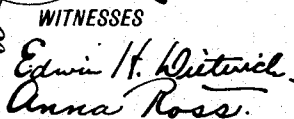


APPLICATION FILED JAN. 2, 1915.

6 SHEETS—SHEET 1.

1,223,347.



BY
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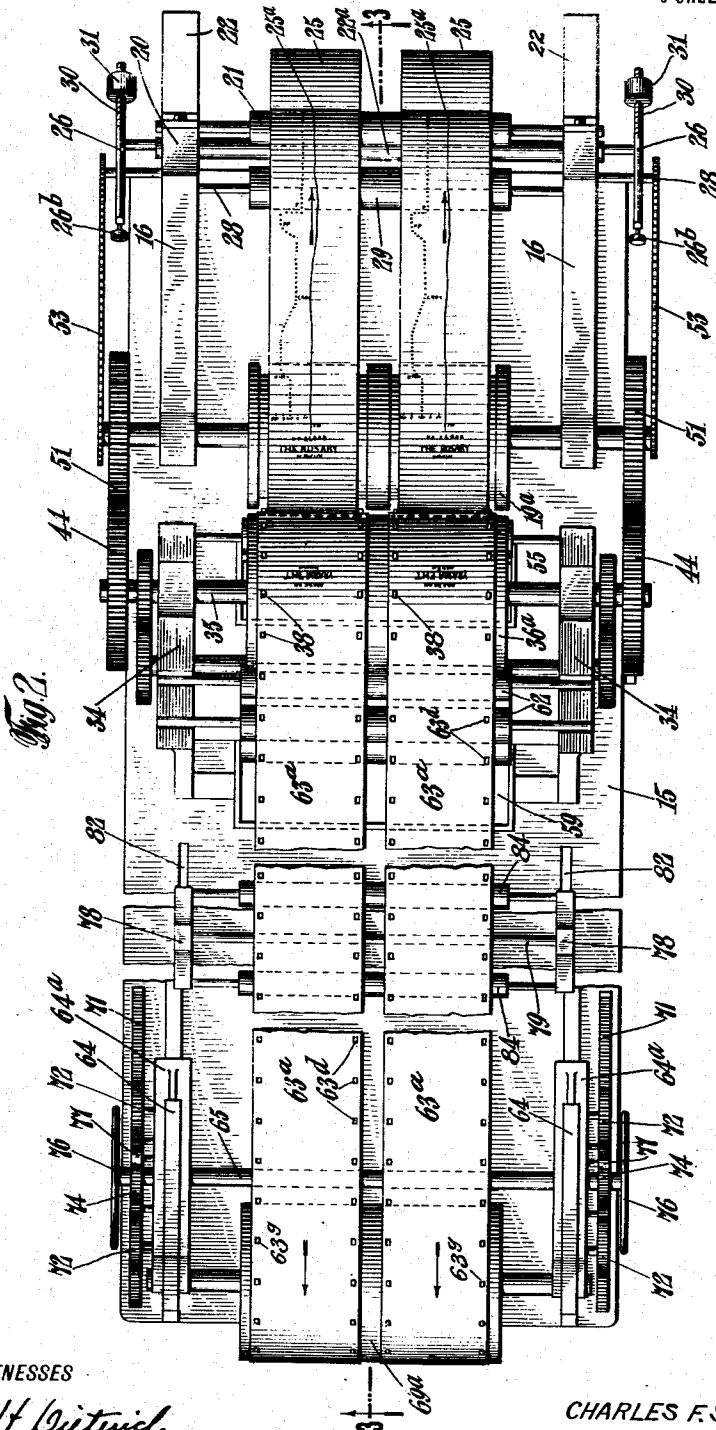
C. F. STODDARD, JR.
PRINTING PRESS.

APPLICATION FILED JAN. 2, 1915.

Patented Apr. 17, 1917.

6 SHEETS—SHEET 2.

1,223,347.



