May 19, 1936. M. NIEDERLE 2,041,478

MEANS FOR LIGHT OR PHOTO PRINTING

Filed June 3, 1933 4 Sheets-Sheet 1

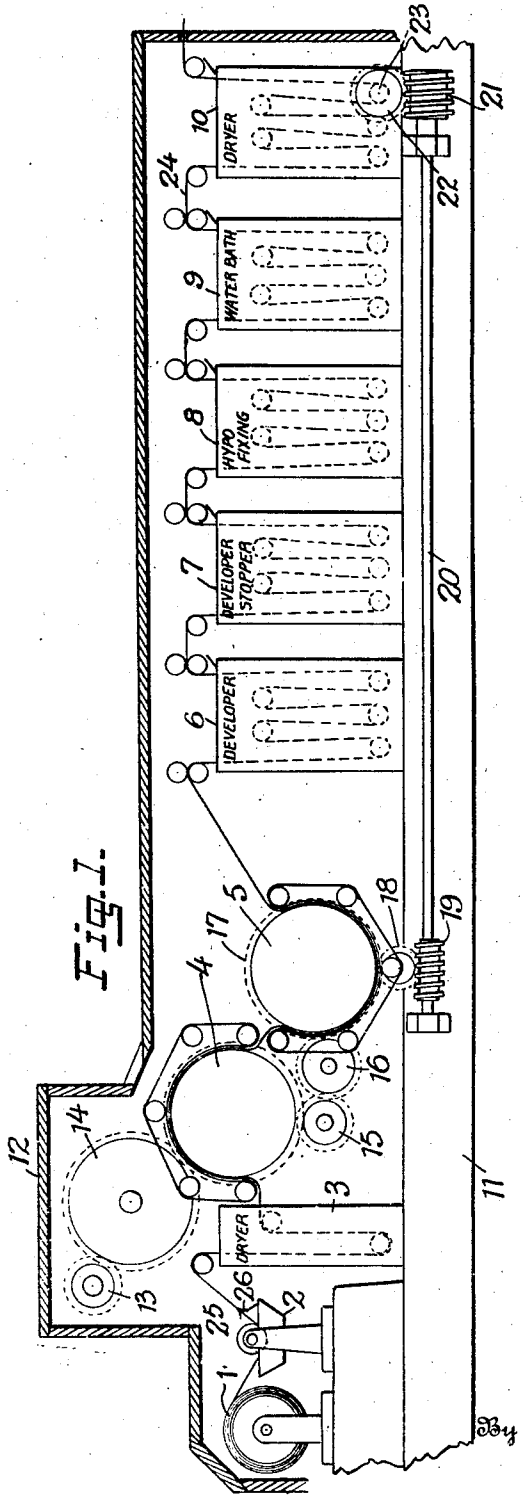


Fig. 1.

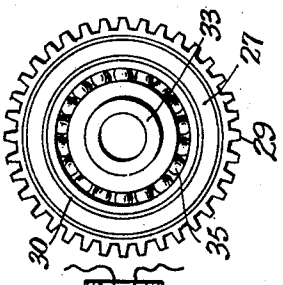


Fig. 4.

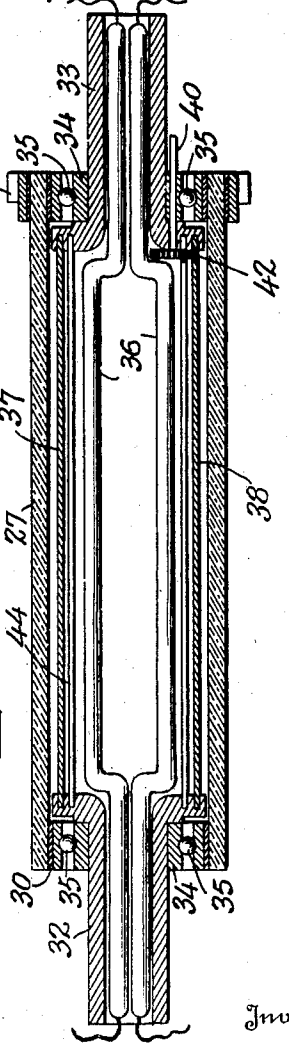


Fig. 3

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MEANS FOR LIGHT OR PHOTO PRINTING

