

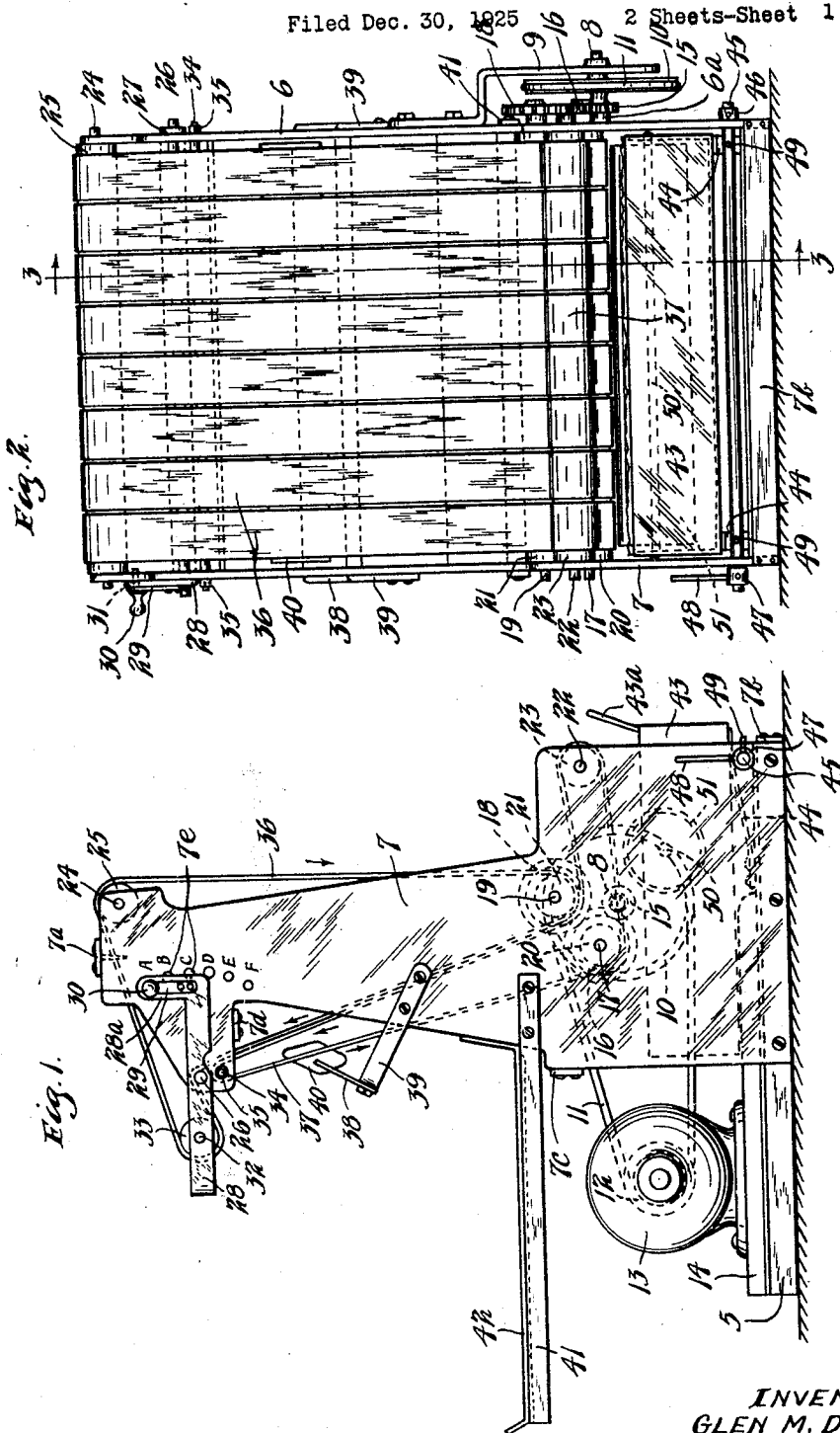
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1,691,023

G. M. DYE

PRINT FLATTENING DEVICE

Filed Dec. 30, 1925 2 Sheets-Sheet 1



INVENTOR.
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BY HIS ATTORNEYS.