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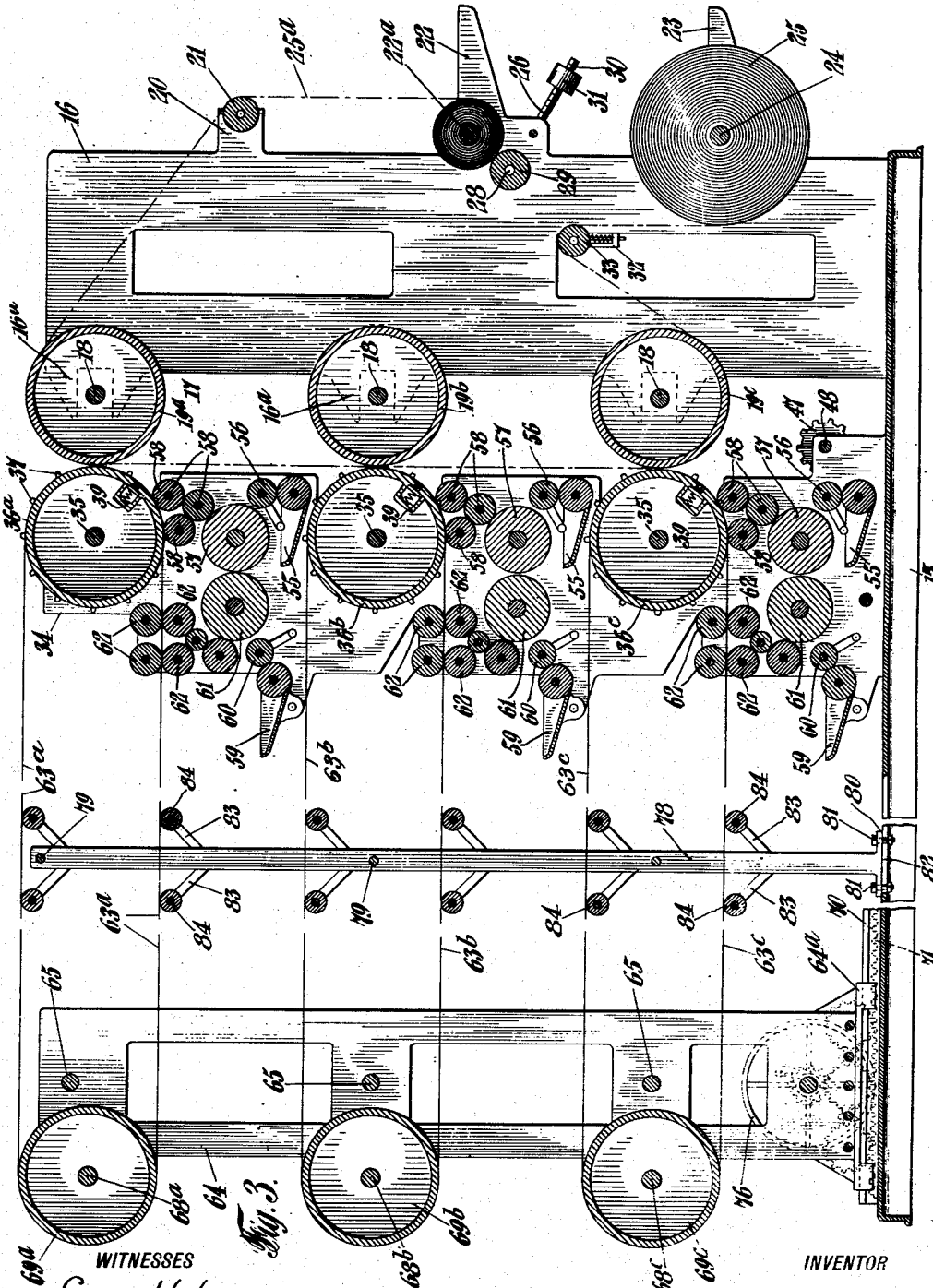
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6 SHEETS—SHEET 3.



