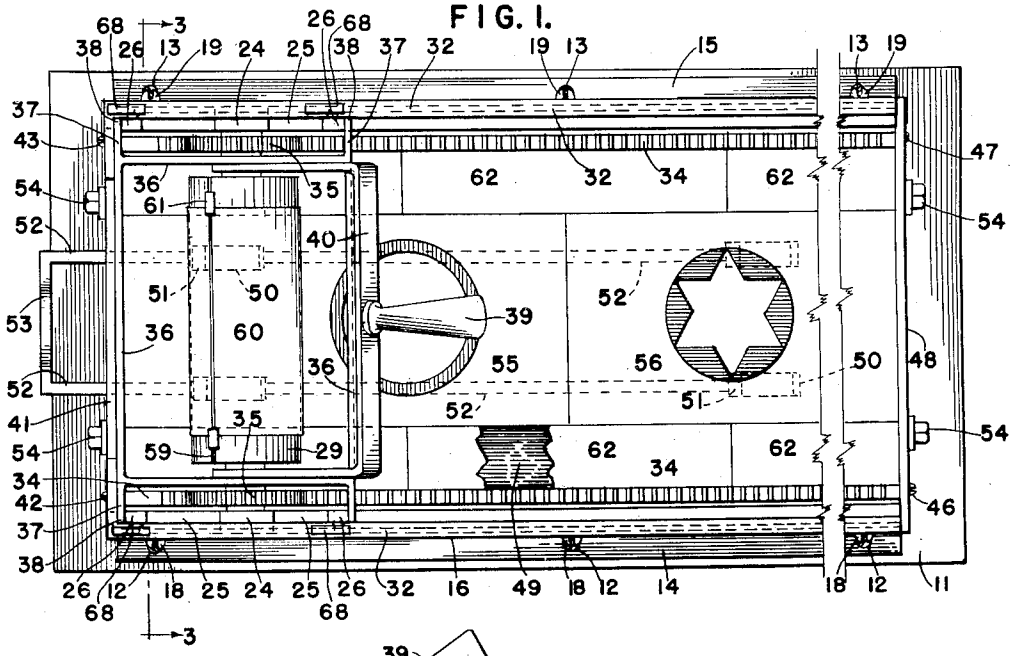
Aug. 30, 1949. A. BENAVIDES 2,480,436

PRINTING APPARATUS

Filed Aug. 2, 1947 2 Sheets-Sheet 1

FIG. 1.



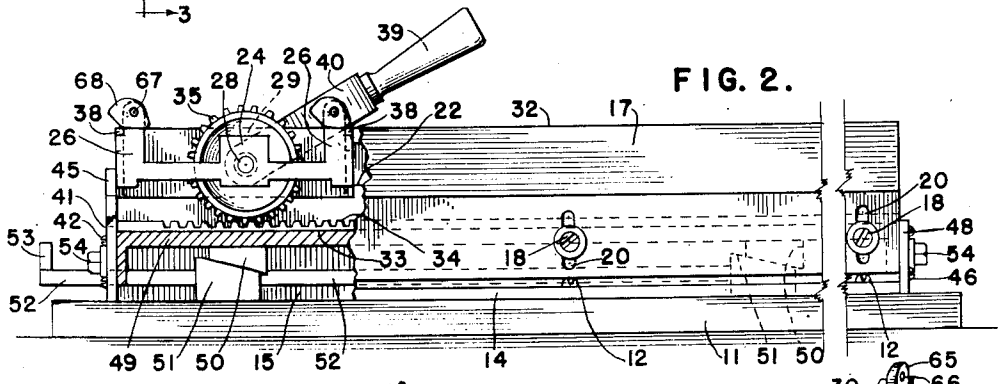


FIG. 2.

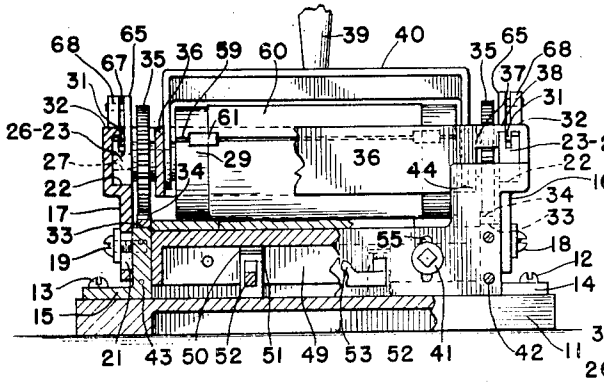


FIG. 3.

