No. 637,576. Patented Nov. 21, 1899.

E. HETT.

LITHOGRAPHIC PRESS.

(Application filed June 13, 1898.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

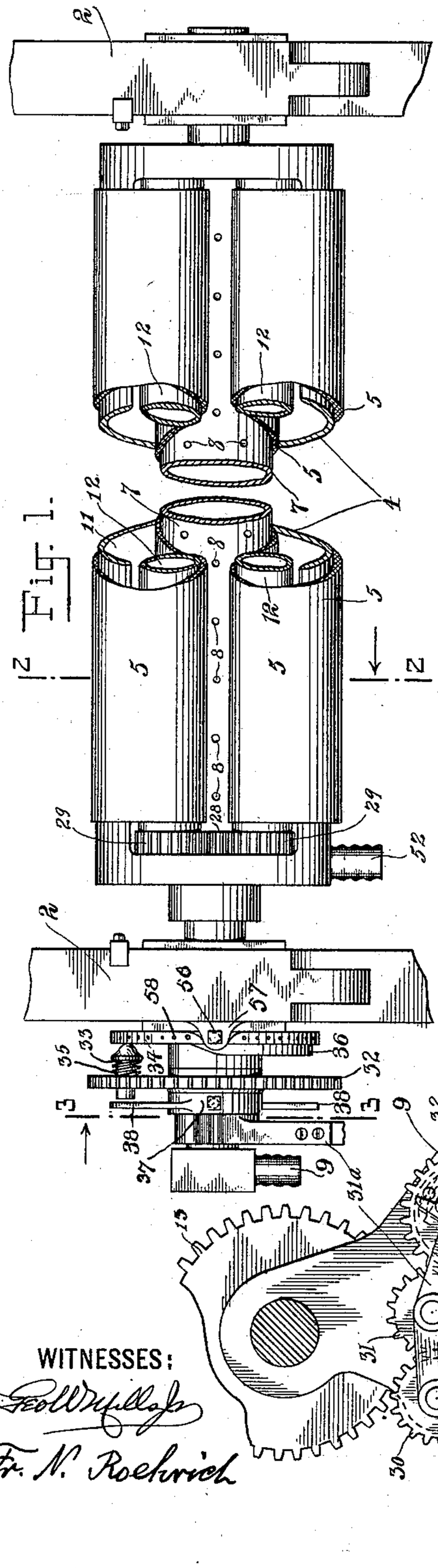


Fig. 2.

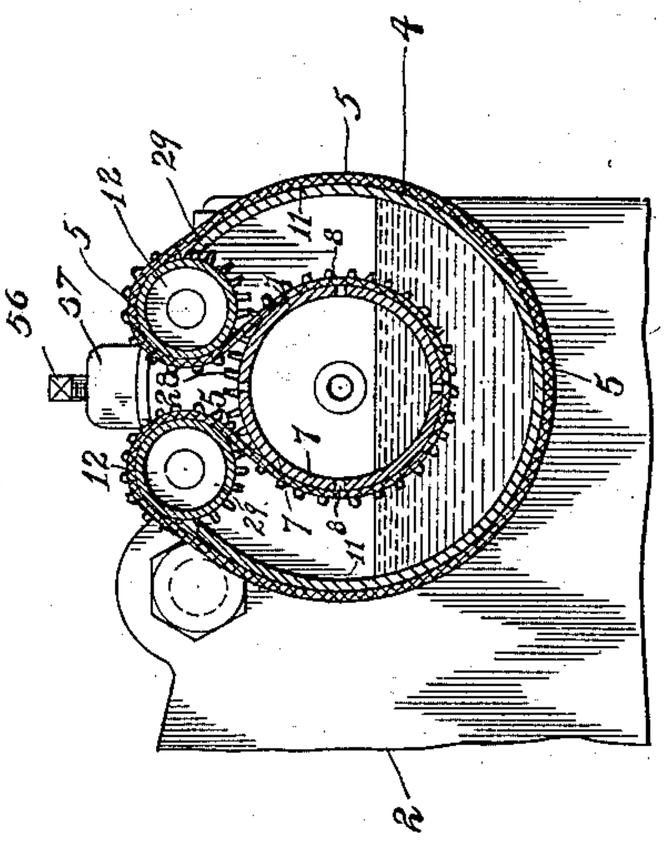


Fig. 3.

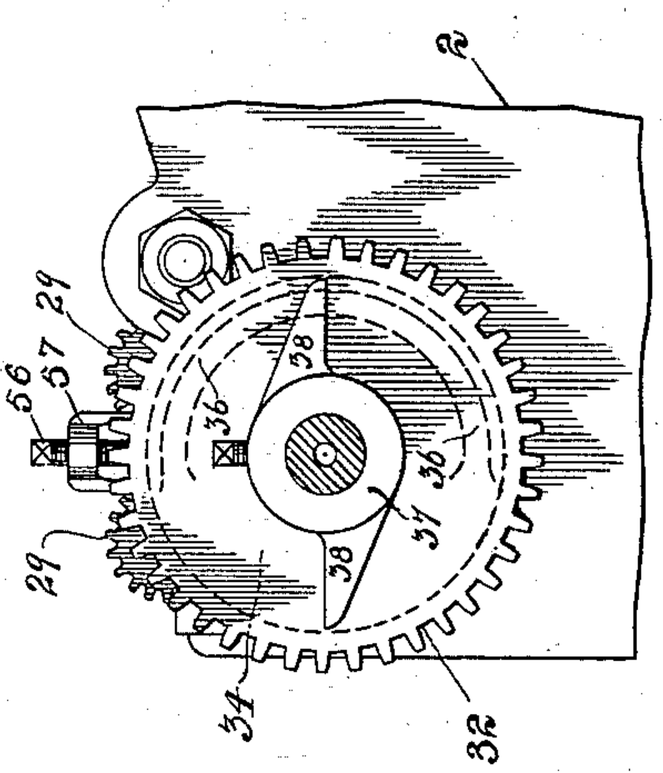


Fig. 4.

WITNESSES:

Geo. Whitaker Jr.

Fr. N. Roehrich

INVENTOR

Edward Hett

BY

Witter & Kenyon

ATTORNEYS

No. 637,576. Patented Nov. 21, 1899.

E. HETT.

LITHOGRAPHIC PRESS.

(Application filed June 13, 1898.)

(No Model.) 4 Sheets—Sheet 2.

Fig. 5.