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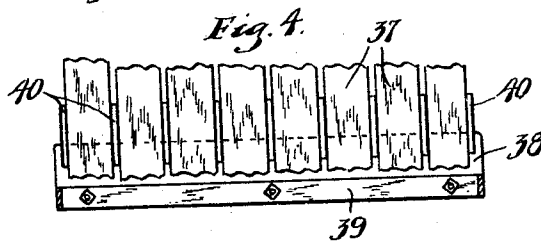
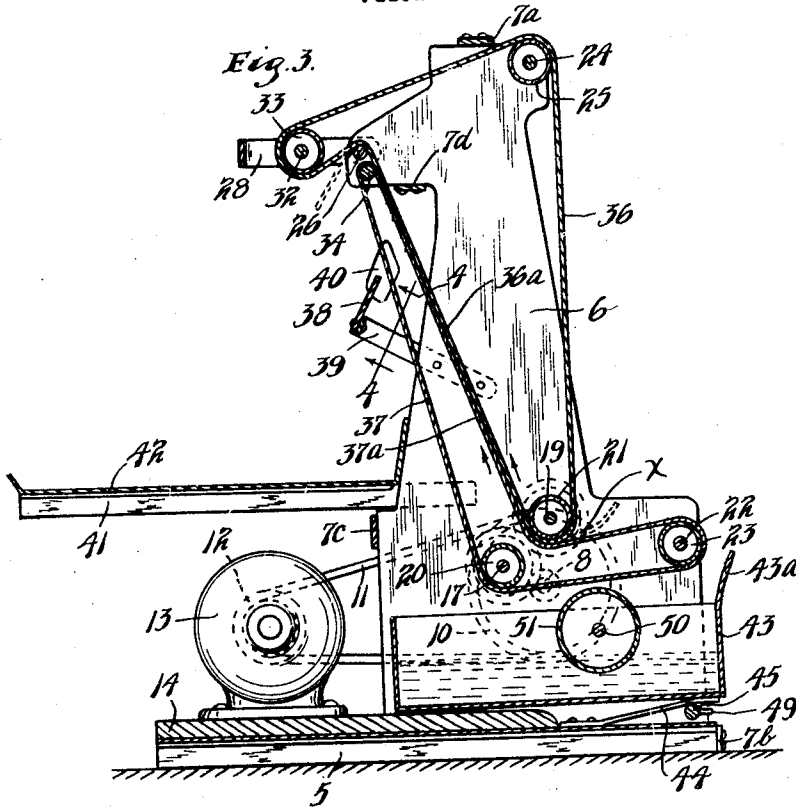
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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PRINT-FLATTENING DEVICE.

Application filed December 30, 1925. Serial No. 78,337.

This invention relates to a machine for flattening photographic prints or similar articles. As is well known to those skilled in the art, when a photographic print is dry it often becomes curled or bent. Sometimes the concave side of the curl or bent portion is on the emulsion side, and in some cases the concave curve is on the plain side of the print. It is desirable to have these prints straight or flattened after such drying or subsequent operation. The prints are sometimes so brittle and so much curled that if they are reversely bent in an effort to flatten the same the prints will crack on the emulsion side. It is desirable therefore to provide some method and means for preventing such cracking. The degree of curl or curve varies greatly in different prints and some prints thus require a greater flattening or straightening effect than others.

It is an object of this invention, therefore, to provide a simple and efficient method for flattening curled prints.

It is a further object of the invention to provide a simple and efficient print flattening means, together with means for varying the degree of flattening effect.

It is a further object of the invention to provide a simple and efficient print flattening means and means for treating the prints so that the same will not be cracked in the flattening operation. It is also an object of the invention to provide a simple and efficient print flattening means in combination with means for moistening the prints prior to the flattening operation so that they will not be cracked.

It is still another object of the invention to provide a print flattening means comprising a traveling member with which the prints travel to the point where the flattening operation takes place, together with means for moistening the print while it is moved with said traveling member.

It is also an object of the invention to provide a print flattening device having spaced parallel rollers and a plurality of adjacent comparatively narrow strips running thereover in parallel relation by means of which the print is carried, said strips preferably being elastic.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which

like reference characters refer to the same parts throughout the different views, and in which,

Fig. 1 is a view in side elevation of the device;

Fig. 2 is a view in front elevation, as seen from the right of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 2; and

Fig. 4 is a section taken on the line 4—4 of Fig. 3.