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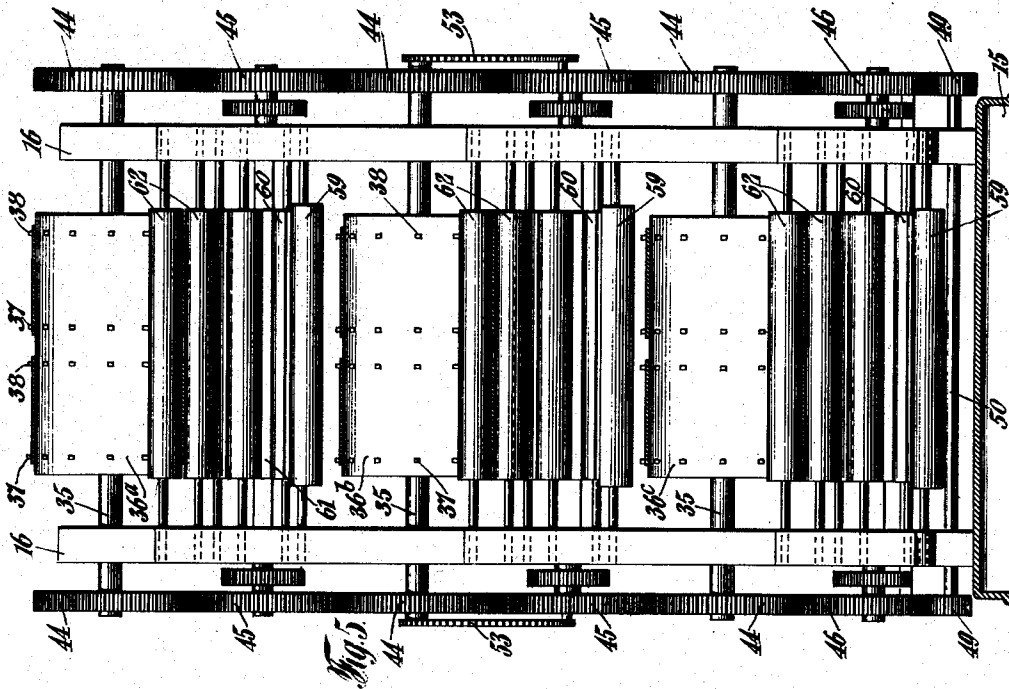
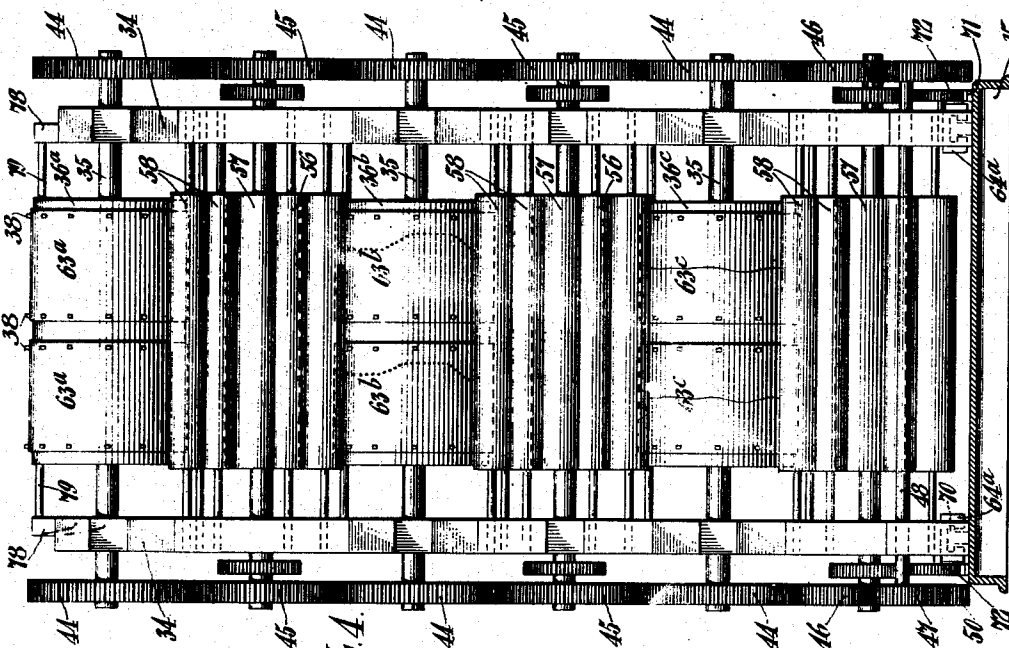
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 PRINTING PRESS.
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1,223,347.

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6 SHEETS—SHEET 4.