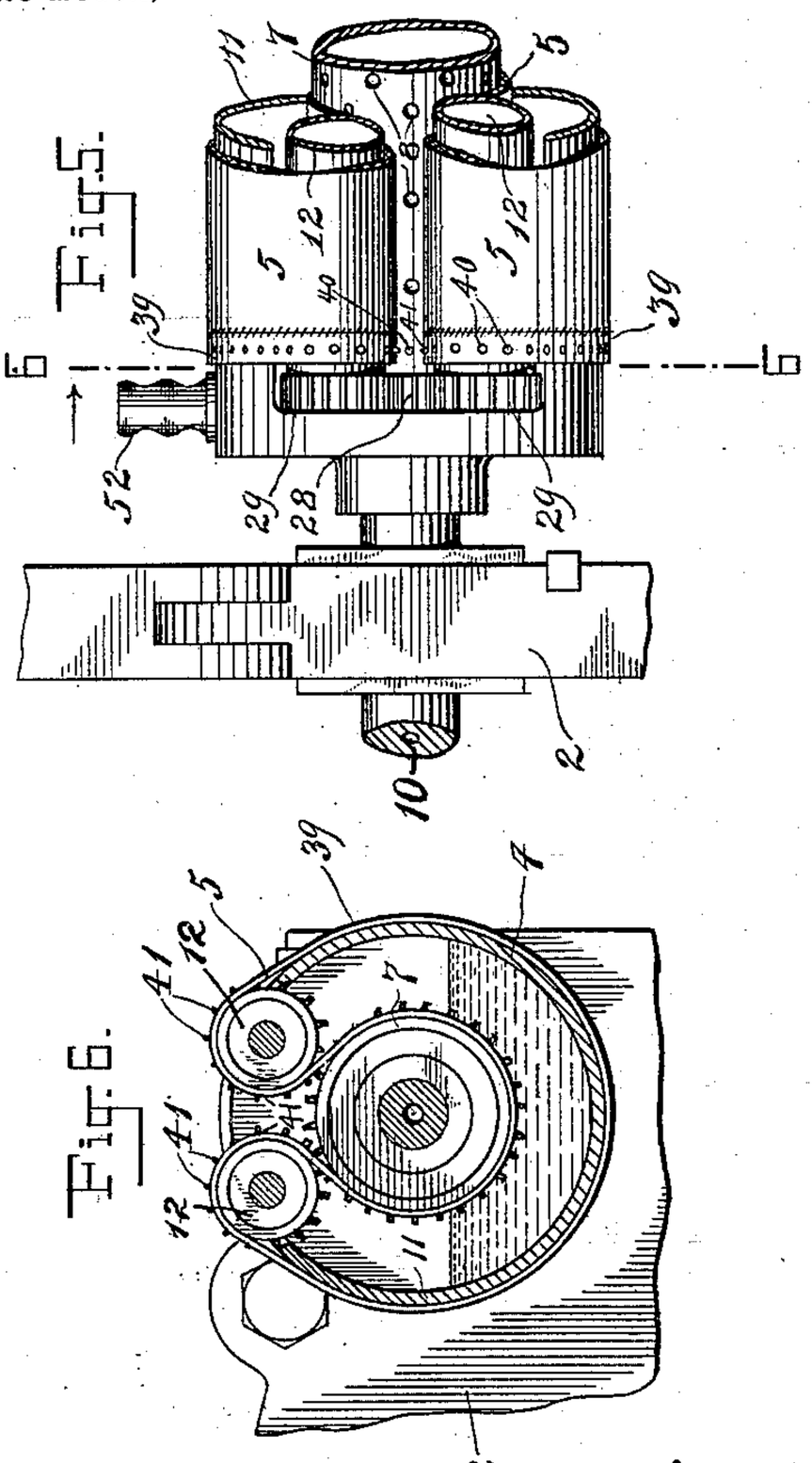


Fig. 6.

Fig. 8.

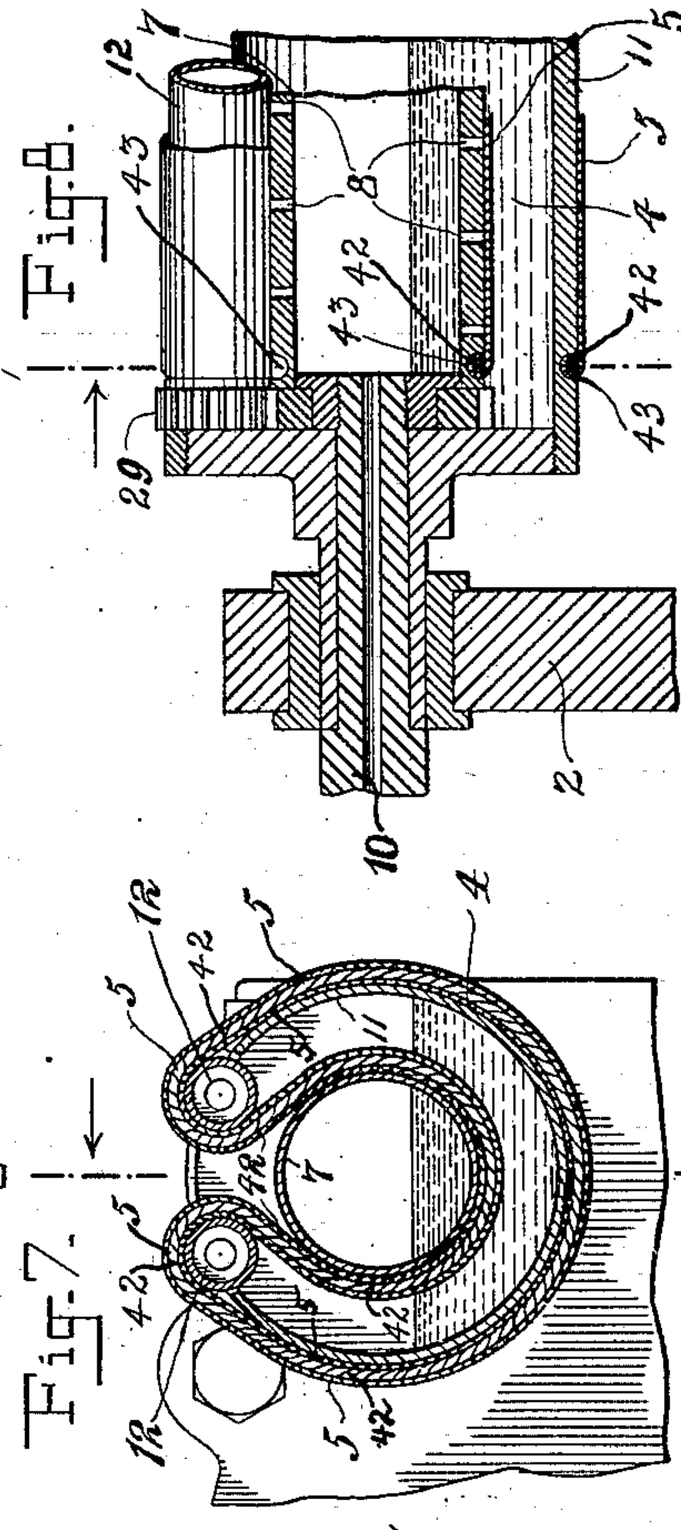


Fig. 7.

Fig. 10.

