

(No Model.)

4 Sheets—Sheet 1.

T. J. TURLEY.
CHROMATIC PRINTING.

No. 538,985.

Patented May 7, 1895.

Fig. 1.

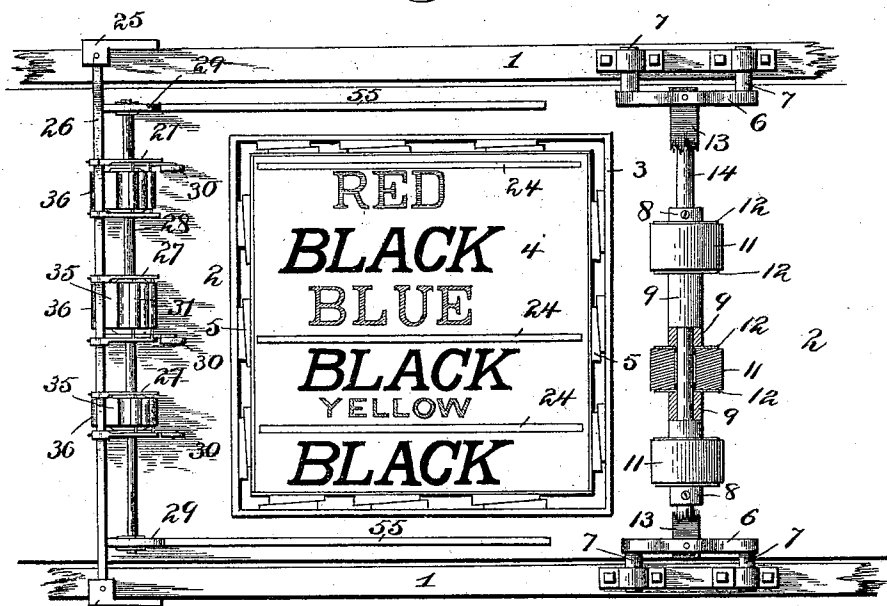


Fig. 2.

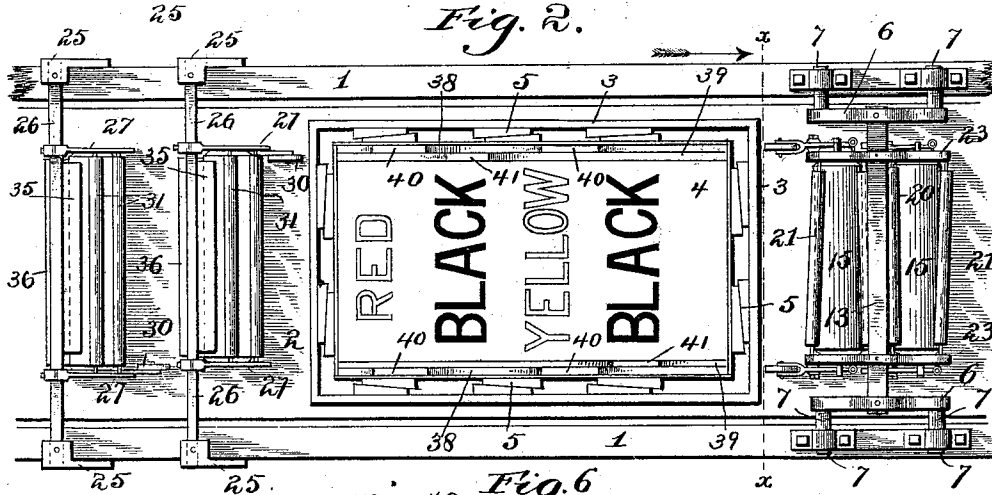


Fig. 6.



Fig. 7.



Witnesses:

J. M. McGirr.
Albert Popkins

Inventor:

T. J. Turley,
By Howson & Howson
his Att'ys.

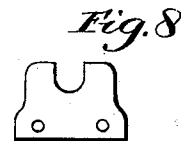
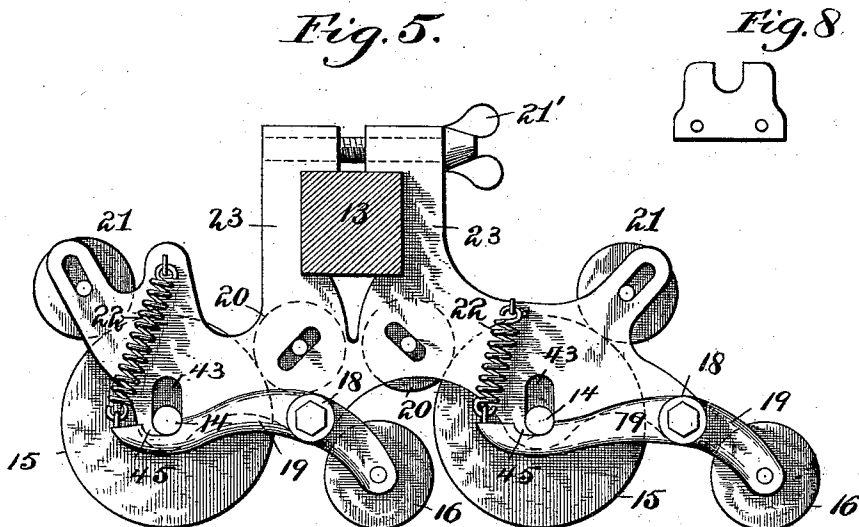
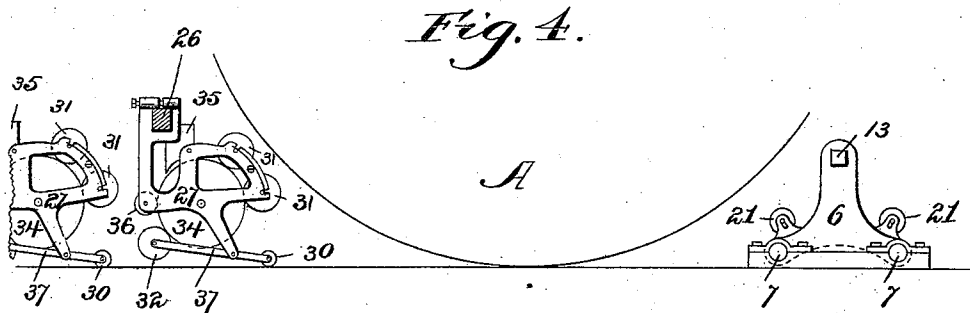
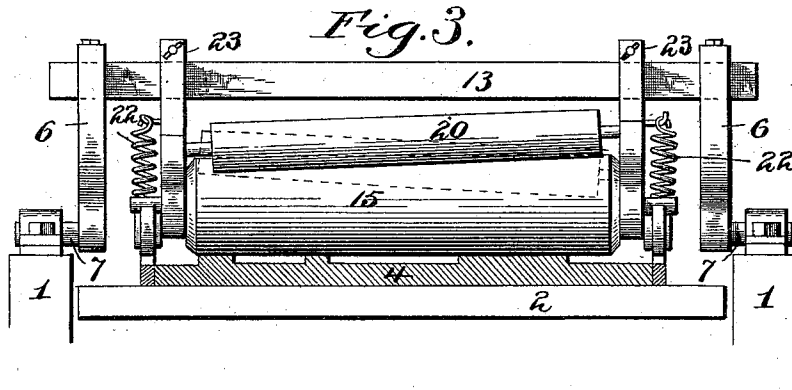
(No Model.)

4 Sheets—Sheet 2.

T. J. TURLEY.
CHROMATIC PRINTING.

No. 538,985.

Patented May 7, 1895.



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(No Model.)

4 Sheets—Sheet 3.

T. J. TURLEY.
CHROMATIC PRINTING.

No. 538,985.

Patented May 7, 1895.

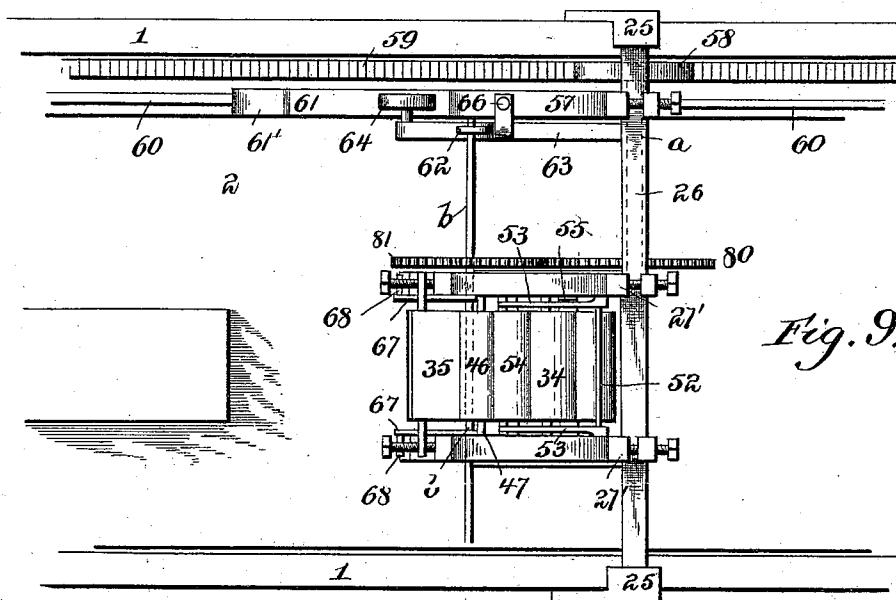


Fig. 9.