Referring to the drawings, a machine is shown comprising a base member 5 to each side of which are secured the upstanding plates 6 and 7 forming standards, which plates are of the shape shown in Figs. 1 and 3. The plates 6 and 7 are connected by a plurality of bars 7^a, 7^b, 7^c and 7^d extending therebetween and secured thereto. The plate 6 has a bearing boss 6^a projecting therefrom in which is journaled a driving shaft 8, said shaft being supported at its outer end in a bearing bracket 9 illustrated as a bar reversely bent at right angles to extend parallel with the plate 6 and be secured thereto at one end by suitable bolts. The driving shaft 8 carries a pulley 10 over which runs a driving belt 11 also running over a pulley 12 secured to a suitable motor 13. The motor 13 is illustrated as of the electrical type and is secured to a plate 14 mounted on the base 5. A pinion 15 is secured in shaft 8 and meshes with a gear 16 carried on a shaft 17 extending between and journaled in the plates 6 and 7. The gear 16, in turn, meshes with a gear 18 of the same size which is also mounted on a shaft 19 which also extends between and is journaled in the plates 6 and 7. The shaft 17 carries a roller 20 having a length equal substantially to the distance between plates 6 and 7 and the shaft 19 carries a roller 21 of similar length. A shaft 22 extends between and is journaled at its ends in the plates 6 and 7, at the forward portion of said plates, which shaft carries a roller 23 having a length substantially equal to the distance between the plates 6 and 7. A shaft 24 extends between and is journaled in the plates 6 and 7 at the upper front corner thereof, which shaft carries a roller 25 also extending between plates 6 and 7. A smaller roller 26 extends between plates 6 and 7 and has its ends journaled therein at the upper rear side of said plates. As shown in Figs. 1 and 3, said roller is held in place by a suitable arm

27 at one end and by an arm 28 mounted on the other end thereof, said arms being mounted, respectively, on the outer sides of plates 6 and 7 and being adapted to oscillate about the axis of roller 26. The arm 28 is illustrated as having a right angle projection 28^a to which is secured a spring plate 29 having a knob 30 secured at one end from which projects a pin 31 adapted to extend through an aperture in the arm 28^a and into any one of a plurality of holes 7^c in the plate 7, said holes being shown as designated by suitable characters illustrated as letters of the alphabet. A shaft 32 has its ends journaled in the arms 27 and carries a roller 33 extending between said arms. Another small roller 34 is journaled in and extends between the plates 6 and 7, said roller preferably being held in place by collars 35 secured to its ends at the outer side of plates 6 and 7, respectively. Adapted to run about rollers 21, 25, 33 and 26, respectively, is a plurality of endless belts or strips 36. While these strips 36 may be made of various materials, in practice, they have been made of resilient or elastic webbing. This webbing preferably is of rather soft absorbent material. Adapted to run about the rollers 20 and 34 is a plurality of endless belts or strips 37, similar to the strips 36. The rollers 26 and 34, as shown in Figs. 1 and 3, are quite close together and it will be seen that belts 36 and 37 each have an upwardly inclined run which runs are in parallel relation and substantially in contact. A plate 38 extends across the rear portion of belts 37, being secured to and supported on a bar 39 having its ends bent substantially at right angles and secured to the outer sides, respectively, of plates 6 and 7. The plate 38 carries a plurality of plates 40, as shown in Figs. 1 and 3, which plates extend at right angles to plate 38, being held in slots therein and also projecting between the belts 37 and at the outer sides of the end belts 37. A pair of bars 41 are secured, respectively, to the outer sides of plates 6 and 7 and project rearward therefrom, said bars being adapted to hold a sheet metal trough 42. A tank 43 is disposed below the belts 36 resting at its rear end on the plate 14 and being supported at its front end on a pair of bars 44 secured at their rear ends to the base 5 and spaced some distance above said base at their forward and outer ends. A shaft 45 extends between and is journaled in the plates 6 and 7, being held in place by a collar 46 at one end and a collar 47 at its other end, the collar 47 having a handle 48 projecting therefrom. The shaft 45 extends beneath the outer ends of bars 44 and has secured radially therein pins 49 disposed in alignment with said bars 44, said pins normally projecting forwardly and horizontally. The tank 43 has an upwardly projecting lip 43^a at its forward end and a shaft 50 extends between and

is secured in the sides of said tank. A roller 51 is journaled on shaft 50 and extends between the sides of said tank having its top surface normally spaced a short distance below the lower run of the belts 36.