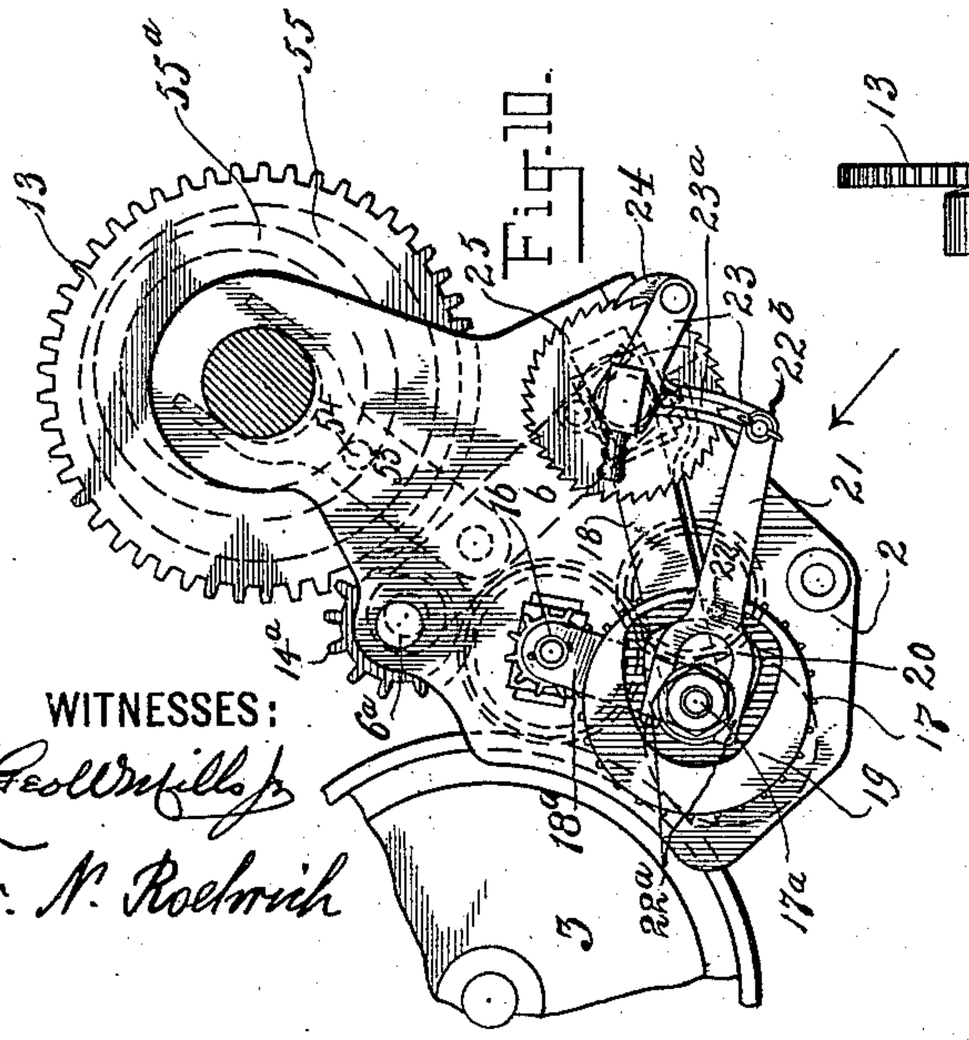
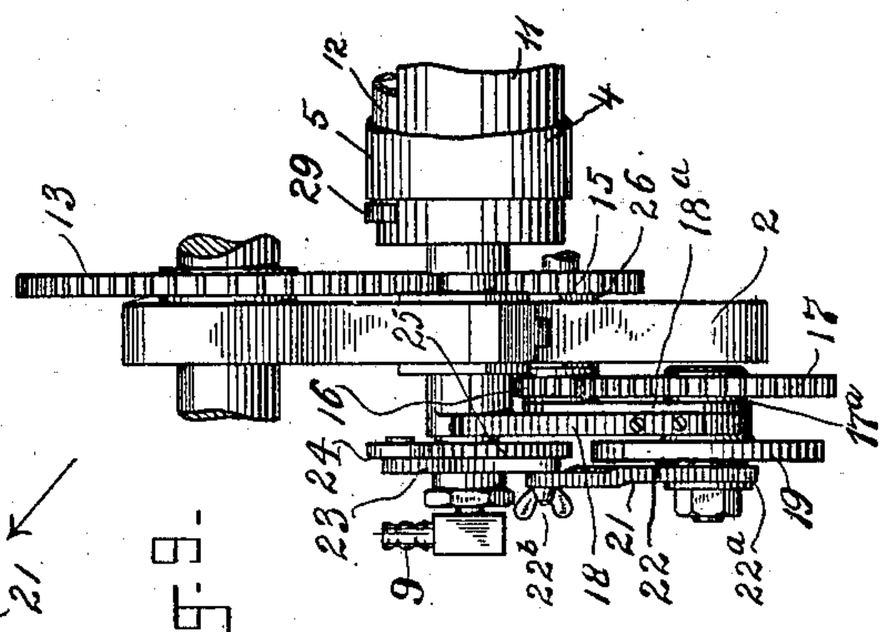


Fig. 9.



WITNESSES:

Geo. Wilkinson

Fr. N. Roebrich

INVENTOR

Edward Hett

BY

Witter & Kenyon

ATTORNEYS

No. 637,576. Patented Nov. 21, 1899.

E. HETT.

LITHOGRAPHIC PRESS.

(Application filed June 13, 1898.)

(No Model.) 4 Sheets—Sheet 3.