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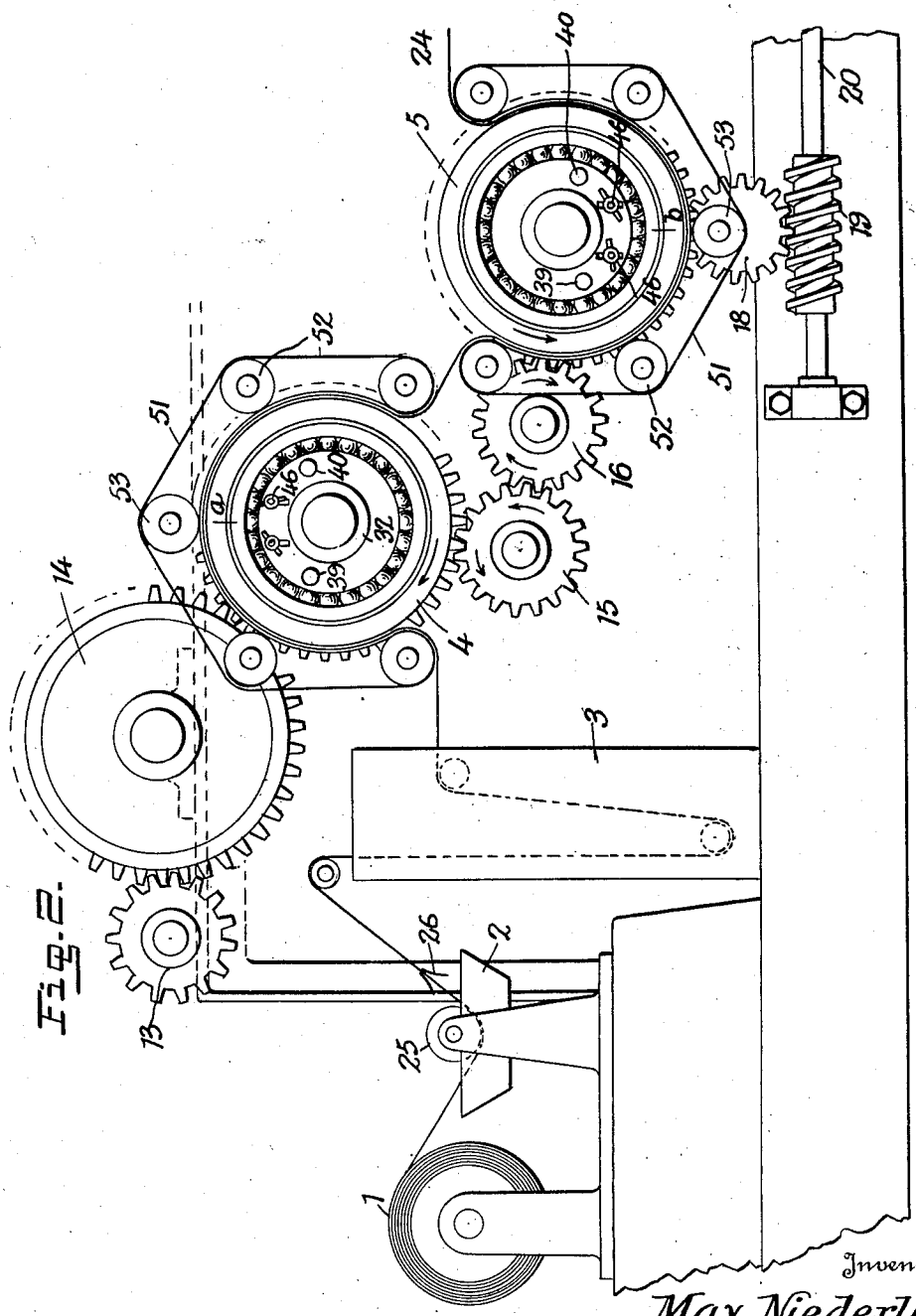


Fig. 2.

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MEANS FOR LIGHT OR PHOTO PRINTING

Filed June 3, 1933 4 Sheets-Sheet 3

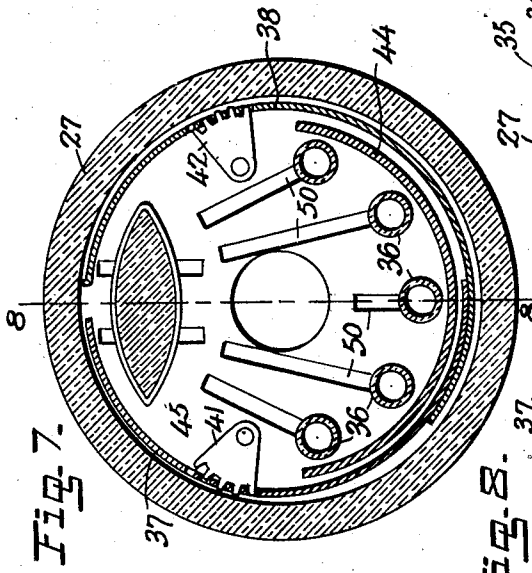


Fig. 7.

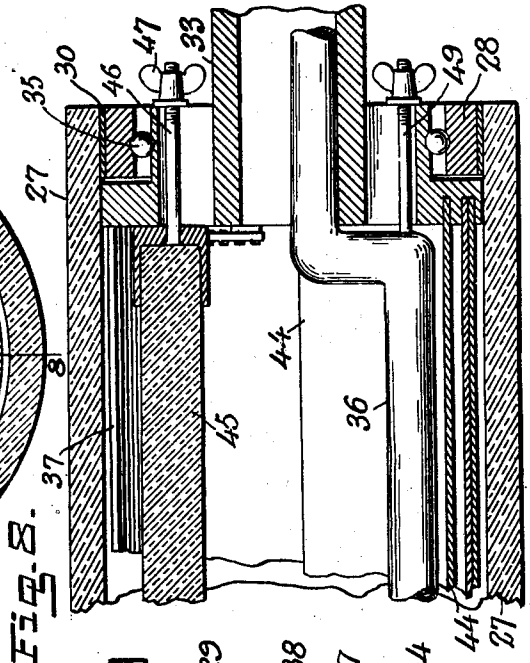


Fig. 8.