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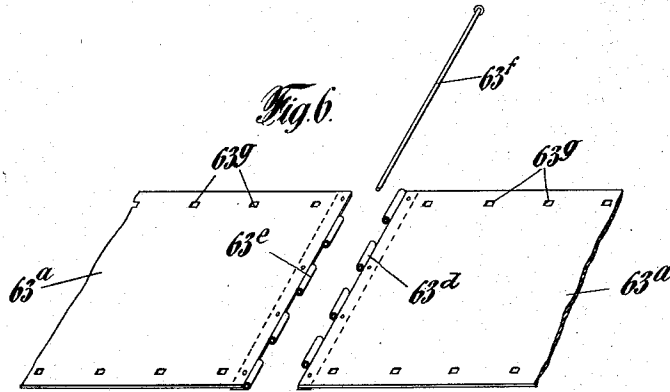
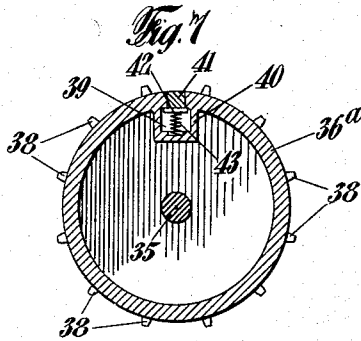
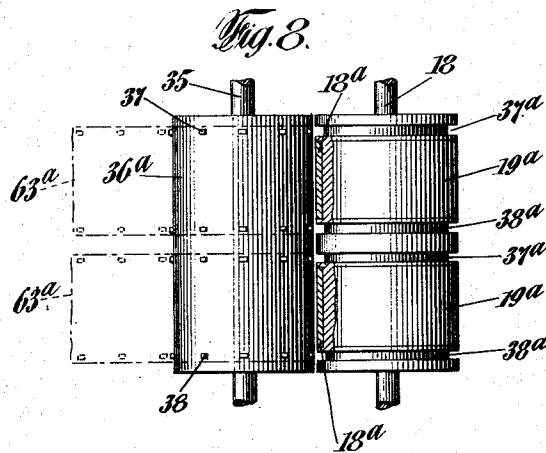
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1,223,347.

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6 SHEETS—SHEET 5.



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Patented Apr. 17, 1917.

6 SHEETS—SHEET 6.

Fig. 9.

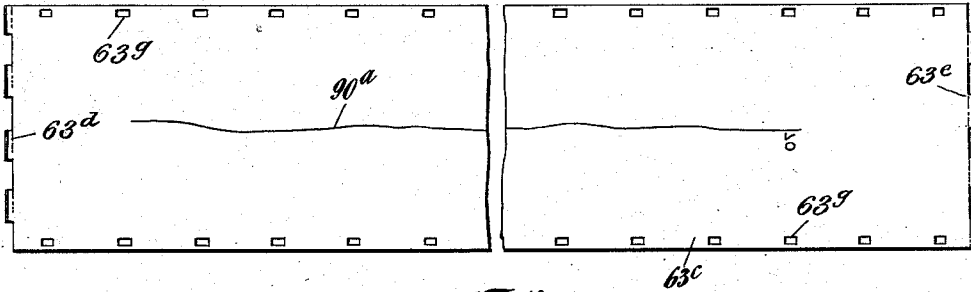


Fig. 10.

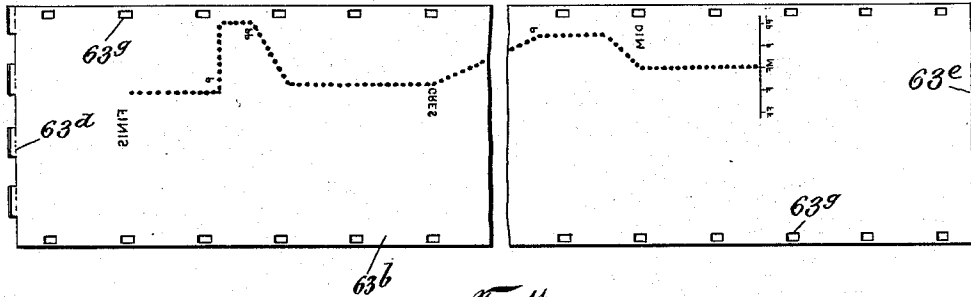


Fig. 11.

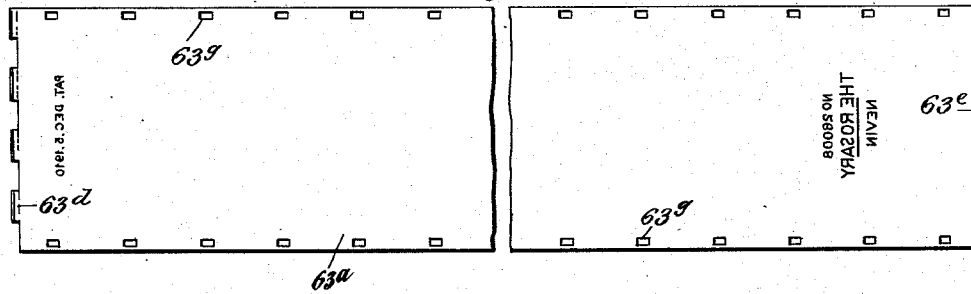
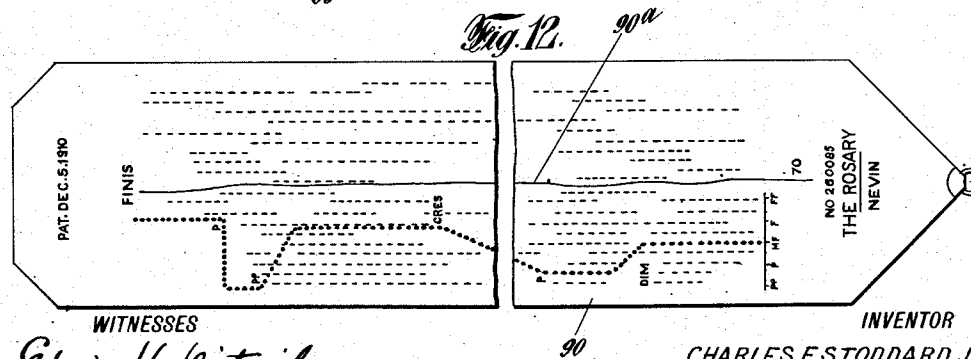