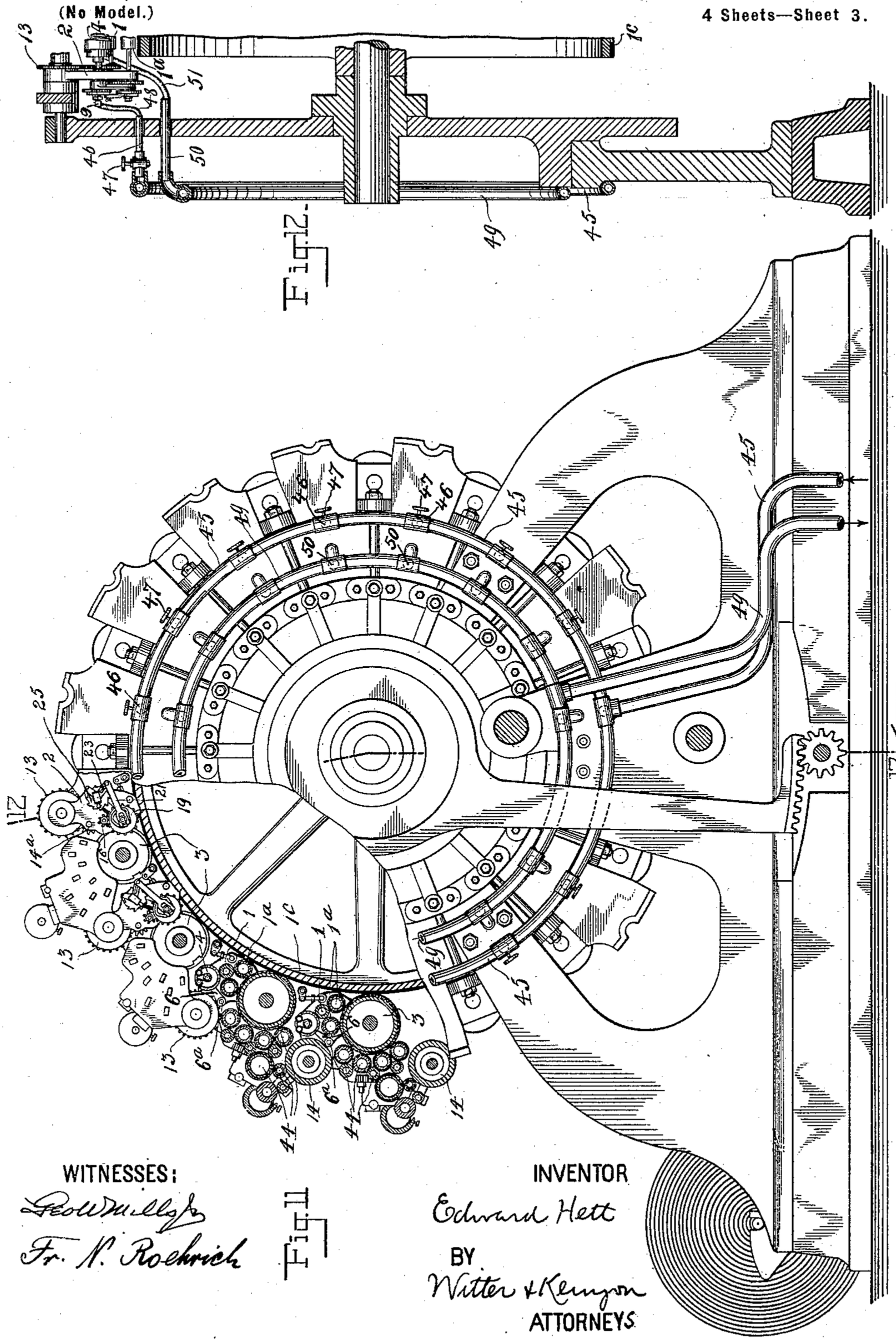


Fig. 12.

Fig. 11.

WITNESSES:

Geo. W. Gillespie

Fr. P. Rockrich

INVENTOR

Edward Hett

BY

Witter & Kenyon

ATTORNEYS

No. 637,576. Patented Nov. 21, 1899.

E. HETT.

LITHOGRAPHIC PRESS.

(Application filed June 13, 1898.)

(No Model.) 4 Sheets—Sheet 4.

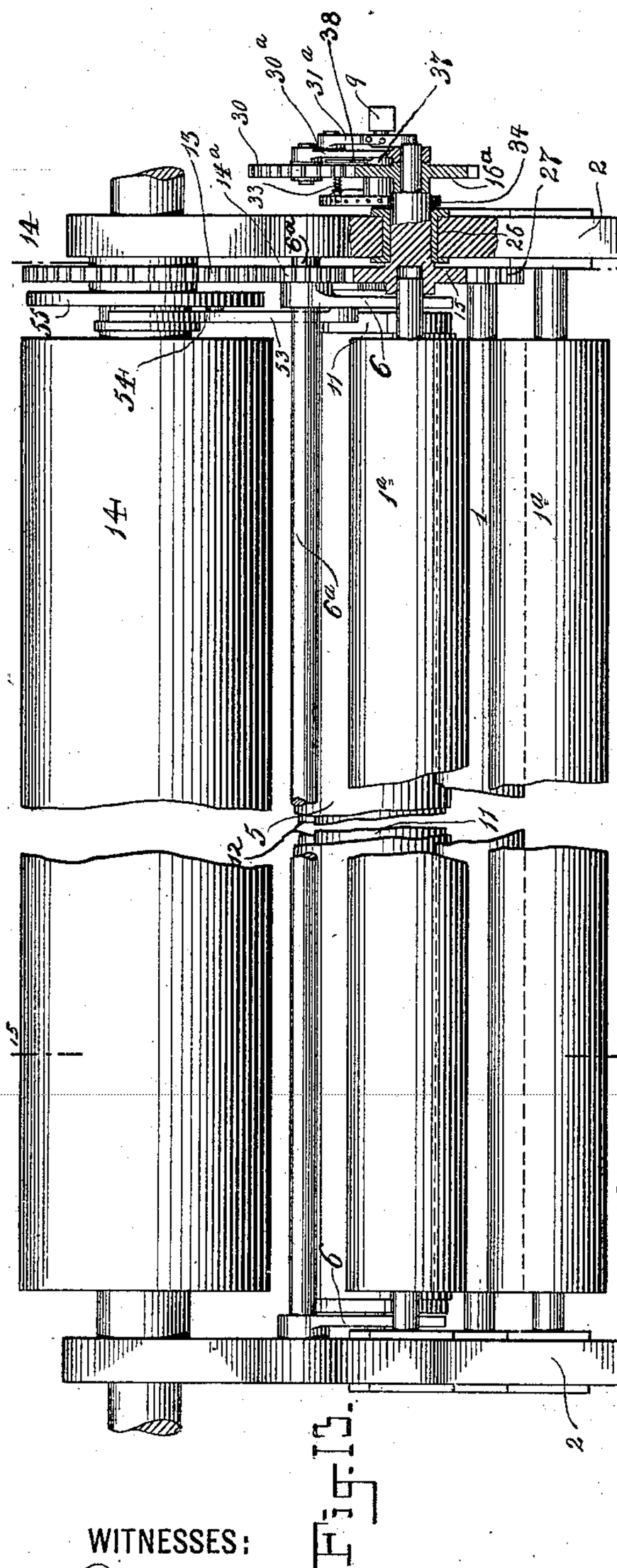


Fig. 14.

Fig. 15.