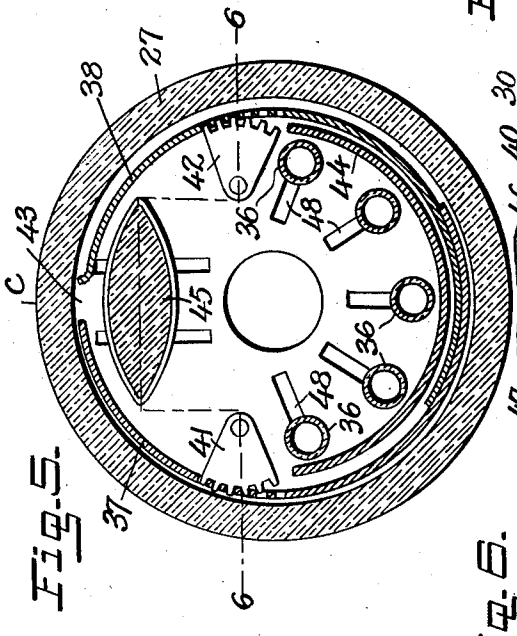


Fig. 5.

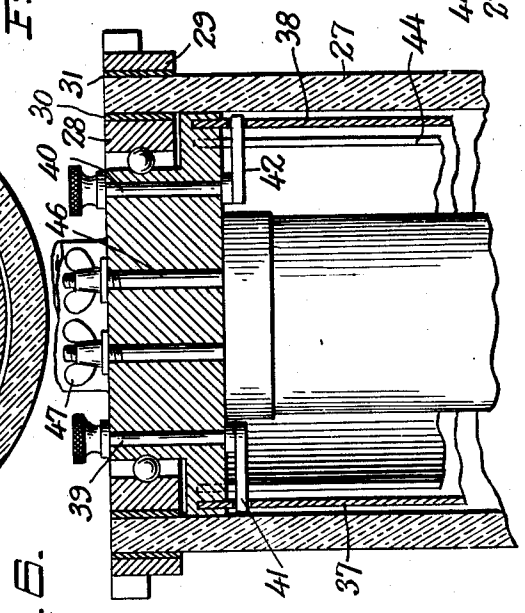


Fig. 6.

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MEANS FOR LIGHT OR PHOTO PRINTING

Filed June 3, 1933 4 Sheets-Sheet 4

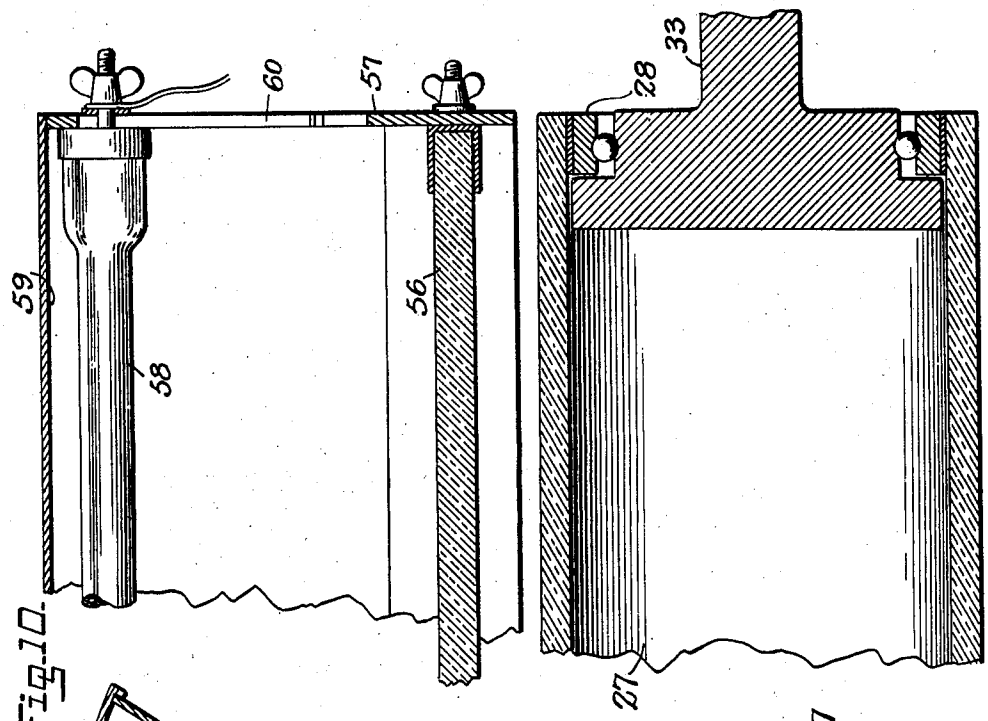


Fig. 10.