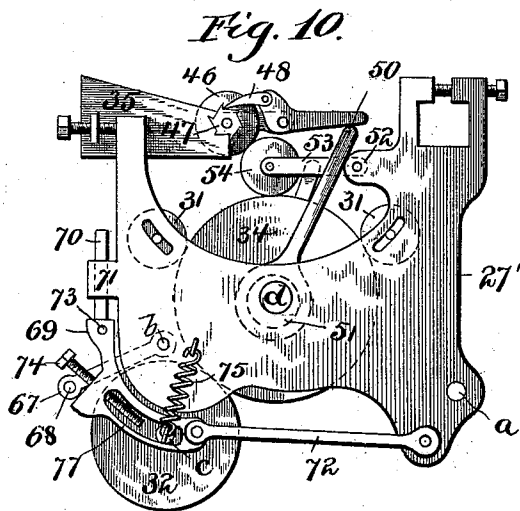


Fig. 10.

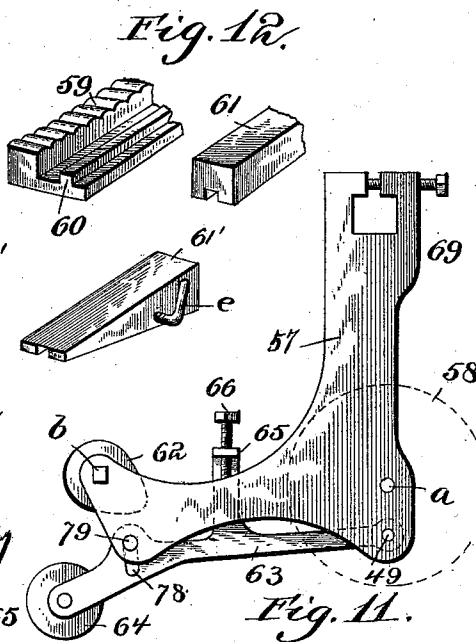
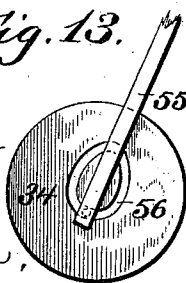


Fig. 11.

Fig. 13.



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(No Model.)

4 Sheets—Sheet 4.

T. J. TURLEY.
CHROMATIC PRINTING.

No. 538,985.

Patented May 7, 1895.

Fig. 14.

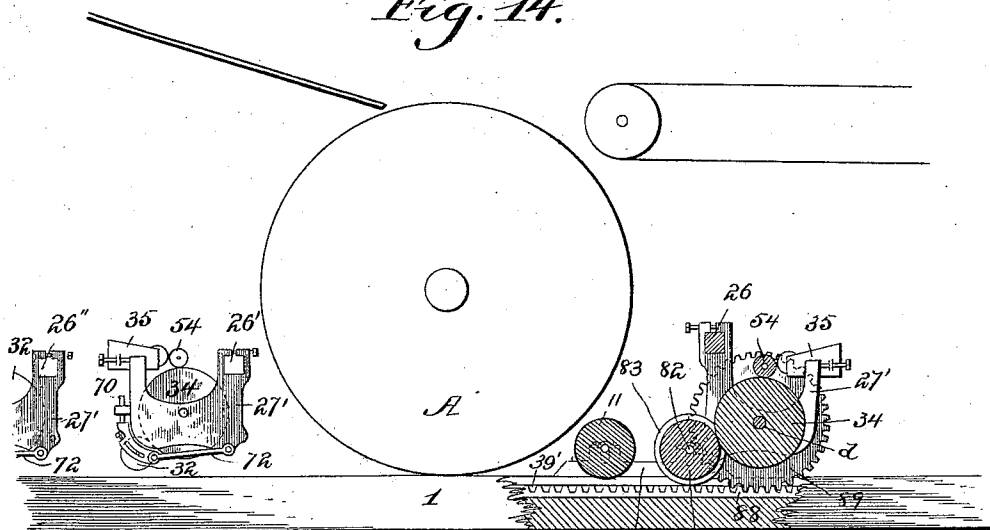
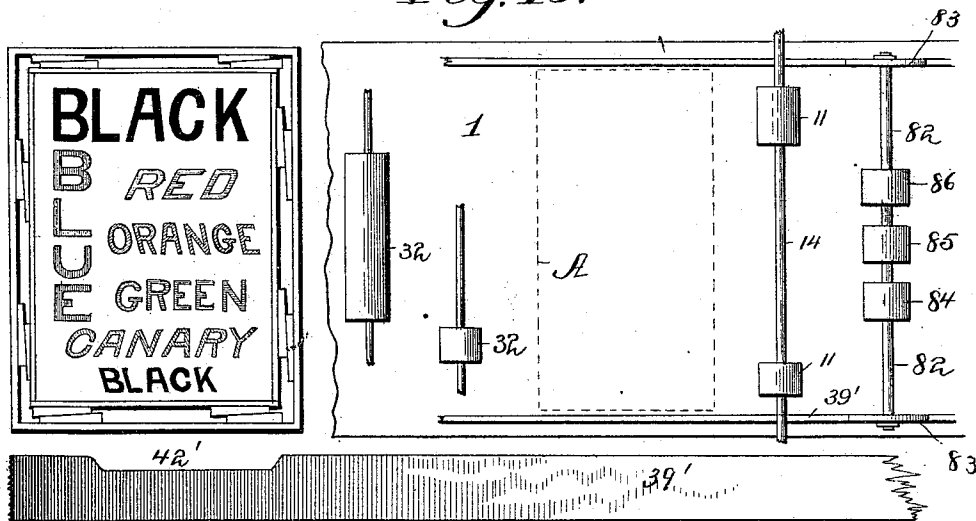