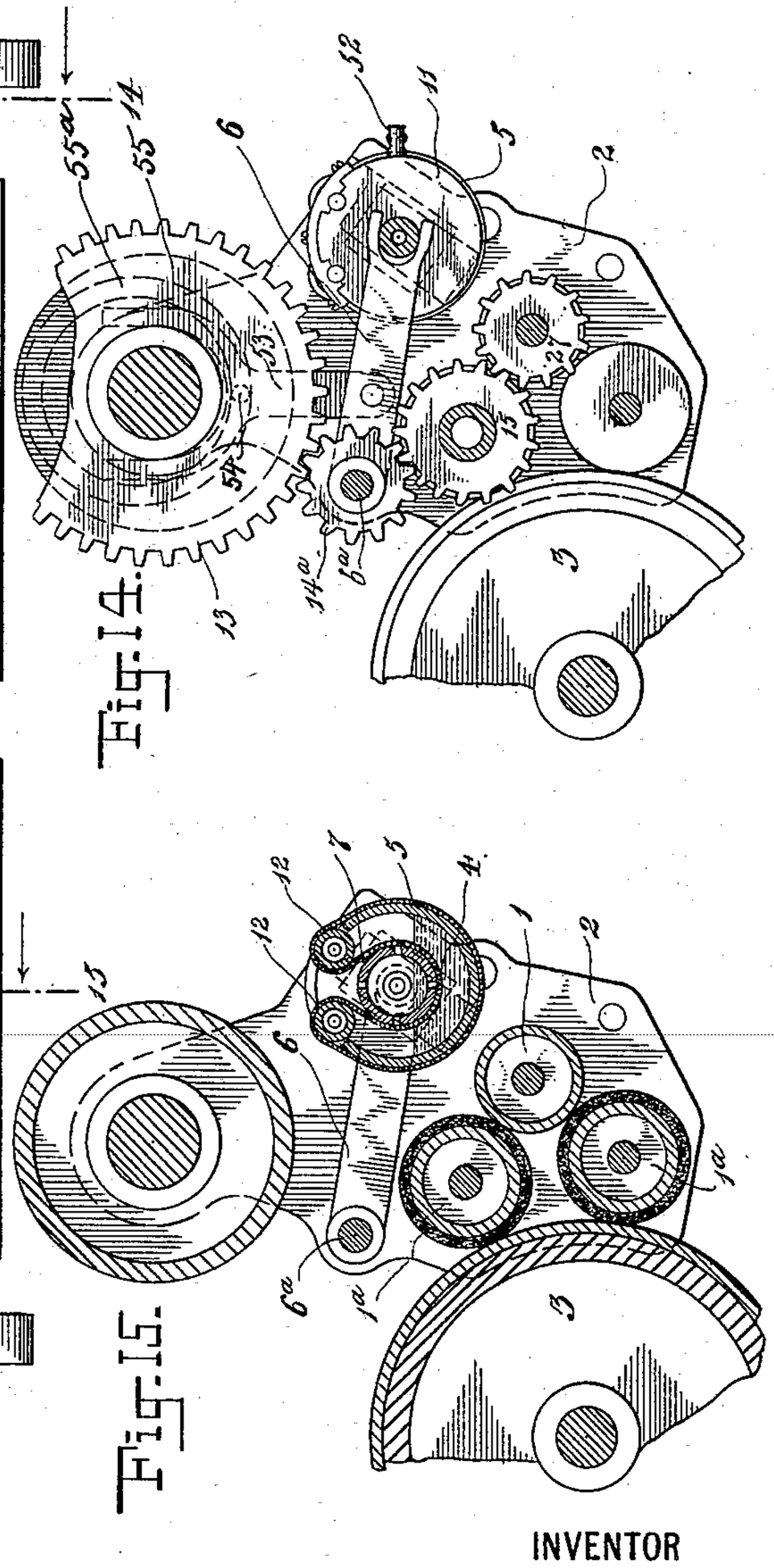


Fig. 15a.

Fig. 15b.

WITNESSES:

Geo. W. Mills Jr.

Fr. P. Roehrich

INVENTOR

Edward Hett

BY

Witter & Kenyon

ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWARD HETT, OF NEW YORK, N. Y.

LITHOGRAPHIC PRESS.

SPECIFICATION forming part of Letters Patent No. 637,576, dated November 21, 1899.

Application filed June 13, 1898. Serial No. 683,354. (No model.)

To all whom it may concern:

Be it known that I, EDWARD HETT, a citizen of the United States, and a resident of New York, (New Dorp,) in the county of Richmond, State of New York, have invented certain new and useful Improvements in Lithographic Presses, of which the following is a specification.

My invention relates to lithographic or planographic presses, and particularly to the damping mechanism for use in such presses.

It has for its main object to provide improved means for supplying water in suitable quantities and at proper times and places to the damping-rollers of a lithographic or planographic press, and especially to prevent an excessive supply of water to such rollers and to the printing-cylinder.

It consists of the novel devices and combinations herein shown and described.

In the operation of lithographic presses great difficulty has heretofore been encountered in avoiding an excess of water upon the damping-rollers and upon the printing-surface, especially where the printing-surface is cylindrical, and particularly so in multicolor-presses, where damping-rollers often lie directly above the paper web and where there are a plurality of sets of printing-cylinders, each relatively small as compared with the drum or impression-cylinder and each with its set of inking-rollers and damping-rollers with their connections, and where, owing to the necessarily small size and crowded and complicated character of the mechanism and to its consequent inaccessibility when the press is in operation, it is of the utmost importance that the damping be automatic, exact, and certain in its operation without the use of constant supervision. This difficulty has been due in great measure to the lack of a positive feed to the damping-rollers of water or other suitable dampening liquid and to improper or defective distribution of the water. It is of course essential in lithographic-printing presses that a sufficient supply of water be furnished to the damping-rollers and the printing-cylinder and that such water be evenly and properly distributed. Without a sufficient supply of water no lithographic printing can of course be done. A scarcity of water, moreover, will quickly destroy the lithographic surfaces and will produce other injurious results. An excess of water is, however, almost as injurious as a scarcity of water. Where the water is excessive in amount, it tends to form into drops or layers upon the damping-rollers or printing-surface, to ruin the lithographic surface, to work back upon the inking-rollers and mix with the ink, to interfere with the proper inking of the printing-cylinder, to fall in drops upon the web, and generally to render the resulting product inferior or unmarketable. I have found that by the use of a belt of suitable material, to which motion is imparted in any suitable manner, communicating both with the fountain containing the damping liquid and with the damping roller or rollers damping liquid can be properly and positively supplied in sufficient amounts and in even and proper distribution for securing the best results without any deleterious excess of water, without the formation of drops or layers, and without any injury whatever to the lithographic-printing surfaces or to the proper inking thereof or to the printed work itself. I have also found that these results are obtained to good advantage where the fountain containing the damping liquid is arranged to have an oscillating movement, so as to bring intermittently against the damping-roller a surface which is supplied with damping liquid from the fountain and which conveys damping liquid to the damping-roller at the times of such contact.

In the drawings accompanying this specification and forming part hereof, in which like reference characters in the different figures refer to corresponding parts, I have shown and will now proceed to describe the preferred form of my improved devices.

Figure 1 is a plan of my improved fountain. Fig. 2 is a vertical cross-section through the same on the lines 2 2 of Fig. 1 viewed as shown by the arrow, and Fig. 3 is a similar section on the lines 3 3 of Fig. 1 viewed as shown by the arrow. Fig. 4 is a side view of the outside of one of the damping-frames. Fig. 5 is a plan of a part of the fountain, showing certain modifications in the belt and in means for imparting motion to it. Fig. 6 is a vertical cross-section through the same on the lines 6 6 of Fig. 5 viewed as shown

by the arrow. Fig. 7 is a vertical cross-section through the fountain, showing another modification of the belt, taken on the lines 7 7, Fig. 8, viewed as shown by the arrow; and Fig. 8 is a vertical longitudinal section through the same, taken on the line 8 8 in Fig. 7. Fig. 9 is a front view of part of my improved mechanism for driving the roller in the fountain, and Fig. 10 is a side view of the same mechanism. Fig. 11 is a side view, partly in section, of a multicolor-press with part of the casing broken away, showing a number of printing-cylinders, with their sets of inking-rollers and damping-rollers and connections, with the means for supplying damping liquid to the different fountains and for conveying the waste water away, the supply and overflow pipes being broken, as shown, to enable other parts to be seen more clearly, some of the sets of printing-cylinders, damping-rollers, and inking mechanism being shown in section and other sets in end elevation. Fig. 12 is a section taken on the lines 12 12 in Fig. 11 viewed as shown by the arrow. Fig. 13 is a front view of the damping-frames and the damping-rollers and connecting-gearing viewed from the printing-cylinder with part of the gearing broken away through its center. Fig. 14 is a vertical cross-section taken on the lines 14 14 of Fig. 13 viewed as shown by the arrow; and Fig. 15 is a vertical cross-section taken on the lines 15 15 of Fig. 13.

1 1^a 1^a represent damping-rollers of a lithographic press. These may be of any desired kind or number and may be arranged in any desired manner. As shown in the drawings, 1 is the ordinary brass roller and constitutes the distributing-roller, and 1^a 1^a are the cloth-covered rollers which usually come into direct contact with the printing-cylinder.

1^c is the drum of a multicolor-press, of which 3 3 are the printing-cylinders.