Fig. 12.



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UNITED STATES PATENT OFFICE.

CHARLES F. STODDARD, JR., OF RIDGEFIELD PARK, NEW JERSEY.

PRINTING-PRESS.

1,223,347.

Specification of Letters Patent.

Patented Apr. 17, 1917.

Application filed January 2, 1915. Serial No. 146.

To all whom it may concern:

Be it known that I, CHARLES F. STODDARD, Jr., a citizen of the United States, residing at Ridgefield Park, Bergen county, in the State of New Jersey, have invented certain new and useful Improvements in Printing-Presses, of which the following is a full, clear, and exact specification.

My invention relates to improvements in printing presses, and the same has for its object more particularly to provide a simple, efficient and reliable press by means of which long strips or elongated bodies, such as music rolls, may be printed with suitable lines, marks, inscriptions or other characters in one or more colors, as desired.

Further, said invention has for its object to provide a printing press by means of which a single continuous line or mark may be printed longitudinally upon long strips or bodies, or upon which lines, marks or other characters may be printed or otherwise marked thereon in series or succession without regard to whether said lines, marks or characters appear at regular or at irregular intervals or points.

Further, said invention has for its object to provide a printing press in which the printing form is constructed in the shape of an endless flexible band, and adapted to be rotated over a pair of cylinders suitably arranged in relation to each other, and in relation to the impression cylinder.

Further, said invention has for its object to provide a printing press of the character described comprising a series of superposed printing forms which are adapted to operate in succession upon a band or elongated body of material passing between the impression cylinders and the cylinders adjacent thereto over which the printing forms are rotated.

Further, said invention has for its object to provide a printing press by means of which a separate line, mark or character may be printed at each point of impression, or whereby a part thereof may be printed at each point of impression in order to produce the completed matter upon passing under the upper or last of said printing forms when the complete printed line, mark or character is composed of several colors.

Further, said invention has for its object to provide a printing press which may be readily adjusted in order to accommodate printing forms, of the character specified, which may vary greatly in length.

Further objects will in part be obvious, and in part be hereinafter more fully described.

To the attainment of the aforesaid objects and ends, my invention consists in the novel details of construction, and in the combination, connection and arrangement of parts hereinafter more fully described and then pointed out in the claims.

In the accompanying drawings forming part of this specification, wherein like numerals of reference indicate like parts,—

Figure 1 is a side elevation partly broken out showing one form of printing press constructed according to and embodying my said invention;

Fig. 2 is a plan or top view;

Fig. 3 is a longitudinal section taken on the line 3—3 of Fig. 2.

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 1, looking in the direction of the arrow *a*.

Fig. 5 is a transverse section taken on the line 5—5 of Fig. 1, looking in the direction of the arrow *b*.

Fig. 6 is a detail perspective view showing the opposing ends of a printing form, and the means for securing the same together.

Fig. 7 is an enlarged detail transverse section of one of the form cylinders showing the yielding means for accommodating the hinge of the flexible form;

Fig. 8 is a detail plan or top view partly in section, showing the construction of one of the form cylinders, and of the impression cylinder coöperating therewith;

Figs. 9, 10 and 11 are respectively face views of several printing forms, partly broken out, illustrating the different matter which may be printed thereon in succession upon the press, and

Fig. 12 is a detail face view showing an extended music roll or note sheet, partly broken out, with the printed matter appearing thereon as produced after successively passing under the several printing forms of the press.