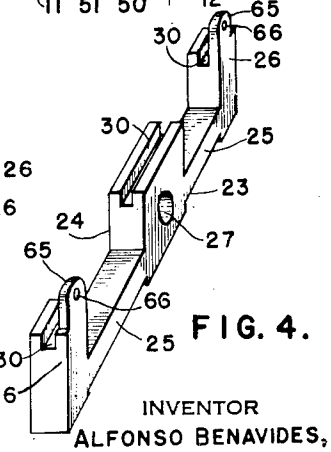


FIG. 4.

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PRINTING APPARATUS

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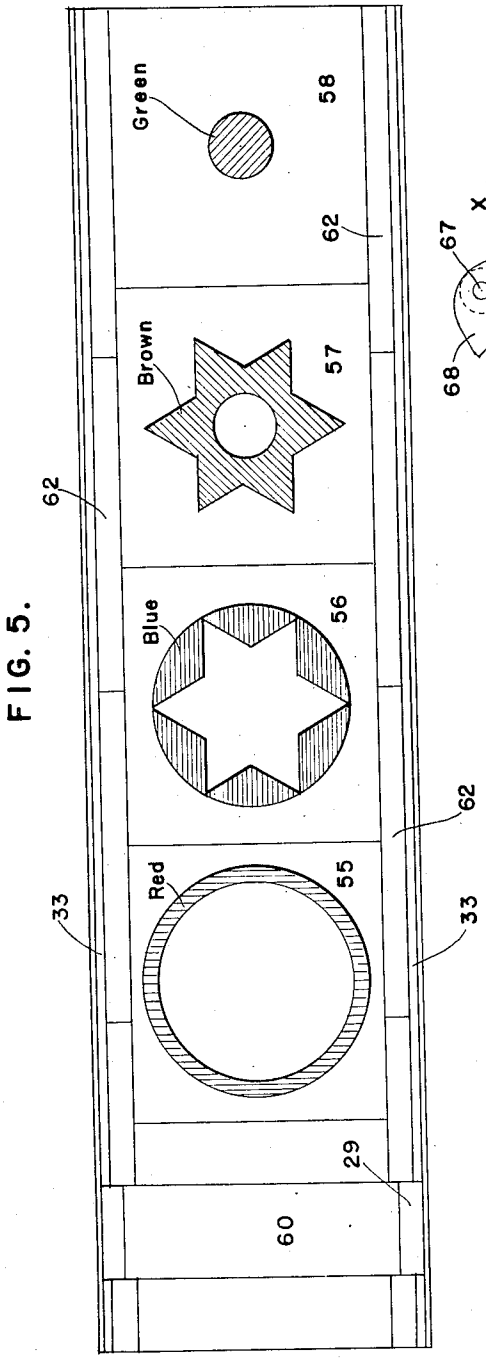


FIG. 5.

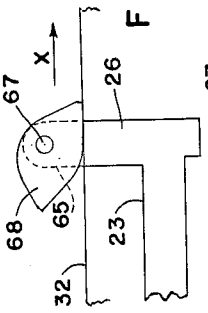


FIG. 7.

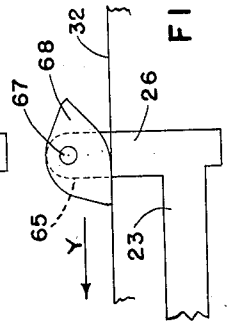


FIG. 8.

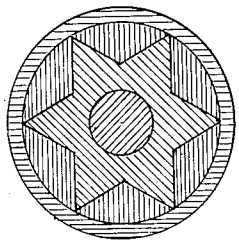


FIG. 6.

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PRINTING APPARATUS

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Application August 2, 1947, Serial No. 765,691

2 Claims. (Cl. 101—186)

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This invention relates to improvements in methods of and apparatus for printing multicolor pictures or designs directly upon a sheet of material which is held upon a roller.

An object of this invention is the provision of a method and apparatus for printing multicolor pictures or designs directly upon a sheet of paper, fabric or other suitable material which is wound upon a roller, the said roller being adapted to move over a plurality of variously colored ink carrying printing frames or plates and successively imprint the various colors upon the sheet of material to form a completed multicolored picture.

Another object of this invention is to provide a method and apparatus for multicolor printing, comprising a roller carrying a sheet of material thereon which is adapted to move over a plurality of differently colored inked printing plates and in consecutive order imprint the said material with the design from each printing plate to form a complete composite picture upon the said material.