The damping-rollers are mounted in the usual manner in damping-frames 2, pivoted to the framework of the press. Damping liquid is conveyed to distributing-roller 1 from fountain 4 by means of a belt 5 in a manner presently to be described. The fountain 4 is preferably made to oscillate for the purposes and in the manner hereinafter set forth, and in such oscillation a part of its periphery is intermittently brought into contact with the surface of the damping-roller. Belt 5 is preferably made endless, and is adapted to pass inside of the fountain and around a roller mounted therein, and is moistened with damping liquid during such passage, and is then adapted to pass outside of the fountain and around that part of its periphery which comes into contact with the damping-roller. Intermittent motion is preferably imparted to the belt, thus enabling the belt to convey damping liquid to the damping-roller positively and in proper amounts. The fountain is supplied with damping liquid, and an overflow-pipe is provided for the discharge of any excess of the damping liquid.

I will now proceed to describe the construction of the fountain and belt, the means for imparting motion to the belt and to the fountain, and means for supplying damping liquid thereto and discharging the waste damping liquid therefrom.

Fountain 4 is mounted in swinging arms 6 6, pivoted on shaft 6^a, secured in damping-frames 2 2, and is adapted to be oscillated or swung forward or backward, so as to make contact intermittently with the surfaces of the damping-rollers by means presently to be described. The fountain has a hollow roller 7, which is mounted inside of the fountain. It is preferably provided with perforations 8 8. Supply-pipe 9 connects with the hollow shaft 10 of roller 7 at one side of the fountain, the mouth of the hollow shaft 10 opening into the interior of the roller 7. Through supply-pipe 9 and hollow shaft 10 damping liquid is supplied to the interior of the roller 7, whence it passes out through the perforations 8 into the outer shell 11 of the fountain. (Shown in Figs. 2, 6, and 7.) Endless belt 5 passes around the periphery of the shell 11 of the fountain, over a roller 12 into the interior of the fountain, around roller 7, and then passes around a second roller 12 onto the outside of the fountain, as clearly shown in Figs. 2, 6, and 7. Motion is imparted to this belt preferably by the devices shown in Figs. 9 and 10. These devices are actuated by the driving mechanism of the press through gear-wheel 13, secured to the ink-distributing cylinder 14. Ink-distributing cylinder 14 can be driven by the driving mechanism of the press in any suitable manner. This mechanism is accordingly not shown in the drawings and will not be further described. Gear-wheel 13 meshes with pinion 14^a, loosely mounted on shaft 6^a in frames 2, pinion 14^a meshing with gear-wheel 15, (see Fig. 9,) keyed on a stud 26 running loose in one of the frames 2. In this stud 26 the shaft of the upper damping-roller 1^a loosely revolves. Small gear-wheel 16 is also keyed on the same stud and meshes with gear-wheel 17, keyed upon a shaft 17^a, loosely mounted in swinging links 18 and 18^a, the former link 18 being pivoted to shaft 10 of the fountain and at its end carrying shaft 17^a, the latter link 18^a (see Fig. 10) being pivoted at one end to stud 26 and at its free end carrying shaft 17^a. On the same shaft 17^a is also fixedly mounted a cam-wheel 19, having in one of its sides a cam-shaped groove 20. An oscillating arm 21, carrying a roller 22, which projects into and runs in the said groove, has fingers 22^a, passing upon both sides of shaft 17^a for the purpose of supporting the oscillating arm, and has at its other end an adjustable connection, by means of pin and thumb-screw 22^b, with rocking bell-crank 23, the latter having a slot 23^a at any point along which slot-pin 22^b may

be secured. Bell-crank 23 is loosely mounted upon the shaft of roller 7 and carries a pawl 24, which takes into the teeth of ratchet-wheel 25, keyed to the shaft of roller 7. As gear-wheel 13 upon the ink-distributing cylinder 14 is driven by the driving mechanism of the press oscillating arm 21 is moved backward and forward, thus feeding forward ratchet-wheel 25, and with it roller 7, a certain distance at each revolution of cam-wheel 19. The adjustable connection between oscillating arm 21 and bell-crank 23 is for the purpose of causing pawl 24 to feed ratchet-wheel 25 forward a greater or less distance at each revolution of cam-wheel 19, the extent of the feed being determined by the point where pin and thumb-screw 22^b secure oscillating arm 21 to bell-crank 24. This feed of roller 7 is intermittent. As roller 7 is thus intermittently rotated it imparts an intermittent motion to belt 5. The greater the movement of the belt at the time of contact with the damping-roller the greater will be the amount of damping liquid deposited upon the roller. Accordingly by varying the movement of the belt the amount of damping liquid furnished to the damping-roller will be increased or diminished.

The means for imparting a positive driving motion to the damping-rollers are shown in Figs. 13 and 14 and are as follows: Gear-wheel 13, secured to and driven by ink-distributing cylinder 14, through pinion 14^a, loosely mounted on shaft 6^a, drives gear-wheel 15, keyed on stud 26. The latter gear-wheel 15 meshes with gear-wheel 27, keyed on the shaft of distributing damping-roller 1. Thus the distributing-roller is positively driven by the driving mechanism of the press at any determinate rate of speed desired. Motion is imparted from the distributing-roller to the other damping-rollers by friction in the usual manner. By thus imparting a positive and regulatable motion to the damping-rollers I am enabled to regulate with great accuracy and certainty the amount of damping liquid to be supplied to the damping-rollers. In order to insure the more certain movement of belt 5, I prefer to also positively drive rollers 12 12. This is accomplished by means of gear-wheel 28 upon shaft of roller 7. Gear-wheel 28 meshes with gear-wheels 29 29 on rollers 12 12. By the above means an intermittent motion is imparted to the belt positively and with certainty.

In Figs. 1, 3, 4, 13, 14, and 15 I have shown a modified form of the mechanism for imparting intermittent motion to roller 7. In this case gear-wheel 13 on ink-distributing cylinder 14 meshes with pinion 14^a, mounted loosely on shaft 6^a, secured to frame 2. Pinion 14^a meshes with gear-wheel 15, keyed on stud 26, running loosely in frame 2. Upon the other end of the stud and outside of frame 2 a gear-wheel 16^a is also keyed to the stud. Gear-wheel 16^a meshes with gear-wheel 30, the latter loosely turning in bearings in triangular piece 30^a. This piece is swiveled upon stud 26. Gear-wheel 30 meshes with gear-wheel 31, also loosely mounted in triangular piece 30^a, and gear-wheel 31 meshes with gear-wheel 32, loosely mounted on the shaft of roller 7, as shown in Fig. 1. Arm 31^a, pivoted to triangular piece 30^a and encircling the shaft of roller 7, tends to support the chain of gearing described and keeps gear-wheels 30, 31, and 32 in mesh with each other in all positions of the fountain. Mounted in a hole in gear-wheel 32 is a pin 33, having a round head adapted to bear upon a plate 34. A spring 35 tends to hold the rounded head of the pin against plate 34. Plate 34 has a cam-surface 36 upon its surface, upon which pin 33 is adapted to ride as gear-wheel 32 revolves. The cam-surface 36 runs around one side of plate 34, near its periphery, for a distance slightly greater than half the surface of the plate. 37 is a collar surrounding and secured to shaft 10 of roller 7. It has wings 38 38 on each side, as shown in Fig. 3. As gear-wheel 32 rotates pin 33 rides up on cam-surface 36 and is forced through the hole in gear-wheel 32 to the left and in this position strikes one of the wings 38, causing the wings 38 and collar 37, shaft 10, and roller 7 to turn substantially one-half a revolution. Each time pin 33 rides up on cam 36 roller 7 is rotated, as above described. In this manner an intermittent rotation is given to the roller and through it and the rollers 12 an intermittent motion is imparted to belt 5. Plate 34 can be adjusted one way or the other, so as to vary the position of cam 36. It may be locked in any position by means of screw-pin 56, mounted in a screw-threaded opening in the lug 57, forming part of dampening-frame 2. Pin 56 takes into holes 58 in plate 34, as shown in Fig. 1. By screwing pin 56 into any of the holes 58 plate 34 can be locked in any desired position.