Fig. 15.



Witnesses:

J. B. McGirr.
Albert Copping

Inventor:

T. J. Turley,
By Howard & Howard,
his Attys

UNITED STATES PATENT OFFICE.

THEODORE J. TURLEY, OF NASHVILLE, TENNESSEE.

CHROMATIC PRINTING.

SPECIFICATION forming part of Letters Patent No. 538,985, dated May 7, 1895.

Application filed October 15, 1894. Serial No. 525,985. (No model.)

To all whom it may concern:

Be it known that I, THEODORE J. TURLEY, a citizen of the United States, residing at Nashville, county of Davidson, State of Tennessee, have invented Improvements in Chromatic Printing, of which the following is a specification.

My invention relates to chromatic printing and its object is to provide means whereby matter can be readily printed in two or more colors, on a bed and cylinder press, at one impression, from ordinary type set and locked within a chase in the usual manner. I accomplish this object in the manner and by the means hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of a portion of the bed of a press with my invention applied, partly broken away. Fig. 2 is a plan view of a modified form of my invention. Fig. 3 is a sectional elevation on line *xx* of Fig. 2, showing the manner of supporting the black-ink rollers. Fig. 4 is a diagrammatic view showing the relation of the color-inking apparatus and the black-ink rollers to the impression-cylinder. Fig. 5 is an end elevation of the right frame supporting the black-ink rollers. Figs. 6, 7, and 8 are details to be hereinafter referred to. Fig. 9 is a plan view of a novel color-inker used in connection with such a form as shown in Fig. 2. Fig. 10 is an end elevation of one of the frames thereof. Fig. 11 is an end elevation of the supplementary frame. Figs. 12 and 13 are details. Fig. 14 is a side elevation of a modification, partly sectional. Fig. 15 is a diagrammatic plan view thereof.

It is very desirable in color printing, by means of attachments to the ordinary press, to have the devices for such work constructed in the simplest way and capable of being easily and quickly applied to the press in ordinary use, thus enabling the printer to make ready in the shortest time possible; and in color work, I have used supplemental forms and holders with gratifying success, but in the present instance I desire to provide means whereby these supplemental forms and holders may be entirely dispensed with and by which all the colors may be readily printed at one impression from ordinary type.

Referring to the drawings accompanying

this description, I will state at the outset that while I have shown the form as extending nearly across the bed of the press, Figs. 1 and 2, it is to be understood that the matter to be printed may occupy greater or less space, in width or length, the particular width and length, as well as the slightly exaggerated position of the bed of the press with respect to the framing, being shown for the purpose, simply, of clear illustration.

In order to effect my purpose I employ in some instances, for the color inking, the inkers disclosed and claimed in my Patent No. 530,865, dated December 11, 1894.

To adapt the color inkers for use in connection with my black ink rollers, a slightly modified construction of the device for causing the color ink roller to ink its appropriate matter is necessary, as will appear in the description to follow.

In Fig. 1, the matter is in an ordinary chase, 3, placed laterally of the bed, 2, of the press, to which it is secured in the usual manner, not deemed necessary to show in the drawings. The press is of course supplied with the ordinary ink fountain and table, located and operating in the usual way. The form is composed of ordinary type from which different colors, red, black, blue, and yellow are to be printed, as indicated by the names of said colors. The form is locked in the chase by the quoins, 5, as customary.

The color inking devices are located in proper position back of the impression cylinder, laterally of the press, Fig. 1, or longitudinally, as in Fig. 2, according as the form is placed laterally or longitudinally of the press. The side frames, 27, of these inking devices are clamped to the cross bar or bars, 26, supported by brackets, 25, upon the framing, 1, of the press. Journaled in these frames are main rollers, 34, distributing and feed rollers, 31 and 36, and mounted above the roller, 34, is a suitable reservoir, 35, from which ink is fed to the roller, 34, by the feed roller, 36. Arms, 37, are fulcrumed in the lower part of the frames, 27, and each of said arms carries at one end a roller, 32, and at the opposite end a small wheel, 30, the latter of which is adapted to be elevated by coming in contact with metal strips, 24, locked within the chase and

placed below type-high, thus depressing the roller, 32, and causing the said roller to ink the form. These strips, 24, are made of standard lengths of metal or other suitable material and can be readily set up with the type with the usual furniture. The roller, 32, is normally held above type-high by any suitable means, as a spring, as set forth in my patent above mentioned.