In the accompanying drawings I have shown my invention in connection with a press embodying generally the principal features of an ordinary lithographic press and in said drawings 15 denotes a bed-plate or base upon one end of which are rigidly secured the upright frame members 16, 16. Upon the inner or left hand ends of said frame members 16, 16 are provided brackets

16^a in which are supported bearings 17 for the shafts 18 carrying the impression cylinders 19^a, 19^b, 19^c. The impression cylinders 19^a, 19^b, 19^c are provided adjacent to their opposite ends, and intermediate their ends with annular recesses 37^a, 38^a, and intermediate each of said sets of said recesses said impression cylinders are provided with a recessed portion in which is secured a felt packing 18^a.

Upon the outer or right hand ends of said frame members 16, 16 are arranged, in the order named from top to bottom, brackets 20, 20 in which is supported a roller 21, brackets 22, in which is supported a winding shaft 22^a, and brackets 23 in which is supported the shaft 24 for the roll 25 forming the matter to be printed.

Upon the outer sides of said frame members 16, 16 are pivotally supported arms 26, 26, each having its inner end slotted at 27 to receive the end of a shaft 28 upon which is fixed a friction roller 29 adapted to engage with the material as it is reeled up on the finished product roll upon the shaft 22^a. The slotted end of the arm 26 is provided with a spring 26^a serving to maintain the shaft 28 normally pressed against the lower end of said slot. The spring 26^a is held under proper tension by means of an adjusting screw 26^b. The outer end of the arm 26 is screw-threaded at 30 and upon said threaded end works an adjustable weight 31 which serves to maintain the inner end of the arm 26 normally raised and the roller 29 carried thereby normally in contact with the reeled or finished product upon the shaft 22^a.

Intermediate the frame members 16, 16 are provided bearings 32 in which is supported a roller 33 over which the stock passes before reaching the impression cylinder 19^c.

To the left of the frame members 16, 16 are rigidly secured vertical frame members 34, 34 in which are supported the ends of the shafts 35, 35, 35, upon which are mounted the form cylinders 36^a, 36^b, 36^c. The said form cylinders 36^a, 36^b, 36^c are mounted in close proximity to said impression cylinders 19^a, 19^b, 19^c, and in axial horizontal alinement therewith. The said form cylinders are of twin formation and provided upon their outer surfaces with four rows of spurs 37, 37, 38, 38, which register with the annular recesses 37^a, 38^a, provided in the impression cylinders 19^a, 19^b, 19^c.

Each of the form cylinders 36^a, 36^b, 36^c, is provided with a longitudinal recess 39 having a relatively broader base portion 40. Within each recess 39 is disposed a longitudinal bar 41 whose outer surface is conformed to the contour of the cylinder, and whose inner surface is provided with a base 42 corresponding substantially in transverse width with the width of the enlarged base

40 of said recess 39. Below said base portion are provided a series of springs 43 which serve to maintain the outer surface of the bar 41 normally flush with the outer surface of the cylinder. The purpose of the yielding bar 41 is to accommodate the hinge of the flexible band-like printing form hereinafter described.

Upon the opposite ends of the shafts 35 of the form cylinders are mounted large gears 44 which mesh with corresponding intermediate gears 45, mounted upon the outer sides of the frame members 34, and with an intermediate gear 46 meshing with a pinion 47 fixed upon the forward end of the driving shaft 48. The intermediate gear 46 also meshes with a pinion 49 on the shaft 50 which extends through the frame members 34, 34, and is provided upon its opposite or farther end with a corresponding pinion, whereby rotation is transmitted to the opposite side of the press to rotate a set of gears driving fountains and vibrating cylinders 57 and 61.

The gears 44, 44 also mesh with a set of gears 51, 51, 51 mounted upon the shafts 18 of the impression cylinders 19^a, 19^b, 19^c.

Upon one of the shafts 18 is fixed a sprocket wheel 52, and a sprocket wheel 54 is mounted upon the shaft 28 supporting the friction roller 29. 53 denotes a chain belt passing over the sprocket wheels 52 and 54 in order to transmit rotation to said friction roller 29.

The press shown in the accompanying drawings is one designed for lithographic work and is provided with the usual means for transmitting ink from a suitable ink receptacle to an ink drum, from which in turn it is transferred to a series of leather faced rollers and then to the printing surface. The press is also provided with a water fountain, and means for transferring water from said fountain to a metal cylinder from which, in turn, the water is transferred to a series of metal rolls faced with felt or other absorbent material. At Fig. 3 of the drawings these parts are shown diagrammatically, and in said figure 55 designates an ink fountain, 56 a transfer roller by means of which the ink is transferred intermittently from the ink fountain to the ink drum 57, from which, in turn, the ink is transferred to a series of three leather faced inking rollers 58, 58 normally in contact with the printing form traveling upon the cylinder 36^a.