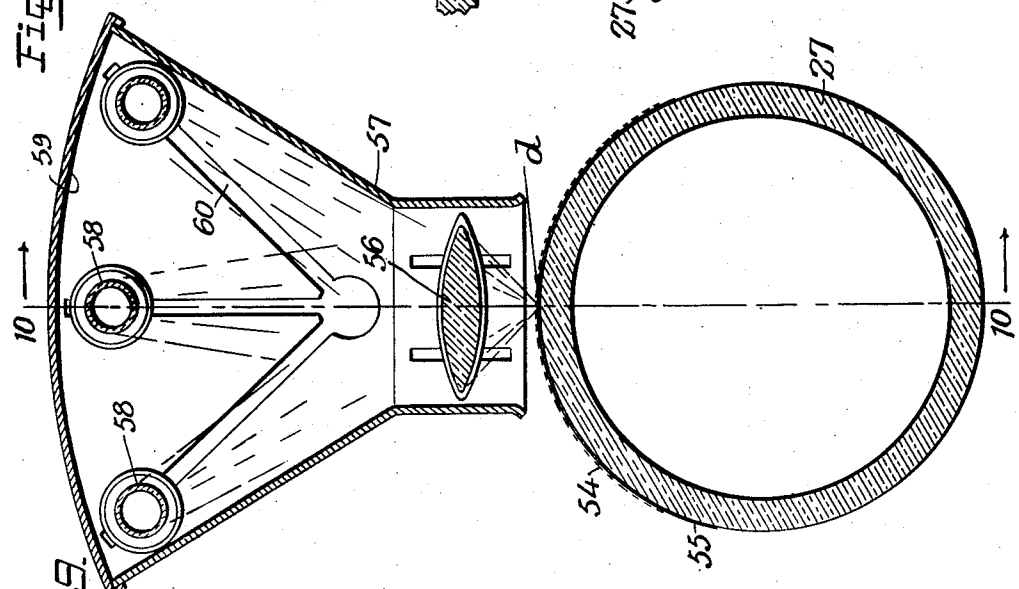


Fig. 9.

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Patented May 19, 1936

2,041,478

UNITED STATES PATENT OFFICE

2,041,478

MEANS FOR LIGHT OR PHOTO PRINTING

Max Niederle, Miami, Fla.

Application June 3, 1933, Serial No. 674,229

8 Claims. (Cl. 95—75)

My invention relates to means for light or photo printing, and particularly to a mechanism adapted for photorotary printing to obtain exact and perfect reproductions of any original, such as a photograph, painting, drawing, printed or drawn page, or other sheet, page or the like, showing an original or reproduction, or any other material or disclosure, that is capable of reproduction upon a flat surface.

Heretofore attempts have been made to produce copies in semblance of facsimiles, by photographic, photo-engraving, photogravure, lithographic, stone, steel engraving zinc and copper plates and plates of other metals, and by the use of many other means and methods, but in each instance complicated and expensive types of presses, screens or line screens or other means of producing grain surface effects, and complicated steps and procedures of production by photographic processes, transferring and reproduction, etching makeready, and the like, requiring the services of highly trained experts and technicians, have been employed; and, even then the result is only an attempt at a facsimile reproduction. With my apparatus an exact reproduction of an original is obtained by the use of relatively simple and inexpensive apparatus with completely satisfactory results by persons not expertly and technically trained as heretofore. In this way the result accomplished is not an imitation of the original, but is a direct reproduction from a negative or other light transparent member.

An object of my invention is to provide means for printing or reproducing continuously upon a strip or web of paper, or other suitable material, to give successive reproductions from the original negative, or the like, at rapid speeds of production, and with each reproduction substantially identical in lights and tone, and to provide for adjustments and variations to accomplish substantially perfect photo printing from all kinds, densities, and varieties of transparent members.

Another object is to so construct the apparatus that continuous, substantially instantaneous, uniform, and perfect contact printing is accomplished.

A further object is to provide mechanism for continuous light printing, employing as the source of light, a neon tube or other similar member projecting a high intensity of light without giving off heat, which emanation of light is high in sensitive rays and is yet produced with a minimum consumption of current, as compared with incandescent, arc, mercury vapor and other lights heretofore used, thus making possible adjustments and variations in the disposition of the tubular light source to dispose the same in proper proximity to the light transparent member, without danger of excessively heating, cracking, or otherwise injuring the light transparent member, or the material in contact therewith, or causing expansion or contraction of parts of the mechanism, through variations of temperature, to thus destroy or interfere with perfect alignment and registry.

Still another purpose of this invention is to provide as a source of light emanation, one or more light tubes adjustably mounted to thus vary the direct penetration of light rays therefrom, and means to control the quantity and intensity of the printing light ray permitted to penetrate the transparency.

Another object is to provide focusing or diffusing means, as for instance a condensing lens, which will concentrate the printing light rays on a continuous line throughout the entire width or length of the transparency as it is progressively advanced.

Yet another object is to attain and maintain a complete and perfect non-shifting contact and alignment, and a uniform speed of travel of the transparency and the material being printed upon, while being carried through the printing light ray area.

A further object is to provide means, in conjunction with the light tubes, or other source of light, for adjusting and focusing or diffusing the light rays therefrom, which means can be in the form of an elongated lens, and which with the light tubes is relatively adjustable to vary the focusing and concentration of the strip or line of printing light, or diffusance and widening of the same.

Another purpose is to provide an apparatus by which light or photo prints can be made with closest and most accurate registry and placement, with each print accurately sized and dimensioned according to the original or transparency, thus particularly adapting the mechanism and process for use in producing prints, and the like, to be subsequently overprinted with coloring or other matter, the reproductions being thus admirably suited for multi-coloring.

A further object is to so construct the apparatus that a screen can be interposed or otherwise used to give continuous reproductions of the screen itself, or to produce screened, grained, or other varied effects in light printing through a combination with the transparency of a screen or sur-

facing or treatment, to give the desired effect in the finished light print.

A still further object is to provide apparatus for accomplishing light printing by a continuous rotary production, at high speeds limited only by the capacity of the mechanical elements and the sensitiveness of the printing surface, which apparatus can be used to print quickly and cheaply on one or both sides of a strip or web of material, with a minimum requirement of time, effort and skill in the preparation and makeready, and which apparatus is of such simple and inexpensive character and construction, that it can be installed at low cost, while the operation is carried out with a minimum consumption of current for light sources and the like.

With the above and other objects in view, which will be apparent to those skilled in the art, my invention includes certain novel features of construction, assembly and operation, and certain novel steps in the preparation and the process or method of use, which will be hereinafter set forth in connection with the drawings, and then pointed out in the claims.