Another object of this invention is to provide a method and apparatus for the purpose set forth wherein means are included to assure positive and accurate register of the printing plates with the sheet upon the roller.

Another object of this invention is to provide a method and apparatus for the purpose set forth including means upon an impression roller for holding a sheet of material thereon.

A further object of this invention is to provide a method and apparatus as set forth including, in the apparatus, means for regulating or adjusting the roller relatively with the printing plates located upon the bed of the apparatus.

Another object of this invention is the inclusion therein of an automatically operating cam which operates to keep the roller in contact with the printing plates while traveling in its operative direction and lift the roller away from the printing plates while being retracted.

A still further object of this invention is the provision of a device in which the constituent elements are so arranged structurally and functionally as to assure improved results with materials and members which may be manufactured at reasonable cost, may be easily assembled and which will be efficient in operation with minimum wear to the parts.

The invention possesses other objects and features of advantage, some of which, with the foregoing will be set forth in the following description and in the claims wherein parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit. In the accompanying drawings there has been illustrated the best embodiment of the invention known to me, but such embodiment is to be regarded as typical only of many possible embodiments, and the invention is not to be limited thereto.

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The novel features considered characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Figure 1 is a plan or top view of the printing machine.

Figure 2 is a side view of same and shows a part of the side broken away.

Figure 3 is a partial sectional and end view of the same, the sectional portion being taken approximately along the line 3—3 of Figure 1.

Figure 4 is a detail, in perspective, of a carrier and bearing which form a part of the machine.

Figure 5 is a schematic plan view showing the printing plate arrangement.

Figure 6 is a view showing a completed design in several colors.

Figures 7 and 8 are enlarged diagrammatic views of a cam forming part of the device and which will be hereinafter described.

Referring in detail to the parts, 11 designates a base member to which are attached, by means of screws 12 and 13, angular side support members 14 and 15 respectively. To the said side members there are attached adjustable side support members 16 and 17 respectively. The said adjustable side members 16 and 17 are secured to the said first mentioned side support members by the screws 18 and 19 respectively which engage through slots 20 and 21 and provide a means for vertically adjusting the said adjustable side support members 16 and 17. A ledge 22 is formed upon each of the adjustable side members 16 and 17 and form a track upon which carrier blocks 23 are adapted to move.

The carrier blocks 23 are formed with a central block formation 24 having extending arms 25 and upwardly extending end members 26. The central block 24 has a bore 27 which functions as a bearing for a roller shaft 28 carrying an impression roller 29. The upper edges of the central block 24 and upwardly extending end portions

26 are grooved as at 30 which engage downwardly turned lips 31 formed at top flange 32 of the adjustable side members 16 and 17. Upon the upper edge 33 of each of the said side members 14 and 15 there is secured a rack 34. The aforesaid imprinting roller 29 is carried upon the said shaft 28, the ends of which extend through said bores 27 in the central blocks 24 formed upon the said carrier blocks 23. Gears 35 are fixed upon the said shaft 28 and engage the said racks 34. Embracing the said imprinting roller 29 and engaging the said shaft 28 is a rectangular shaped frame 36 having projecting ears 37 and fingers 38 which support same upon said end members 26 formed upon said carrier blocks 24. The ends of the said shaft 28 extend through perforations in the sides of said frame and into the said bores 27 which form bearing for same. The gears 35 which are fixed upon the said shaft impart rotary motion to the said imprinting roller 29 when the frame 36, carrier block 23 and attached roller are moved along the said end members.

A handle 39 is attached to a yoke 40 which is in turn connected with the said frame 36. An end plate 41, extending across one end of the base member 11, is secured to the ends of the angular side members 14 and 15 by means of screws 42 and 43 and has upwardly projecting end portions 44 and 45 which act as a stop means to limit the movement, in one direction, of the frame 36 carrying the impression roller 29, its attached gears 35 and carrier blocks 23. Upon the opposite ends of the said angular side members 14 and 15 there is attached by means of screws 46 and 47 an end plate 48, similar to the end plate 41 but without the projecting end portions 44 and 45.

A vertically adjustable bed member 49 is carried between the said side members 14 and 15 and the end plates 41 and 48 and is adapted to vertical movement by means of the wedge blocks 50 and 51; the wedge blocks 50 being fixed upon the under side of the said bed member 49 and the wedge blocks 51 being connected to the bars 52 which terminate in a cross-bar 53 which forms a handle for manipulating the wedges 51 which are movable upon the base member 11. Locking bolts or screws 54 attached to the said adjustable bed member 49, engage through slots 55 in the end plates 41 and 48 and provide means for locking the said bed member 49 in its desired position.