To give motion to the color ink rollers I preferably mount them on a shaft, 28, at one end or both ends of which is placed a friction wheel, 29, running in contact with metal strips, 55, set in the main form at any suitable point, or secured to the bed in any suitable manner. These strips are shown at a slight distance from the edge of the form but they may be placed along side of the form, or the wheels may be operated by the edge of the chase, if desired.

When the colors extend lengthwise of the form and the latter is placed laterally of the press bed, as in Fig. 1, the strips, 24, for operating the color inkers are of uniform height, and the same length as the matter to be printed in a given color; but where the form is placed longitudinally of the press bed, these strips must be of different construction, as shown in Fig. 7, where it will be seen that the strip, 39, is provided with a cam projection or elevated rail, 41, corresponding in length to the length of matter to be printed in color,—in the instance shown, to the length of the “yellow.” The roller, 32, being normally above type-high will thus be depressed only when the wheel, 30, is raised by the elevated rail or cam projection, 41, on the strip, 39, as it passes under the rollers. Up to this point the construction and the operation of the inkers somewhat resemble that of my prior patent mentioned, the main point of difference lying in the omission of the supplemental form and holder, and in the introduction of the metal strips, 24, and 39, in the body of the form for operating the wheels, 30.

In my former patent means are employed to depress the supplemental form to clear the black ink rollers. My present invention is a material departure from the prior practice in that I provide a novel arrangement of black ink rollers, in order to cause them to ink the part of the form to be printed in black, the preferable construction for this purpose being shown in Fig. 1, and partly in Fig. 3.

The ordinary black ink rollers are removed, and in their bearings are mounted brackets, 6, having projecting bosses or pins, 7, of the same diameter as the shafts of the rollers removed so that they can readily be seated in the bearings of the said rollers. The bosses, 7, may be confined to the bearings by the same cap and screws or bolts used with the old ink rollers.

Supported by the upper ends of the brackets, 6, is a transversely extending bar, 13, passing through rectangular or polygonal holes in the frames, in which the said bar can

be moved laterally of the press but not otherwise.

Journaled in suitable frames, 23, clamped to the bar, 13, by set screws, 21', is a shaft, 14, upon which are mounted the black ink rollers, 11, of a standard width corresponding to the width of the matter to be printed in black, said rollers aligning with such matter. On the shaft, 14, are secured collars, 8, to hold the rollers against lateral displacement, and between the separate rollers, 11, in proper order, are placed spacing collars, 9, of less diameter than the rollers. These spacing collars are of various standard lengths such as one, two, three, four, five, six, &c., ems, and align with the matter to be printed in colors when properly adjusted. If the blue matter is four ems wide, the spacing collar aligning therewith will be four ems, &c. By making these collars of standard lengths the pressman is enabled to quickly and accurately assemble the black ink rollers upon the shaft, which is preferably done as follows: The form is placed upon the imposing stone, at each end of which is secured a plate of the shape shown in Fig. 8; and the shaft 14 is placed in the bearing of these plates, and a collar, 8, is first secured in place thereon at a point opposite the outer line of the first column of matter. The short ink rollers, 11, are then slipped on the shaft, with the spacing collars, 9, in proper order and finally all is clamped in position by the other end collar, 8.

The frames or hangers, 23, are unclamped from the bar, 13, and the ink roller shaft quickly set in the bearings of said hangers which are again clamped in position upon the bar, 13, so that the black ink rollers will align with their appropriate matter, and the spaces between them formed by the collars, 9, fall opposite the color type.

Against the sides of the short rollers, 11, I preferably place thin metallic washers, 12, for the purpose of preventing said rollers from spreading while in contact with the form. Any number of the rollers, 11, and collars may be used, as desired.

By this construction of black ink rollers, it will be seen that they can be quickly and accurately adjusted in proper position upon the shaft, and then readily attached to the press. With the form placed laterally on the bed, the black ink rollers remain always at a fixed distance above the form; but if, for any reason, it is desired to place the form longitudinally of the press, as in Fig. 2, the black ink rollers must be raised to clear the type for other colors. To accomplish this, the black ink rollers, 15, are mounted in slotted bearings, 43, of the frames, 23, instead of circular bearings, so as to provide for a slight vertical movement of the shafts, 14, on which the said rollers are mounted.

Two sets of rollers are preferably employed but it is manifest that one set might be used in either of the constructions shown.

Suitable distributing rollers, 20 and 21, set

at an angle to the main rollers are mounted loosely on shafts in bearings on the frames above the rollers, 15, so that the said distributing rollers may vibrate across the face of the ink rollers, 15, as the latter are turned by the ink table, thus spreading the ink evenly on the black ink rollers.