In the drawings:

Figure 1 is a view in side elevation diagrammatically showing one form of my invention.

Fig. 2 is an enlarged fragmentary view in side elevation of the mechanism at the printing end.

Fig. 3 is a longitudinal sectional view through one of the printing rollers.

Fig. 4 is a view in end elevation of the roller.

Fig. 5 is an enlarged transverse sectional view through one form of printing roller that might be employed.

Fig. 6 is a fragmentary sectional view substantially on line 6—6 of Fig. 5.

Fig. 7 is a view similar to Fig. 5 illustrating a modified construction.

Fig. 8 is a fragmentary sectional view taken on line 8—8 of Fig. 7.

Fig. 9 is a transverse sectional view through one form of transparency producing means.

Fig. 10 is a fragmentary longitudinal sectional view on line 10—10 of Fig. 9.

As the parts are shown in Figure 1 they constitute a complete equivalent of mechanism adapted to sensitize or otherwise treat a continuous web, strip or sheet of paper, the light or photo printing means, and then means for developing, stopping, fixing, washing and drying the paper as printed, to thus permit the supply of paper at one end of the machine and the discharge of a printed and completely finished sheet at the other end, which sheet is ready for cutting, folding, or other treatment, as may be desired.

Referring to Figure 1, the roll of paper indicated at 1 is passed first through a sensitizing or treating tray 2, then through a suitable dryer or processing apparatus 3, after which it is passed around printing roll 4, for printing one side, and then around printing roll 5, for printing the other side. The web, strip or sheet, of paper or other suitable material, is then carried through a developer tank 6, is conducted through a tank 7 in which it is subjected to developer stopper, through tank 8 where hypofixing is accomplished, through a water bath tank 9, and then through dryer 10. The strip, web or sheet is thus supplied in uncoated or untreated condition at one end of the machine and is discharged at the other end as a completely printed, permanently fixed and dried sheet, web or strip, that can be cut, folded, and otherwise treated or handled, as may be desired.

It is preferable that the apparatus be mounted on a base 11 and be enclosed in a case 12 so that it will be a self-contained unit and can be readily transported and can be moved at will to any place where it is desired for use. On the other hand, the main printing portions only can be employed, in which instance the sensitized or properly coated paper will be supplied at one end and, after proper exposure and light or photo printing, will be discharged at the other end ready for development, fixing, drying and the like. This exposed strip, sheet or web can be rolled or otherwise assembled and when properly cased and protected can be taken from the machine to be transported and taken to a photographic laboratory or other place where development, fixing and drying can be conveniently and expeditiously accomplished.

In the complete mechanism as shown, a motor shaft 13 has thereon a pinion meshing with drive gear 14, which in turn meshes with the gear pinion 15. This gear pinion 15 in turn meshes with intermediate pinion 16 having its teeth meshed with gear ring 17 associated with roller 5. Through this arrangement and intergearing, roll 4 is revolved in clockwise direction, while roll 5 is turned in counterclockwise direction, both rolls preferably moving at the same speed. A worm gear 18 driven from gear 17, or the roll 5, meshes with worm 19 to revolve shaft 20. This shaft 20 has thereon a worm gear 21 through which rotary motion is imparted through worm gear 22 to a roller 23 by which the strip or web 24 is drawn through the dryer 10 and is held in proper tension as it progresses through the various mechanisms and portions of the machine.

While the emulsion carrying tray 2 is shown with an immersion roller 25 dipping the strip 24 into the tray to be coated or treated on both sides, and a squeegee or wiper 26 is illustrated on the discharge side to remove excess moisture, this arrangement might be varied so that both sides of the strip, web or sheet will be treated by contact with moisture or emulsion carrying rollers, or so that only a single side will be coated or treated. Suitable squeegee or other wiper or like mechanism or parts can be used at the discharge side of each of the tanks 6, 7, 8, and 9 to remove excess chemicals or moisture, or the sheet, strip or web, can be passed through between rollers serving to press out excess moisture.

Where the strip or web is to be sensitized and developed, fixed and treated, within the machine, it will be found highly desirable to provide and use a case 12, having this light proof and preferably providing window or view openings at suitable points closed by ruby glass or other material that will afford protection to the light-sensitive coating or material. However, if desired, the machine can be employed without the case 12, when used in a dark room or other place suitably protected against ingress of light to affect the light-sensitive material. It may be found desirable to use the machine in a room or compartment having the character of the air controlled, as to temperature and humidity, to thus insure ideal operating and working conditions irrespective of normal atmospheric temperature and humidity conditions. However, for reasons to be hereinafter more fully explained it is not necessary to provide cooling means of any sort to draw off heat generated by operation of the machine, for the reason that there is low generation of heat, except possibly the heat of friction of moving parts, during the operation of my improved mechanism.

As intimated, the construction and arrangement from which the web or strip **24** is passed after leaving roll **1**, through tray **2**, tanks **6**, **7**, **8**, and **9**, and dryer **10**, can be of various arrangements and constructions suitable to meet the particular requirements of use, and the main mechanical features of my invention are embodied in the rollers **4** and **5** and the parts and mechanisms appurtenant thereto.