In operation, the motor 13 will be driven from a suitable source of power and the gears 16 and 18 will be driven through the pulley 10 and shaft 8. Rollers 20 and 21 will thus be driven at the same speed. Rollers 20 and 21 being driven, the belts 36 and 37 will be traversed about the various rollers in the direction indicated by the arrows in Figs. 1 and 3. The prints to be flattened will be placed between the belts 36 and 37 substantially at the meeting point of these belts indicated at *x* in Fig. 3, said prints being disposed on the belts 37 with their concave side uppermost. The prints will be engaged between the belts 36 and 37 and will travel upward between the inclined runs 36^a and 37^a of said belts. The prints continue to move upwardly above roller 34 and will pass beneath the belts 36 and over the upper roller 26, thus being bent in reverse direction to their curl and flattened. The prints will drop after passing roller 26 and will be collected in the trough or tray 42. As above stated, some prints require more flattening effect than others. It will be noted that the arms 27 and 28 can be swung about the axis of roller 26 by withdrawing pin 31 from its hole 7^a in the plate 7 and swinging said arm. When arms 27 and 28 are swung the position of roller 33 is varied and the angle formed by the belts 36 and running over the roller 26 will be varied, said angle becoming wider as roll 33 is raised and becoming narrower of sharper as roll 33 is lowered. The wider the angle the less flattening effect is given the prints and the sharper the angle the greater is the flattening effect given the prints. The flattening effect can therefore be quickly adjusted by the operator by merely moving the arm 28, the arm 27 moving therewith.

Also, as above stated, it is sometimes desirable to prevent cracking of the prints and for this purpose the prints are moistened. To effect this a supply of water or other moistening liquid is contained in the tank 43 to such a depth that the roller 51 is partially submerged therein. When it is desired to moisten the prints the arm 48 will be swung downwardly so that pins 49 are moved to vertical position. This raises the outer ends of arms 44 and the outer end of tank 43 and roller 51 is raised into engagement with the lower runs of the belts 37. As said belts move therein they will rotate the roller 51 and will have a layer of moisture imparted thereto. As these belts come over the roller 23 and under the roller 21, they come in contact with the belts 36 and the latter belts will absorb some of the moisture. The moisture in one

or both belts will be partially absorbed by the print as it travels in its movement from roller 21 and the rollers 34 and 26 and will thus be softened so that all danger of cracking the prints as it moves over roller 26 is avoided. In practice, the machine is constructed and arranged so that there is an interval of about three seconds between the time the print passes roll 21 and roll 26 and the print has ample time to absorb sufficient moisture to prevent cracking.

The plates 40 operate to properly space and position the belts 37 and these plates, together with plate 38 also act as a deflector to deflect the prints which may come in contact therewith so that said prints will fall into the tray 42.

From the above description it is seen that applicant has provided a very simple and efficient device for flattening or straightening prints or similar curled articles. The device can be suited to the amount of flattening effect necessary and the prints can be moistened to insure that they will not be cracked. The device is comparatively simple and is rapid in operation. The same has been amply demonstrated in actual practice and found to be very successful and efficient.

It will, of course, be understood, that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of applicant's invention, which, generally stated, consists in a device capable of carrying out the objects above set forth, in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. A print flattening device having in combination, means for moistening a print, and means for flattening said print while moistened.

2. A print flattening means having in combination, means for moving and flattening a print, and means for moistening said print during said movement.

3. A print flattening device having in combination, a pair of rollers mounted in spaced relation, a member having a convex surface and disposed about a fixed axis, an endless member moving around said rollers with the outer surface of one run thereof engaging said convex surface to form an angle in said run, and means for varying the size of said angle.

4. A print flattening device having in combination, a pair of rollers mounted in spaced relation, a member having a convex surface and disposed about a fixed axis, an endless member moving around said rollers with the outer surface of one run thereof engaging said convex surface to form an angle in said run, and means for varying the position of one of said rollers to vary said angle.

5. A print flattening device having in com-

ination, a flexible sheet, a member having a convex surface over which said sheet moves to form an angle in its outer surface, a print being adapted to move between said sheet and member, and means for varying said angle.