Pivoted to the frames, 23, at 18 are levers, 19, having one end normally held upward by springs, 22, connected to the frames. One arm of each of said levers is preferably provided with a recess in which the end of the shaft, 14, may rest, while the other end carries a wheel, 16, adapted to be engaged by the elevations or cam tracks, 40, on the metal strips locked in the form at each side thereof, and outside of the strips, 39, hereinbefore described.

Depressions, 42, alternate with the elevations on said strips, 38, such depressions corresponding in length to the length of the matter to be printed in colors. By this arrangement, it will be seen that as the form moves under the black ink rollers, the wheels, 16, will be alternately depressed and raised, running in the depressions while the color type is passing under the black ink roller which is thus raised by the spring, 22, above type-high to clear the color type. Riding on these elevations or rails, 40, the wheel is raised thereby depressing the black ink roller into contact with the black type matter.

With the inkers and strips, 38 and 39, arranged as described, and shown in Fig. 2, it will be plain that the color ink will be deposited upon the appropriate section of the form as the wheels, 30, are raised by the rails or elevations, 41, as the form passes under the color inkers, while the color ink rollers, 32, will be held clear of the black type as the wheels, 30, pass from the rails, 41. In a similar manner, the depressions, 42, on the strip, 38, permit the wheels, 16, to lower thereby raising the black ink roller above the color type, while the elevations, 40, raise the wheels, 16, at the proper time to cause the black ink rollers to ink the matter to be printed in black.

While I find the operation of the color inking mechanism shown in connection with Fig. 2, to be satisfactory, I prefer to employ the construction illustrated in Figs. 9 to 13, inclusive, in which the metal strips for depressing the color ink rollers are located outside of the form instead of being locked within the said form. Referring now to the said figures, the cross bar, 26, supports the frames, 27', in which are journaled the main ink cylinder or roller, 34, and the vibrating distributing rollers, 31. The reservoir, 35, is secured to the frames, 27', in a horizontal position, and carries in its feeding end the feed roller, 46, on the end of whose shaft is a ratchet wheel, 47, engaged by a pawl, 48, carried at the upper end of a rod, 50, to which rod a reciprocating motion is given by any suitable means, such as an eccentric, 51, mounted

upon the rotating shaft of main ink roller, or by any other suitable cam rotating with the said ink roller.

Extending transversely of the frames, 27', is a rock shaft, 52, from which projects two arms, 53, in the outer ends of which is mounted a suitable shaft upon which the feed roller, 54, is journaled. To one of these arms is connected a rod, 55, having a projecting stud upon its lower end engaging a cam, 56, on the end of the main roller, 34, so timed that the said rod may be raised as the pawl and ratchet are operated to turn the feed roller, 46, thus taking ink from the reservoir and feeding it intermittently to the main roller, 34.

Near the edge of the bed of the press is a supplementary frame, or hanger, 57, which is clamped to the cross bar, 26; and passing through bearings in this hanger and one of the frames, 27', is a shaft, *a*, upon the outer end of which shaft is mounted a friction wheel, 58, in operative contact with a metal bar, 59, preferably corrugated, extending the whole length of the bed of the press. Motion is transmitted from the shaft, *a*, to the shaft, *d*, of the ink roller, 34, by a gear, 80, meshing with a gear, 81, on the shaft, *d*. This bar is provided with an upwardly projecting tongue, 60, upon which is adapted to be seated, grooved metal strips, 61, corresponding to the metal strips, 40, Fig. 2; and at each end of the said strips, 61, is placed an inclined block, 61', which is held in position by a friction screw clamp, *e*, passing through the side of the block and engaging, by frictional contact, the side of the tongue, 60. These strips are to be of a length corresponding to the length of the matter to be printed in colors.

A vibrating shaft, *b*, passes through a bearing in the opposite side of the frame, 57, and through bearings in the lower part of the frames, 27'. On the outer end of this shaft is an arm, 62, which is adapted to be raised by an upwardly projecting extension, 79, on a vibrating arm, 63, which is pivotally supported at 49, upon the hanger, 57. The arm, 63, carries at its free end a friction wheel or roller, 64, which is adapted to be engaged by the inclined block, 61', and thus caused to pass without jerk or jar upon and from the strip, 61, at a predetermined point in the movement of the bed of the press.

An upward extension, 65, upon the arm, 63, is provided with a laterally projecting lug or boss through which a set screw, 66, passes and bears upon the top edge of the frame, by which the vertical movement of the arm, 63, may be regulated.

A stud, 79, on the frame, 57, works in a slot guide, 78, on the arm, 63, or the guide may be on the frame and the stud upon the hanger, if desired.