In Figs. 5 and 6 I have shown a modified form of connecting the endless belt with rollers 7 and 12. As shown in these figures, a steel tape 39 is fastened to both edges of the endless belt and has holes 40, through which pins 41 upon rollers 7 and 12 are adapted to project. By these means, as well as by friction, motion is imparted to the belt from the rollers. I prefer to use endless belts without seams, as such belts give less trouble and are less likely to develop fullness and wrinkles. Belts with seams, however, may be used if desired. In Figs. 7 and 8 I have shown means for arranging and securing such belts with a view to prevent fullness and wrinkling. Along each edge the belt is wrapped around a thin cable 42, which is secured thereto by any suitable means—as, for example, by sewing the belt around the cables. The cables are sunk into grooves 43 in the rollers.

The means for oscillating the fountain so as to cause it to intermittently make contact

with one of the damping-rollers are shown in Figs. 10, 13, 14, and 15 and consist of the following-described devices: Shaft 10 of the fountain is supported at each side of the press by the forked ends of oscillating arms 6 6, the forks of the arms straddling and supporting the shaft of the fountain. Oscillating arms 6 6 are keyed on shaft 6^a. An oscillating upward-and-downward movement is given to these arms by means of a rod 53, which is pivoted at one end to one of the arms 6, as shown in Figs. 10 and 13, and at its other end it carries a roller 54, which runs in a cam-shaped groove 55^a in the side of a disk 55, keyed to the sleeve of ink-distributing roller 14 and revolving with it. Rod 53 is forked at its end, the forks embracing the sleeve of the ink-distributing roller and serving to support the rod at its upper end. As ink-distributing roller 14 revolves an oscillating movement is by the means above described imparted to oscillating arms 6 6 and thence to the fountain, causing the latter to oscillate, so as to bring a portion of its surface intermittently into contact with the distributing damping-roller.

In Figs. 11 and 12 I have shown my improved device as applied to a multicolor-press, where a large drum 1^c has a series of relatively small printing-cylinders 3 surrounding it, each with its set of inking-rollers 44 and other inking mechanism and its set of damping-rollers 1 1^a. With so many and such fine and such complicated parts crowded closely together in a comparatively small space it is impossible to show the mechanism in detail or even to show all of it in these views. They are intended merely to show the general arrangement of my improved devices in a multicolor lithographic press and to show the means for supplying damping liquid to the different fountains and the means for removing the waste damping liquid.

45 is a supply-pipe for supplying damping liquid to the different fountains. It is connected with any suitable source of supply of damping liquid. Branch pipes 46, each provided with a cock 47, lead from the supply-pipe 45 and are provided at their ends with flexible-hose connections 48, leading to the pipe 9 of each fountain. The flexible hose permits the swinging action of the damping-frames 2 without interrupting the flow of damping liquid. By these means damping liquid in sufficient quantities can be supplied to all the fountains without interfering with the operation of the press.

49 is an overflow-pipe for carrying away the waste damping liquid from each fountain. It has branch pipes 50, having flexible-hose connections 51, with an overflow-pipe 52 leading from each fountain. When the water in the fountain rises to the height of the overflow-pipe, it will flow off through the overflow-pipe and be discharged. In this way any overflow of water from the fountain upon the mechanism of the press or upon the paper or web is effectually prevented.

The belt may be of any suitable material and texture which is adapted to be moistened by its passage into and through the fountain and to convey that moisture in proper amounts to the damping-roller when brought into contact with it. It is important, however, that the belt should not be permeable enough to permit of the passage lengthwise through it of damping liquid from the fountain when the press is not in operation, as in such a case the belt would draw off the damping liquid from the fountain and cause it to drip upon the mechanism of the press or upon the paper or the web. The form of belt which I prefer and which gives satisfactory results without any drawing off of the damping liquid from the fountain or any dripping, referred to above, consists of a layer of impermeable material—such, for instance, as rubber, faced with one or more layers of permeable material, such as felt. In practice I prefer to make the belt of three layers—an inner impermeable layer of rubber and a thin surface permeable layer on each side of the rubber—as, for instance, of felt. Such a belt is readily moistened by the damping liquid while passing through the fountain and conveys the liquid in sufficient quantity to the damping-rollers when brought into contact with it without any unnecessary drainage of the liquid from the fountain and without any dripping of the damping liquid upon the mechanism of the press.

By means of my improved devices I am enabled to supply to the damping-rollers with greater certainty and exactness an amount of damping liquid suited to produce the best results in lithographic printing and to avoid both a scarcity and also an excess of such liquid, and I am thus enabled to prevent the injurious results, referred to above, that flow from either such an excess or a scarcity.

As my improved devices are automatic and are accurate, reliable, and certain in operation and need little supervision, they are of special value in multicolor-presses, where the parts of the mechanism are numerous, complicated in character, and small in size, where the printing is rapidly performed, and where printing is taking place simultaneously in many different places, so that constant supervision and regulation of the action of the damping mechanism, so necessary in the mechanism now employed in lithographic presses, cannot be maintained.

The term "lithographic" as used in the specification and claims herein is employed in its broad sense of planographic to include any printing by the lithographic process or by any printing-surface adapted for printing lithographically, whether such printing be done by or such printing-surface be stone, metal, or any other surface capable of printing by the lithographic process, as distinguished

from printing by an intaglio or raised surface, or whether such lithographic-printing surface be flat, curved, or cylindrical.

Many modifications may be made in the above-described apparatus without departing from my invention. Thus the form and material of the belt may be varied. The means for imparting motion to the belt may be widely varied. The construction and arrangement of the fountain and the means for supplying it with damping liquid and means for oscillating it may also be widely varied.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a lithographic press, the combination of a damping-roller, an oscillating fountain for holding damping liquid adapted to oscillate to make contact intermittently with the damping-roller, means for oscillating said fountain to cause it to make contact intermittently with the damping-roller, a roller mounted inside of said fountain, an endless belt adapted to pass inside of the fountain and around the roller therein to be there moistened with damping liquid, and to pass thence outside of the fountain and around that part of the periphery of the fountain that comes into contact with the damping-roller, and means for imparting motion to the belt, whereby damping liquid will be conveyed from the fountain to the damping-roller.