The said bed member 49 carries printing blocks 55, 56, 57 and 58 (Figures 1 and 5) each of which comprises a partial design and is inked with a different color. The partial design of plate 55 is conventionally marked for the color red, the partial design of plate 56 being marked for the color blue, that of plate 57 is marked for brown and the plate 58 marked for the color green.

The impression roller 29 is formed with a slot 59 into which one end of a sheet of any suitable material 60 may be inserted and held in place by suitable clips 61. The other end of the sheet material 61 may be left free or also inserted into the slot 59 after being tightly wound upon the roller 29.

Spacer blocks or plates 62 may be provided to fix the printing plate in proper position and the printing plates must be so placed that the distance from outer to center of plates corresponds, exactly, with the circumference of the roller and its attached sheet. The gears, co-acting with the roller and gear rack assures perfect alinement and register of each successive partial design as the printing roller passes over the printing plates.

In operation the various printing plates are inked with any desired color, the sheet material attached to the roller and the roller drawn over the variously colored printing plates. As the roller passes over the printing plates, the sheet upon the roller gets its first imprint from the plate 55, which in the drawings indicate the color red; the following impression upon the sheet being blue from the plate 56 and finally green from the plate 58, giving the resultant composite design shown in Figure 6, where all the colors are imprinted to produce the colored design shown. The sheet may then be removed and a new sheet placed upon the roller and the operation repeated.

The bed member carrying the printing plates may be adjusted as, already described, to conform to any varying thickness of sheet material. When a roller of larger or smaller circumference and its conforming gears are employed, adjustment may be made through the medium of the adjustable side members.

The upwardly extending ends 26 of the carrier blocks 23 are provided with lugs 65 having bores 66 within which pins 67 are secured. The said pins carry cam elements 68 which are adapted to slidably engage along the upper edge 32 of the adjustable side members 16 and 17 and are employed to raise or lower the carrier blocks 23 and frame 36 within which the roller 29 is mounted.

In Figures 7 and 8 the cam operation is diagrammatically shown. Figure 7 shows the cam 68 in the position it occupies when the roller moves in the direction shown by the arrow X. In such position the cam holds the roller in its lower printing position, while Figure 8 shows the position of the cam when the roller is being retracted or moved in the direction indicated by the arrow Y. In this latter position the roller is slightly raised to allow same to clear the printing frames while being retracted.

The printing plates may be cut out of any suitable pliable material such as rubber or linoleum or may be cut out of a metallic substance when required, and may be inked by hand after each operation.

While the drawings show four color printing plates, a greater or lesser number of printing plates may be used. Also the inking of the plates can readily be accomplished by the addition of automatically controlled inking rollers. Furthermore, the said impression roller may be automatically operated by the addition of a motor and controls.

Other modifications may be made without departing from the general spirit of the invention.

I claim:

1. An apparatus for printing multicolor designs upon sheet material, comprising a base member, angular supporting members attached to the said base member, vertically adjustable flanged members attached to the said angular supporting members, carrier blocks slidably mounted upon said adjustable flanged members, a shaft having end bearings in said carrier blocks, an impression roller upon the said shaft and adapted to turn therewith, gears upon the said shaft, racks upon the upper edges of said angular supporting members engaging said gears and adapted to rotate said impression roller when said carrier blocks are moved along the said flanged supporting members, a frame encompassing said impression roller and slidably mounted

upon said flanged members, a yoked handle member pivotally attached to said shaft and frame and providing a means for manually moving the said frame and impression roller along the said flanged supporting members, a vertically adjustable bed mounted between said angular supporting members, multiple printing plates upon the said adjustable bed, wedge blocks secured to the underside of said adjustable bed, complementary wedge blocks slidable upon the said base member and engaging said wedge blocks upon the underside of the said adjustable bed, operating rods connecting the said complementary wedge blocks and extending outwardly beyond one end of said adjustable bed, a hand hold connecting the outer ends of said operating rods providing a means for operating the said complementary wedge blocks and a plate secured at one end of the said angular supporting members adapted to stop the movement of the said carrier blocks.

2. An apparatus for printing multicolor designs upon sheet material as defined in claim 1, including sliding cam elements upon the said carrier blocks engaging along the upper edge of said adjustable flanged members and adapted to raise the said carrier blocks, frame and attached impression roller to clear the said multiple printing plates during the retractive movement of same.

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