6. A print flattening device having in combination, a traveling member with which said print moves, a member having a convex surface over which the print is moved by said traveling member, and means for supplying moisture for moistening said print while moving with said traveling member.

7. A print flattening device having in combination, a pair of parallel rollers, a plurality of comparatively narrow strips running over said rollers in close proximity to each other, a member having a convex surface over which one side of each of said strips runs to form an angle in said side and an endless means alined with said strips and moving over said convex surface in contact with said strips.

8. A print flattening device having in combination, a pair of parallel rollers, a plurality of comparatively narrow elastic strips running over said rollers in close proximity to each other, a member having a convex surface over which one side of each of said strips runs to form an angle in said side and an endless means alined with said strips and moving over said convex surface in contact with said strips.

9. A print flattening device having in combination, an endless belt running over a plurality of parallel rollers and having a print-engaging run, a member having a convex surface over which said run passes to form an angle, a second belt running over a plurality of parallel rollers and having a print-engaging run parallel to and substantially in contact with said first mentioned run, one of said latter rollers being closely adjacent said member whereby said run of said second endless member terminates at said roller and moves away from said first mentioned run over said roller.

10. A print flattening device having in combination, two closely adjacent comparatively small parallel rollers, an endless member running over one of said rollers and extending away from the other roller, a second endless member running over the other roller to form an angle in its surface, said endless members having their sides approaching said rollers parallel and substantially in contact a third roller over which said second mentioned endless member runs after leaving said other roller, and means for varying the position of said third roller to vary said angle.

11. A print flattening device having in combination, a pair of rollers mounted in spaced relation, a member having a convex surface and disposed about a fixed axis, an

endless member moving around said rollers with the outer surface of one run thereof engaging said convex surface to form an angle in said run, a second endless member contacting said endless member, a tank disposed adjacent said last mentioned endless member for containing liquid, means in said tank partially submerged in said liquid, and means for moving said means with said last mentioned endless member.

12. A print flattening device having in combination, a plurality of parallel rollers, an endless belt of absorbent material running over said rollers adapted to engage and move a print, a tank adapted to contain liquid, disposed adjacent said belt, a roller in said tank partially submerged in the water therein, and means for moving said tank to bring said roller into contact with said belt to moisten the same.

13. A print flattening device having in combination, two closely adjacent comparatively small parallel rollers, an endless member running over one of said rollers and extending away from the other roller, a second endless member running over the other roller to form an angle in its surface, said endless members having their sides approaching said rollers parallel and substantially in contact and adapted to carry a print therebetween.

14. A print flattening device having in combination, a plurality of parallel rollers, an endless belt of absorbent material running over said rollers adapted to engage and move a print, a tank adapted to contain liquid, disposed adjacent said belt, means in said tank partially submerged in said liquid, and means for moving said means into position to moisten said belt.

15. The method of handling a curled photographic print which consists in moistening the print and then flattening said print while moist.

16. The method of handling a curled photographic print which consists in moistening said print and then while said print is moist,

bending the same in a direction reverse to the curl thereof to flatten said print.

17. The method of handling a curled photographic print which consists in moistening said print and then passing said print between a flexible sheet and a member having a convex surface, said sheet forming an angle over said member.

18. The method of handling a photographic print which consists in traversing said member in contact with an absorbing flexible sheet and moistening said sheet so that said moisture is absorbed by said print.

19. The method of handling photographic prints which consists in progressing the same between flexible members of sheet material, moistening one of said sheets whereby said moisture is absorbed by said print and then passing said print between one of said sheets and a member having a convex surface in contact with said sheet, said sheet making an angle over said member whereby said print is bent.

20. The method of handling a plurality of photographic prints, which prints are curled different amounts, which consists in bodily progressing the prints and while in progress bending said prints in a direction reverse to their curl to flatten said prints and proportioning the amount of bending effect to the amount of curl in said prints.

21. A print flattening device having in combination, a frame, a print flattening means mounted on said frame comprising a movable flexible sheet, and means for holding said print flattening means in various print flattening positions.

22. A print flattening device having in combination, means for bending a print comprising a roller, a belt movable over said roller, the portions of said belt at either side of said roller making an angle with each other, said prints passing between said roller and belt, and means for varying said angle to vary the degree of bending of said prints.

In testimony whereof I affix my signature.

GLEN M. DYE.