59 denotes a water fountain from which the water is intermittently transferred by a felt faced roller 60 to a metal drum 61, and from said drum 61 to the lower pair of a series of felt faced rollers 62, 62 between which rollers the two sets of printing forms 63^a, 63^b, 63^c are severally adapted to pass in pairs.

At the left hand end of the press are pro-

vided a pair of adjustable frame members 64, 64, which are secured together by transverse braces or stays 65, 65. Said frame members 64, 64 are provided at their outer or left hand edges with a series of three brackets 66, within which are adjustably mounted bearing members 67 supporting shafts 68^a, 68^b, 68^c, carrying idlers or supporting rollers 69^a, 69^b, 69, respectively.

The lower ends of each of the frame members 64 is bifurcated at 64^a, and slidably disposed upon a rail 70. Directly in front of and parallel with the rail 70 is disposed a rack 71 which is engaged by a series of gears 72, 72, 72, operatively connected by idlers 73, 73. The said gears 72 are actuated by a gear 74 fixed upon a shaft 75 adapted to be actuated in either direction by a hand wheel 76. A ratchet wheel, not seen, may be provided upon the shaft 75, and be engaged by a pawl 77 in order to hold the adjustable frame members 64, 64 to any of their adjusted positions.

The printing forms 63^a, 63^b, 63^c are each preferably formed in the shape of a flexible endless belt made of aluminium, zinc or other suitable material depending entirely upon the character of the press and the nature of the printing to be performed thereby. That is to say, whether the said press is to operate as a lithographic press or as a press for printing from half-tone, rotogravure plates, or any other kind of printing. For such purposes the printing forms 63^a, 63^b, 63^c are preferably made of a strip or band of said material about 12 inches wide, and varying in length from 18 to 80 feet or more, according to the length of matter to be printed in the course of a complete movement or rotation of each of said printing forms 63^a, 63^b, 63^c.

Each of said printing forms 63^a, 63^b, 63^c is provided at its abutting transverse edges with interengaging hinge portions 63^d, 63^e secured together by a hinge pin 63^f. In connection with the hinge members 63^a, 63^b it is to be noted that the form cylinders 36^a, 36^b, 36^c are each provided with the yielding sections 41 in order properly to accommodate said hinge section when the same passes over the cylinders once in every complete course of travel of each of said flexible printing forms working thereon. It is to be noted in connection with the length of said printing forms that the same should be constructed in multiples of the circumference of its respective form cylinder, in order that the said hinge may properly come into register with the yielding section 41 thereof during each complete course of travel of such flexible printing form.

The said printing forms 63^a, 63^b, 63^c are also provided along each or their opposite longitudinal edges with a row of apertures 63^g, adapted to engage with the spurs, 37, 38

provided upon the surfaces of the form cylinders 36^a, 36^b, 36^c.

In the present instance I have, by way of illustration, merely, shown three different printing forms which are adapted to operate in succession upon a strip of material forming a note sheet or music roll 90 in order to print the desired matter thereon.

For example, by means of the lowermost printing form 63^c, which operates upon the cylinders 36^c, 69^c, is printed the red irregular, longitudinal line 90^a which indicates the varying tempo with which the particular musical selection is to be played. This line may be printed in red, or any suitable or desired color.

Next, by means of the intermediate printing form 63^b, an irregular line consisting of a series of regularly spaced dots may be printed, for example, in blue. This dotted line may represent the varying expression with which the different parts of the selection are to be played.

Finally by means of the top or third printing form, words, letters, marks or other characters may be printed in any desired color. These last-mentioned marks or characters may serve to supplement the expression line by printing upon the note sheet, at certain points of said expression line suitable designations in order to indicate the beginning or change in the expression. These marks usually consist of the letters FF, F, P, PP, etc., to represent the volume of tone desired.

Further, in addition to the marks last-mentioned other matter may be printed by the last printing form, such as the title of the composition; the words of a song; the picture of a scene or part of a play at which the particular portion of the composition is produced, or any other matter, as desired.

It will of course be understood that the foregoing is merely illustrative, and that such matter may be printed in the reverse order from that above indicated, or in any other manner as desired, and that any other matter, including pictures may be printed.