The rollers, which can be made up to be substantially duplicates, have hollow glass cylinders, **27**, of elongated form, accurately sized, and preferably ground or otherwise treated to be of substantially uniform external diameter throughout their entire lengths and to be free of hollows or other surface irregularities; and, where two rollers are used as illustrated in Figs. 1 and 2, the glass cylinders **27** will be accurately shaped and sized so that the roller **4** will be of substantially the same diameter, and consequently the same peripheral or surface circumference as the roller **5**. This hollow glass cylinder **27** is preferably provided with an inner bearing ring **28** at each end, and a ring gear **29** is mounted externally at one end, suitable cushion packings being preferably introduced at **30** and **31** to guard against breakage of the cylinder **27** and to insulate the end of the cylinder against heat transmission from the bearing ring **28** and the ring gear **29**, which in operation are working parts of the machine and might thus be frictionally heated. Hollow shafts **32** and **33** are provided at each end for mounting of the tubular glass roller **27**, and bearing rings **34** are provided on these tubular shafts **32** and **33**. To reduce friction to a minimum, it is preferable that the bearing rings **28** and **34** be provided with suitable ball races to receive ball bearings **35**, although other forms of friction reducing bearings can be employed. By this construction, arrangement and mounting of the parts, the glass cylinders **27** are given a substantially free floating revoluble mounting on the tubular shafts **32** and **33**, and through the driving connections. As above set forth these cylinders **27** of the two rolls **4** and **5** will be rotated in opposite directions at substantially uniform speed and with substantially uniform surface travel.

Through the openings of the hollow shafts **32** and **33**, or through other suitable openings, one or more neon light tubes **36** are disposed to extend substantially throughout the length of the open part of the roller glass cylinders **27**, and these tubes **36** are preferably mounted and held to be adjustable with respect to a predetermined printing or light projecting point or location. As the parts are shown in Figs. 1 and 2, this light projecting or printing point will be, in connection with roll **4**, preferably on the upper side substantially at point A, whereas on roller **5** the printing point is preferably on the lower side substantially at point B, it having been found that such arrangement is convenient for use.

Shaft portions **32** and **33** are fixed or held against rotation with the cylinder **27**, and an adjustable shutter made up of the two semi-tubular members **37** and **38** is mounted within the cylinder **27** to be in close proximity to the inner wall of the cylinder and yet sufficiently clear the same to not interfere in any way with free rotation of the glass cylinder, or contact with the inner surface thereof during rotation. Through the medium of adjusting shafts **39** and **40** extending through a portion of the stationary shaft members **32** and **33**, and pinion means **41** and **42** carried by these shafts and working in suitable racks on the shutters, the shutter members **37** and **38** can be adjusted to vary the width of the opening **43** between the spaced edges thereof. A reflector **44** is preferably mounted within the shutter members **37** and **38** to extend longitudinally at a point opposite the adjustable exposure light opening **43**, and the light tubes **36** are suitably arranged within the reflector. An elongated or prismatic lens **45** is mounted between the light tubes **36** and the light emitting opening **43**, and this lens **45** is preferably adjustable substantially on a radial line of the cylinder **27**, to thus be focused or relatively adjusted with respect to the light emitting opening **43** and the surface of the glass cylinder **27** immediately radially outwardly therefrom. One form of adjusting means is shown in Figs. 5 and 6, and here the threaded adjusting pins **46** extend through suitable slots in the end portions of the shaft parts **32** and **33**, and the lens **45** is thus adjustable toward and from the outer surface of the glass cylinder **27** on a line radially from the center of rotation of the cylinder. Adjustments of the lens are fixed and held by clamp nuts **47**.

The light tubes **36** are also preferably adjustable, and as these parts are shown in Fig. 5, slots **48** are provided substantially radially in the end portions carried by the shafts **32** and **33** so that the tubes **36** can be moved and adjusted on lines substantially radiating from the rotating center or axis of cylinder **27**. It is to be understood that the two ends of the tubes **36** will be adjusted and these adjustments can be fixed and held by clamp bolts **49**, as shown in Fig. 3, or other suitable fastenings. With this arrangement of adjustably mounted shutters **37** and **38**, adjustable lens **45**, and adjustable tubes **36**, the light emitting opening at **43** can be substantially entirely closed, can be opened as a very narrow slit, or can be opened to a considerable extent to give a wide gap or space. The light tubes **36** can be adjusted to any desired settings, within their limit of movement, to thus vary their position and concentrate or spread the field of light emanation; and, lens **45** can be adjusted to vary the concentration of light at the focal line along the outer surface of the cylinder **27**, which focal line is substantially centered along the glass roller **27** at a point indicated at C in Fig. 5. It will be appreciated that the adjustment of the lens **45** permits focusing to draw down and concentrate the center of light projection at the surface of glass cylinder **27** to a hair line, or that this line of light projection can be widened on each side of line C to thus give a wider light band less concentrated and more diffused. At the same time, the shutters **37** and **38** can be moved to vary the light emitting opening at **43**. While I have described the focal line or center as at C and extending longitudinally on the outer surface of tubular glass cylinder **27**, it will be appreciated that this is not a fixed line as the cylinder **27** is constantly rotated during use, but the center of light concentration will remain uniform and fixed and the outer peripheral surface or circumference of the glass roller cylinder **27** will travel constantly across and pass through this light center and any width of the light path that may be projected on either side of the line of focus.