Between the frames, 27', on the shaft, *b*, are laterally extending arms, 67, having studs, 68, projecting therefrom, and engaging the upper edge of an offset in the frames, 69, in which the color ink rollers, 32, are mounted. These

frames are slidably connected with the frames, 27', by the vertical guide pins, 70, working in sockets in the lugs, 71, on the said frames, 27', and are pivotally connected to said frames by the pitmen, 72, while they are connected with each other by the tie-rod 73.

The shaft, *c*, of the color ink roller, 32, is mounted in curved slotted bearings, 77, in the frames, 69, and a set screw, 74, limits the movement of the shaft, *c*, in its bearings, which movement may be varied by proper adjustment of said set screw. A spring, 75, connects the shaft, *c*, with the frame, 27', thus normally holding the frames, 69, in the extreme upward position, and consequently keeping the roller, 32, normally out of contact with the form on the bed of the press.

As the wheel, 64, comes in contact with the strip, 61, it is raised, thereby raising the arm, 63, whose extension, 79, comes in contact with and moves the arm on the end of shaft, *b*, rocking the latter and causing the arm, 67, to lower. The movement of this arm, 67, downward depresses the frames, 69, and the roller, 32, carried thereby, until the latter is brought into contact with the form on the press, to ink the same. As soon as the wheel is released from the strip, 61, the spring, 75, draws the roller, 32, out of contact with the form.

I have described two arms, 67, for depressing the frames, 69, but it is obvious that one may answer the purpose, though it is preferable to use two because of the equal distribution of the strains secured thereby.

In some cases it may not be convenient or possible to arrange all the color inkers back of the impression cylinder, or under the feed board, as in the construction hereinbefore described; and in back delivery presses it is obvious that these inkers cannot all be applied under the feed board, but must be arranged in front of the impression cylinder. In Figs. 14 and 15, I have shown such a modification of my invention as will readily meet this contingency. In these figures, the inkers back of the impression cylinder are in all respects the same as that disclosed in Figs. 9 to 13. One of these inkers is adapted to print the blue, and a short strip, 61, for depressing the "blue" roller, 32, will be used, while the other is arranged to print the canary, and a long strip, 61, will be used to depress the "canary" roller, 32, the strips, 61, in each case corresponding in length to the length of color to be printed.

The black ink rollers, 11, are in every respect similar to those employed in connection with the construction shown in Fig. 1. To apply the other colors—in this case, red, orange, and green,—a shaft, 82, is journaled in slotted bearings in the brackets, 87, which brackets also carry the shaft, 14, for the black ink rollers. Upon this shaft, 82, which is capable of a limited vertical movement, are the short ink rollers, 84, 85, and 86, of standard "em" lengths, and secured thereon with spacing collars, if desired, in the same manner as

the black ink rollers. On the outer ends of this shaft are two friction-wheels, 83, which are of slightly greater diameter than the ink rollers. As long as the wheels, 83, are on the ink table, the rollers, 84, 85, and 86, will therefore be held above type-high while black ink is being applied to the rollers, 11.

Extending from the edge of the ink table (not shown) to the end of the bed of the press are two strips of metal, 39', in line with the wheels, 83, in each of which strips there is a depression, 42', which is to register with the colors, red, orange, and green, in the form. While the wheels, 83, are in contact with the elevated portions of these strips, the rollers, 84, 85, and 86, are held above type-high, but the moment the wheels, 83, run into the depressions, 42', the shaft, 82, is lowered and the rollers, 84, 85, and 86 ink the form. To supply ink to these several rollers, I use the frames, 27', with all their appurtenances except the rollers 32, their necessary operating parts, and the supplemental frame and appendages.

Instead of using friction wheels for turning the main ink cylinder, 34, I use a gear, 89, on the shaft, *d*, meshing with the rack, 88, which is placed on the edge of the bed of all bed and cylinder presses.

Some of the advantages of my invention are manifest since it is clear that the simple means provided for readily attaching the black ink rollers to the press, and the spacing collars and the rollers of standard lengths are both conducive to economy of time and labor in making ready; and the introduction of the metallic strips, 24, 38, 39, of standard lengths adds further to this result; and again, the provision of separated and independent color rollers, in combination with separate distributing rollers and ink supplies for each of such color rollers, overcomes a serious objection found in prior constructions for printing in a plurality of colors at one impression, since by my construction, I entirely obviate the mingling or blending of colors, heretofore existing in this type of machines.

While I have shown a particular form of brackets for supporting the black ink rollers, it is obvious that this form may be varied without departing from my invention; and it is equally clear that, in cases where it is desired, these brackets may be attached directly to the framing, *L*.

It is also to be understood that the frames, 23, for supporting the black ink rollers may be duplex, as shown, in either of the constructions used, or single; that is, they may have one or more sets of bearings for black ink rollers according as it is desired to use one or more of such rollers.

The frame shown in Fig. 5 may be used with the construction shown in Fig. 1, without alteration, and it is intended to be so used, omitting the wheels, 16, because the black ink rollers in that construction are fixed with respect to the form.