2. In a lithographic press, the combination of a damping-roller, an oscillating fountain for holding damping liquid adapted to oscillate to make contact intermittently with the damping-roller, means for oscillating said fountain to cause it to make contact intermittently with the damping-roller, a roller mounted inside of said fountain, an endless belt adapted to pass inside of the fountain and around the roller therein to be there moistened with damping liquid, and to pass thence outside of the fountain and around that part of the periphery of the fountain that comes into contact with the damping-roller, means for imparting motion to the belt, whereby damping liquid will be conveyed from the fountain to the damping-roller, and means for supplying the fountain with damping liquid.

3. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid, a roller mounted in said fountain, an endless belt passing around said roller and driven by said roller and adapted to be moistened with damping liquid, while thus passing around the roller, and passing thence outside of the fountain and adapted to convey damping liquid from the fountain to the damping-roller, and means for intermittently driving said roller actuated by the driving mechanism of the press, whereby intermittent motion will be imparted to the belt and damping liquid will be conveyed by it from the fountain to the damping-roller.

4. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid, a roller mounted in said fountain, an endless belt passing around said roller and driven by said roller and adapted to be moistened with damping liquid, while thus passing around the roller, and passing thence outside of the fountain and adapted to convey damping liquid from the fountain to the damping-roller, a ratchet-wheel secured to said roller, and a pawl intermittently actuated by the driving mechanism of the press and adapted to engage the ratchet-wheel and to intermittently rotate said roller, whereby an intermittent motion will be imparted to the belt and damping liquid will be conveyed by it from the fountain to the damping-roller.

5. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid, a roller mounted in said fountain, an endless belt passing around said roller and driven by said roller and adapted to be moistened with damping liquid while thus passing around the roller, and passing thence outside of the fountain and adapted to convey damping liquid from the fountain to the damping-roller, a ratchet-wheel secured to said roller, and a pawl adapted to engage therewith mounted upon an oscillating arm actuated by the driving mechanism of the press, whereby intermittent motion will be imparted to the belt and damping liquid will be conveyed by it to the damping-roller.

6. In a lithographic press, the combination of a damping-roller, a fountain for holding the damping liquid, a belt for conveying the damping liquid from the fountain to the damping-roller, and means for imparting motion to the belt, and means for regulating the length of movement of the belt, whereby the amount of damping liquid conveyed by the belt from the fountain to the damping-roller may be regulated.

7. In a multicolor lithographic press, the combination of an impression-drum, a series of printing-cylinders and inking mechanisms therefor, a series of damping mechanisms each including a distributing-roller, a fountain for holding damping liquid, a belt for conveying the damping liquid from the fountain to the distributing-roller, and means for imparting motion to the belt, means for regulating the length of movement of the belt, whereby the amount of damping liquid conveyed by the belt from the fountain to the damping-roller may be regulated, a supply-pipe for supplying liquid to the fountains, and an overflow-pipe for removing waste damping liquid.

8. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid arranged and adapted to oscillate so as to make contact intermittently with the damping-roller, an endless belt of suitable material connected with the fountain and arranged and adapted to enter the fountain to receive damping liquid therefrom,

and also to pass around that portion of the outer surface of the fountain which makes contact with the damping-roller, means for oscillating the fountain and means for imparting motion to the belt, whereby damping liquid will be conveyed from the fountain to the damping-roller.

9. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid arranged and adapted to oscillate, means for oscillating the fountain, an endless belt of suitable material adapted to enter the fountain to receive damping liquid therefrom and to make contact with the damping-roller, means for imparting motion to the belt, and means for causing the belt to make contact with the damping-roller.

10. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid arranged and adapted to oscillate, means for oscillating the fountain, an endless belt of suitable material adapted to enter the fountain to receive damping liquid therefrom and to make contact intermittently with the damping-roller, means for imparting motion to the belt and means for causing the belt to make contact intermittently with the damping-roller.

11. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid arranged and adapted to oscillate, means for oscillating the fountain, an endless belt of suitable material adapted to enter the fountain to receive the damping liquid therefrom and to make contact intermittently with the damping-roller, means for imparting motion to the belt, means for regulating the speed at which the belt moves, whereby a greater or smaller quantity of damping liquid will be conveyed from the fountain to the damping-roller, and means for causing the belt to make contact intermittently with the damping-roller.

12. In a lithographic press, the combination of a damping-roller, a fountain for holding the damping liquid, a belt for conveying the damping liquid from the fountain to the damping-roller, means for imparting an intermittent motion to the belt actuated by the driving mechanism of the press, and means for regulating the length of movement of the belt, whereby the amount of damping liquid conveyed by the belt from the fountain to the damping-roller may be regulated.

13. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid, a roller mounted in said fountain, an endless belt passing around said roller and driven by said roller and adapted to be moistened with damping liquid while thus passing around the roller, and passing thence outside of the fountain and adapted to convey damping liquid from the fountain to the damping-roller, a ratchet-wheel secured to said roller, and a pawl adapted to engage therewith, an oscillating arm caused to oscillate by a cam-surface driven by the driving mechanism of the press, and adjustable connections between the oscillating arm and the pawl whereby the extent of the stroke of the pawl can be varied, the length of movement of the belt be regulated and the amount of damping liquid conveyed by the belt from the fountain to the damping-roller may be regulated.

14. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid arranged and adapted to oscillate, means for oscillating the fountain, a roller mounted in said fountain, an endless belt passing around said roller and driven by said roller and adapted to be moistened with damping liquid while thus passing around the roller, and passing thence outside of the fountain and adapted to convey damping liquid from the fountain to the damping-roller, a ratchet-wheel secured to said roller, and a pawl adapted to engage therewith, a cam actuated by the driving mechanism of the press, swinging links by which said cam is supported so as to be free to swing, an oscillating arm actuated by the cam to have an oscillating movement, and adjustable connections between the oscillating arm and the pawl whereby the extent of the stroke of the pawl can be varied, the length of movement of the belt be regulated and the amount of damping liquid conveyed by the belt from the fountain to the damping-roller may be regulated without interfering with oscillation of the fountain.

15. In a lithographic press, the combination of a damping-roller, a fountain for holding damping liquid, a roller mounted in said fountain, a belt for conveying damping liquid from the fountain to the damping-roller, passing inside of the fountain and around the roller to be moistened with damping liquid, and thence passing outside of the fountain to make contact with the damping-roller, a tape secured to the belt and having holes in it, and pins upon the roller adapted to project through the holes for imparting motion to the belt, whereby damping liquid will be conveyed from the fountain to the damping-roller.

16. In a lithographic press, the combination of a damping-roller, an oscillating fountain for holding damping liquid adapted to oscillate to make contact intermittently with the damping-roller, means for oscillating said fountain to cause it to make contact intermittently with the damping-roller, a roller mounted inside of said fountain, gearing actuated by the driving mechanism of the press adapted to intermittently rotate said roller, other rollers in the fountain, gearing connecting them with the first-mentioned roller to cause them to intermittently rotate as it rotates, an endless belt adapted to pass inside of the fountain and around the roller to be there moistened with damping liquid, and to pass thence

outside of the fountain and around that part of the periphery of the fountain that comes into contact with the damping-roller, whereby the belt will be intermittently driven and damping liquid will be conveyed from the fountain to the damping-roller.

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

EDWARD HETT.

Witnesses:
GEO. W. MILLS, Jr.,
EDWIN SEGER.