In Fig. 8 I have shown a slightly different and modified arrangement of the parts, and here the slots **50** in which the light tubes **36** are adjustable are shown extending or substantially

emanating from the focal light center. This arrangement permits full adjustment of the tubes 36 and the tubes are thus adjustable in a definite relation with respect to the lens 45 and the focal center line longitudinally on the periphery of glass cylinder 27. By the use of neon tubes, giving brilliant lighting effects rich in photo printing rays, concentrating these rays by the use of the lens 45, and adjusting the lens, it is possible to secure clear and sharp prints even though the glass cylinders of the rollers 4 and 5 be very rapidly rotated, and the speed of printing and operation with my improved machine is limited substantially only by safe speeds at which the mechanical parts can be operated, as the concentrated and strong photo or light printing rays will accomplish instantaneous printing at any desired speed.

The glass cylinder 27 has a photographic film, a light sensitized coating to be made into a negative, a sheet of any suitable transparent subject having the negative material drawn, printed, or otherwise placed thereon, or in fact has the printing negative applied thereto in any desired manner that will substantially accomplish a light transparent negative upon or around the outer surface of the glass cylinder 27.

This negative is, of course, adherent to or in close contact with the surface of the glass cylinder 27 passing the line C of light center. To carry the web or strip 24 in proper contact with the surface of cylinder 27 of the rollers 4 and 5, I provide contact feed webs 51 made in the form of endless belts and carried over rollers 52 so that the feed belts will have a portion of their length disposed around a part of the circumference of each of the cylinders 27 to thus conduct the web around the roller 27 and hold the strip 24 in close contact with the surface of the roller. A direct contact roller 53 can be provided bearing longitudinally against the feed belt 51 substantially along the center of light contact, at C. With this arrangement, the sensitized strip 24 is fed and led around the cylinder 27 with its sensitized face directly in contact with the negative face of the cylinder 27, and as the light rays are directed through the cylinder roller 27 and through the film, a photo or light print will be made upon the sensitized strip or material. As the parts are shown in Figs. 1 and 2, the printing roller 4 exposes one sensitized side of the strip and the roller 5 exposes the other side, and thus both sides will be subjected to light printing while the strip or sheet is being carried through the mechanism, and due to the drive connections the printings on the two sides of the strip will be maintained in accurate and uniform registry. As the exposure when passing the printing or photo light strip is of very short duration, the light rays will not penetrate from one side to the other of the strip 24, even though this be a relatively thin paper, it of course being understood that the strip 24 has a highly sensitive surface and therefore requires only short exposure.

While the light tubes 36 will give substantially equal and uniform illumination throughout the entire length of the printing portions of the cylinders 27, in some work it may be desirable to work with a narrow strip 24 of paper or other material, and where this is done the ends of the rolls 27, or any other part thereof, can be blocked out to prevent penetration of light. Two or more negatives can be combined in any desired manner upon the roller, and any desired portions can be blanked out for after printing of any special matter, or type can be printed in and photographed or otherwise shown, the same being true with line drawings and in fact any other matter.

Where it is desired to accomplish finished printings having the effect of line screen work, a screen wet plate collodion negative can be stripped to the roller 27; and, it is to be understood that various grained or other screen effects can be employed to suit the particular printed effect to be accomplished.

While the negative can be applied to, affixed around or assembled upon the glass roller 27 in various manners, it may be found desirable to coat, by spraying upon, flowing, or otherwise applying a sensitized material, directly upon the surface of the glass cylinder 27 of the roller, and where this is done a positive is applied around the roller 27, as indicated at 54, and the roller is then rotated with a line of light directed to penetrate through the positive and thus create a negative light print in the sensitized coating. This sensitized coating can then be developed and fixed, and then dried, in the usual manner and the roller will be prepared for photo or light printing as set forth above.

In Figs. 9 and 10 I have illustrated means adaptable for use in preparing a negative directly upon the glass cylinder 27, and as here shown the elongated prismatic lens 56 is mounted in a casing 57 to be adjustable toward and from a light center D extending longitudinally along the cylinder 27. As the lens 56 is adjustable, it can be focused very accurately to project a hairline of light through the positive 54 to print the sensitized coating 55, or this lens 56 can be adjusted to give a wider line of light, which wider line is necessarily less intense and more diffused. One or more light tubes 58, which are also preferably neon tubes, or other tubes giving a brilliant light high in photo or light printing rays, and yet without the generation of heat, is mounted within the case 57, and a reflector 59 is provided to concentrate the rays toward the lens 56. As here shown, three tubes 58 are employed and these are adjustably mounted in radially extending slots 60 in the ends of the case 57 so that they can be adjusted toward and from the lens 56. In this way, the light can be not only focused through lens 56 to increase or decrease the width and brilliancy of the light at the printing line D, but the tubes 58 can be adjusted, and one or more tubes can be used, to thus increase or decrease the quantity of light available for focusing and concentration through the lens 56.

From the foregoing it will be seen that I have provided means for light or photo printing admirably adapted for use in projecting accurate and uniform exposure and light prints, which means is well suited for use in printing large quantities of syndicate pictures, post cards, or other matter, as well as for printing circulars, pictorial supplements, magazine or book pages, and many other members of paper or other strip or sheet material, which have heretofore been produced by some planographic, halftone, line cut, or other printing apparatus and process, as the cost of current consumed is very low when neon tubes are used, and the light tubes can be adjusted and positioned to give highest efficiency as to results, and as thin sensitized paper and other sheet materials can be successfully handled and used, to thus give accurate reproductions, not imitation photography, but true photographs with all of the lights, shadows and tones of the origi-

nal preserved. Whereas with the various planographic printing processes it has heretofore been necessary to make separate negatives and transfers, to etch the printing surface, and to carry through complicated processes and procedures requiring the services and handling of specially skilled artisans, and even then the result produced is only a printed reproduction, with my improved apparatus positive original photographic prints are obtained and are produced at a speed and cost well comparable with planographic and printing reproductions.