Changes may be made in the details of my

invention without departing therefrom, and I desire to state that while I have shown the preferred form which my invention takes I do not limit myself to the details shown.

5 I claim as my invention—

1. In a printing press, the combination with the impression cylinder and bed of the press, of the main ink rollers upon one side of the impression cylinder, the separate color ink rollers upon the opposite side of the impression cylinder normally held above type-high, each of said rollers having a separate ink supply and separate ink distributing rollers, the form from which a plurality of colors is to be printed, strips of standard lengths secured to the bed of the press by the usual furniture and arranged to positively throw the color ink rollers into contact with the type in the form at predetermined points in the travel of the bed, and springs for holding the color ink rollers normally above type-high, whereby various colors may be printed from ordinary type at one impression, substantially as described.

2. In a printing press, the combination with the form set in ordinary type, and mechanism for inking certain parts of the form in colors, of the brackets having projecting bosses or pins seated within the bearings of the ordinary ink rollers of the press, a cross bar supported in the upper ends of the brackets, frames suspended from the cross bar movable laterally with respect to each other, and a shaft or shafts journaled in said frames, with one or more ink rollers mounted thereon, substantially as described.

3. In a printing press, the combination with the bed and form thereon, of the frames attached to a transverse bar, a main ink roller journaled in said frames, means for feeding and distributing ink on said roller, a supplementary hanger or frame attached to the transverse bar outside of the inkers, a color ink roller normally held in contact with the main ink roller, and above type-high, a rock shaft journaled in bearings in the supplementary hanger and frames of the inking apparatus, connections between said rock shaft and color ink roller, and connections between the bed of the press and the rock shaft, whereby the latter may be vibrated at predetermined points in the travel of the bed to cause the color ink roller to ink the form, substantially as described.

4. In a printing press, the combination with the bed and impression cylinder, the main form, of a color inking apparatus consisting of the side frames, the main ink roller supported thereby, means for feeding and distributing ink on said roller, secondary frames movably mounted upon the side frames, a spring connection between the two frames tending normally to elevate the secondary frames, a color ink roller journaled upon a shaft carried by the said secondary frames, a rock shaft extending transversely of the apparatus having an arm thereon engaging with

said secondary frame, a metal strip on the bed of the press, and connections between said strip and rock shaft, whereby the color ink roller may be lowered to type-high, substantially as described.

5. In a printing press, the combination with the bed and main form, of a color inking apparatus, comprising the side frames, the main ink and feed rollers supported thereby, the movable frames mounted upon said side frames, the ink roller journaled in said frames, a spring connection between the two frames tending normally to hold the roller above type-high, a metallic strip upon the bed of the press, and mechanism operated by said strip at a predetermined point in the travel of the bed to lower the movable frames and cause the ink roller to ink a portion of the main form in color, substantially as described.

6. In a printing press, the combination with the bed and main form thereof, of the color inking apparatus supported in the transverse bar, the main ink roller, the color ink roller journaled in a movable frame on said inking apparatus and normally held in contact with said main ink roller, the supplementary hanger or frame attached to the transverse bar outside of the inkers, an arm pivotally supported upon said hanger, a rock shaft passing through bearings in the hanger and the frame of the inking apparatus, and connections between said rock shaft and movable frames, with means for raising said arm to vibrate the rock shaft, whereby the frames may be lowered to bring the ink roller to type-high, substantially as set forth.

7. In a printing press, the combination with the bed and the main form, of the color inking apparatus having the main and distributing ink rollers journaled in side frames attached to the cross bar, the color ink roller journaled in bearings and yieldingly held above type-high and in contact with the main ink roller, the supplementary frame or hanger supported by the cross bar outside of the side frames of the inking apparatus, the rock shaft journaled in bearings in the supplementary frame and the side frames, mechanism for vibrating said shaft, and connections between the color ink roller and shaft, whereby the said roller may be depressed to ink a portion of the main form at a predetermined point in the travel of the bed, substantially as described.

8. In a printing press, the combination with the bed and main form, the side frames for supporting the ink rollers clamped to the cross bar, the main ink roller journaled in said frames, the movable frames having bearings for supporting the color ink roller, the spring connection between the two said frames, normally holding the movable frames upward, the supplementary frame or hanger clamped to the cross bar outside of the side frames, the rock shaft supported in bearings in said frames, and having an arm extending therefrom, an arm pivotally supported upon said

hanger and carrying a friction wheel at its
free end and adapted to engage the arm on
the outer end of said rock shaft, a second arm
extending from the opposite side of said rock
5 shaft and engaging the movable frame, and
a metal strip on the bed of the press for en-
gaging the friction wheel, substantially as and
for the purpose described.

In testimony whereof I have signed my
name to this specification in the presence of 10
two subscribing witnesses.

THEODORE J. TURLEY,

Witnesses:

SAM. H. ORR,

HENRY C. HANLEY.