Between the fixed frame members 34 and the adjustable frame members 64 are provided a pair of vertical supports or standards 78 which are connected together by transverse rods or stays 79, and provided at their lower ends with bases 80. 81 denotes bolts extending through said bases 80 and into longitudinal slots 82 provided in the base 15 of the press whereby to permit of the movement of said frame members 78 back or forth when it is desired to center said supports 78 between the fixed frame members 34 and the adjustable frame members 64. This becomes necessary in order to accommodate printing forms of different lengths. The supports or standards 78 are provided with oppositely extending angular

brackets 83, 83 upon which are loosely mounted anti-friction rollers 84, 84 over which the flexible printing forms 63^a, 63^b, 63^c are adapted to pass in their travel over
 5 the rollers 69^a, 69^b, 69^c and 36^a, 36^b, 36^c.

The operation of the press is as follows:—

The material to be printed is placed in the form of a reel upon the shaft 24 which is supported in the brackets 23 at the right
 10 hand end of the press. Thereupon the free end of the material is passed over the roller 33 under the lowermost impression cylinder 19^c, and between said cylinder 19^c and the form cylinder 36^c, thence upwardly between
 15 the impression cylinder 19^b and form cylinder 36^b, and thence in turn between the impression cylinder 19^a and form cylinder 36^a over said impression cylinder 19^a, over roller 21, and its end thence secured to the
 20 shaft 22^a. The printing forms it will, of course, be understood have previously been adjusted upon the three sets of cylinders 69^a, 36^a, 69^b, 36^b, 69^c, 36^c, respectively. Rotation will be imparted to the form cylinders 36^a, 36^b, 36^c through the medium of the
 25 driving shaft 48, pinion 47, gears 46 and 44 to the gears 45, from the gears 44 to the gears 51, sprocket 52, belt 53, sprocket 54, to the friction roller 29 in contact with the
 30 outer surface of the material 25^a as it is being reeled up upon the shaft 22^a. This operation, above outlined, will continue until the entire quantity of material of the reel 25 is consumed.

35 It will be understood that while my said invention is herein shown and described in connection with a lithographic printing press involving a plurality of colors, the same is nevertheless applicable to presses of
 40 any kind, whether the same are designed to print in one color, or whether the same are designed to print several different colors in succession to form the finished printed matter.

45 Further, it is to be noted that my improved press is particularly adapted for printing elongated bodies of great length, such as music rolls for mechanical players used to actuate musical instruments, which
 50 music rolls require the printing thereon of longitudinal marks or characters extending the entire length of the note sheet; which require the printing thereof in different colors, and which require the printing of
 55 marks or characters of any kind in fixed relation to each other, without regard to the fact whether the same are separated from each other by regular or irregular intervals or spaces.

Further, it is to be noted that while I
 have shown each tier of the press with only two sets of band-like printing forms, the capacity of the press may be easily increased by extending the lengths of the impression cylinders and the form supporting
 65 cylinders in order to accommodate three or more printing forms, as desired, at each tier of the press.

Having thus described my said invention, what I claim and desire to secure by Letters Patent is:—

1. In a printing press, the combination with an impression cylinder, of a pair of cylinders, an endless, band-like printing form arranged thereon, means for securing
 75 the opposing edges of said band-like printing form together, and yielding means provided in one of said cylinders to accommodate the securing means for said band-like printing form as the same passes between
 80 said cylinder and said impression cylinder, substantially as specified.

2. In a printing press, the combination with an impression cylinder, of a pair of cylinders, an endless, band-like printing
 85 form arranged thereon, means for securing the opposing edges of said band-like printing form together, a longitudinal member yieldingly mounted in one of said cylinders for accommodating the means for securing
 90 the opposing ends of said band-like printing form in its passage between said last-mentioned cylinder and the impression cylinder, substantially as specified.

3. In a printing press, the combination
 95 with an impression cylinder, of a pair of cylinders, an endless, band-like printing form arranged thereon, means for securing the opposing edges of said band-like printing form together, one of said cylinders
 100 being provided with a longitudinal recess, a longitudinal member disposed within said recess, and spring means for maintaining said longitudinal member yieldingly in position within said longitudinal groove, said
 105 longitudinal member being adapted to accommodate the securing means for said band-like printing form as the same passes between said cylinder and said impression cylinder, substantially as specified.

Signed at the city of New York, in the county and State of New York, this 9th day of December, one thousand nine hundred and fourteen.

CHARLES F. STODDARD, JR.

Witnesses:

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 LOUIS B. HASBROUCK.