While I have herein shown and described only certain specific mechanical constructions and assemblies, it will be appreciated that many changes and variations can be made in the form, construction, assembly, mounting and operation of the mechanism, without departing from the spirit and scope of my invention.

I claim:

1. Means for light printing comprising, a revoluble tubular transparent roller having a light transparent negative advanced with its outer surface, a light tube disposed within the tubular roller to give penetrating light rays substantially equally throughout the length thereof, means to advance sensitized paper with said roller past a predetermined photo printing line extending along the length thereof, an elongated lens also within the transparent roller between the printing line and the light tube, and means to adjust said lens to focus and consequently vary the width of the photo or light line.

2. Means for photo or light printing comprising, a revoluble tubular transparent roller having a light transparent negative movable with its outer surface, an elongated source of light within the tubular roller, a lens also disposed within said roller, means to advance a sensitized strip as the roller is revolved so that the strip travels with the transparent negative, and means to adjust said lens toward and from the transparent cylinder to focus the rays from the light tube and create a printing light line penetrating the transparent negative to reach the sensitized strip, the adjustment of said lens permitting variation of the width and concentration of the printing light line.

3. Means for photo or light printing comprising, a revoluble tubular transparent roller having a light transparent negative movable with its outer surface, an elongated light tube mounted against rotation within the tubular roller, a lens also held against rotation within said roller, means to advance a sensitized strip as the roller is revolved so that the strip travels with the transparent negative, means to adjust said lens toward and from the transparent cylinder to focus the rays from the light tube and create a printing light line penetrating the transparent negative to reach the sensitized strip, the adjustment of said lens permitting variation of the width and concentration of the printing light line, and adjustable shutter means to shield against penetration of light rays except as projected through said lens and also adaptable to vary the area of projection of the concentrated rays from the lens.

4. Means for photo or light printing comprising, a revoluble tubular transparent roller having a light transparent negative movable with its outer surface, an elongated light tube mounted against rotation within the tubular roller, a lens also held against rotation within said roller, means to advance a sensitized strip as the roller is revolved so that the strip travels with the transparent negative, means to adjust said lens toward and from the transparent cylinder to focus the rays from the light tube and create a printing light line penetrating the transparent negative to reach the sensitized strip, the adjustment of said lens permitting variation of the width and concentration of the printing light line, and means to permit adjustments and hold relative settings of the light tube to vary the disposition of said light tube with respect to the lens.

5. Means for photo or light printing comprising, a revoluble tubular transparent roller having a light transparent negative carried and advanced with its outer surface, means to advance a light sensitive strip in unison with the travel of the light transparent negative, a plurality of cool-operating light tubes disposed within the tubular roller to emanate light rays substantially in equal volume throughout the length thereof, means to confine the light rays to penetrate said transparent roller and the transparent negative in a line extending longitudinally to thus affect the sensitized strip in a projected light line progressively throughout its length as advanced in unison with the transparent negative, means adjustably supporting said light tubes to be independently and severally adjustable toward and from the line of light printing emanation, and an elongated lens interposed within the transparent roller between the light tubes and the desired line of light emanation and adjustably mounted to be focused to vary the width and intensity of light ray projected on the line of penetration through the transparent negative.

6. Means for photo or light printing comprising, a revoluble tubular transparent roller having a light transparent negative associated with and carried upon its outer surface as the roller is revolved, means to advance a strip of sheet material having a sensitized face in unison with the rotation of the roller and the consequent travel of the light transparent negative, a neon light tube extending through said tubular transparent roller and held against rotation, an elongated lens also disposed and held against rotation within the tubular transparent roller and interposed between the neon tube and a predetermined photo printing position, means to adjust the proximity of the neon light with respect to the lens, means to adjust said lens to focus the light rays to penetrate in a line through the transparent roller and through the negative to thus affect the strip of sensitized material, and shutter means also disposed within the tubular transparent roller and held against rotation therewith to mask against escape of emanated light rays from the tube and adjustable to positively vary the width of focused light rays permitted to pass.

7. Means for light printing upon sensitized sheet strip material comprising, a revoluble hollow roller having the wall thereof penetrable to light and having a negative associated with the wall, an elongated neon light tube mounted within the hollow roller and extending substantially parallel with the axis of rotation to emanate light rays substantially equally throughout the extent of the negative along the roller, means to revolve the roller, means to hold a sensitized strip to travel with the roller and consequently the negative, and an elongated lens also disposed within the roller between the neon light tube and the negative to focus light rays from the tube

to penetrate the negative and act upon the sensitized strip substantially in a line.

8. Means for light printing upon sensitized sheet strip material comprising, a revoluble hollow roller having the wall thereof penetrable to light and having a negative associated with the wall, an elongated neon light tube mounted within the hollow roller and extending substantially parallel with the axis of rotation to emanate light rays substantially equally throughout the extent of the negative along the roller, means to revolve the roller means to hold a sensitized strip to travel with the roller and consequently the negative, an elongated lens also disposed within the roller between the neon light tube and the negative to focus light rays from the tube to penetrate the negative and act upon the sensitized strip substantially in a line, and means to adjust and focus said elongated lens to vary the relative position thereof between the neon tube and the negative.

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