May 12, 1931. A. LANGSNER 1,804,793

DEVELOPING APPARATUS WITH BLANKET ADJUSTMENT AND SPRAY APPLICATION OF LIQUID AMMONIA

Filed Jan. 9, 1928 - 3 Sheets-Sheet 1

Fig. 1

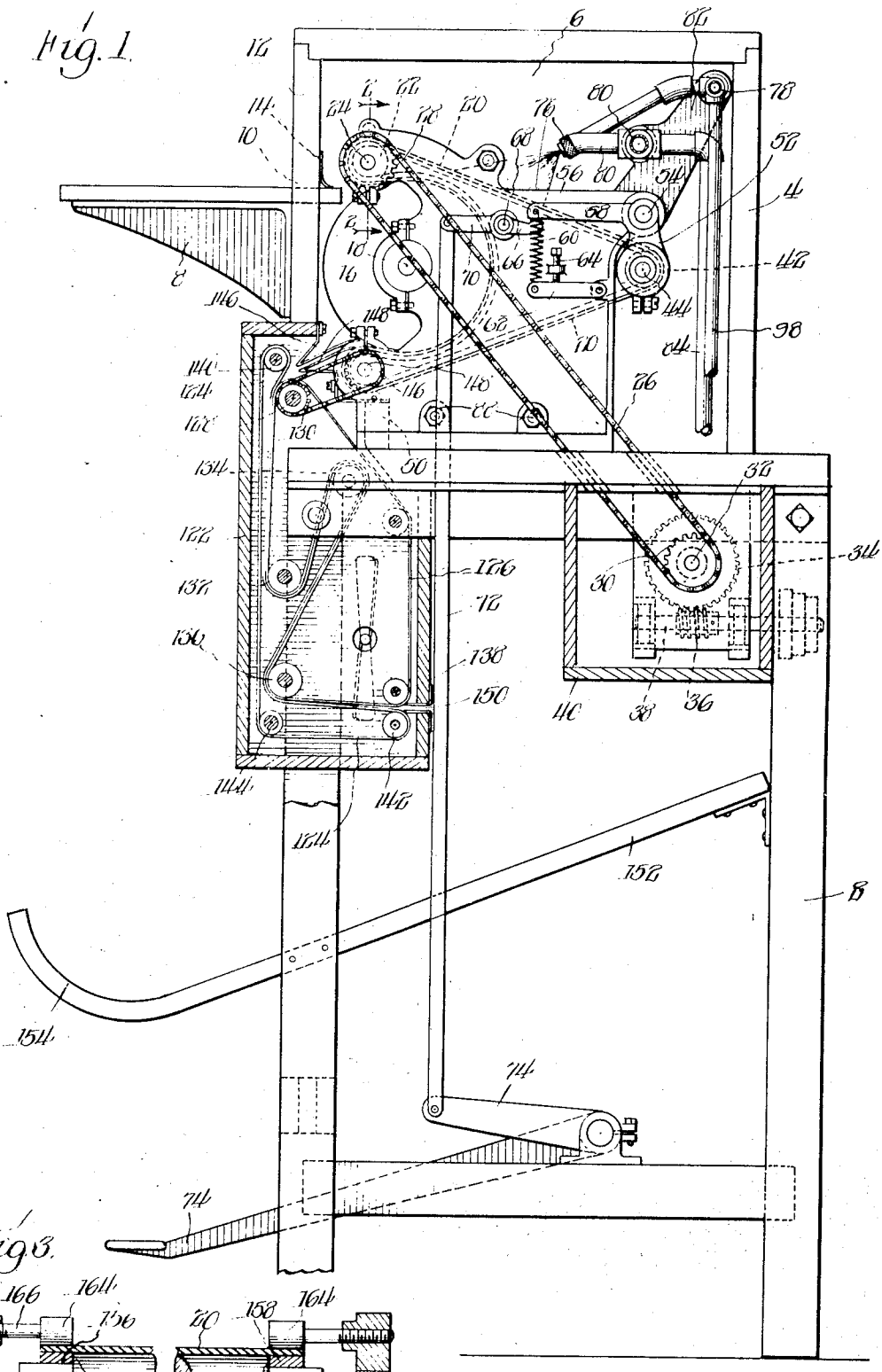
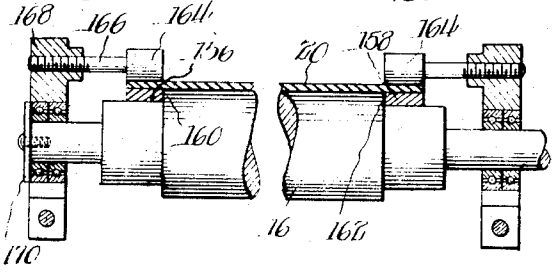


Fig. 3.



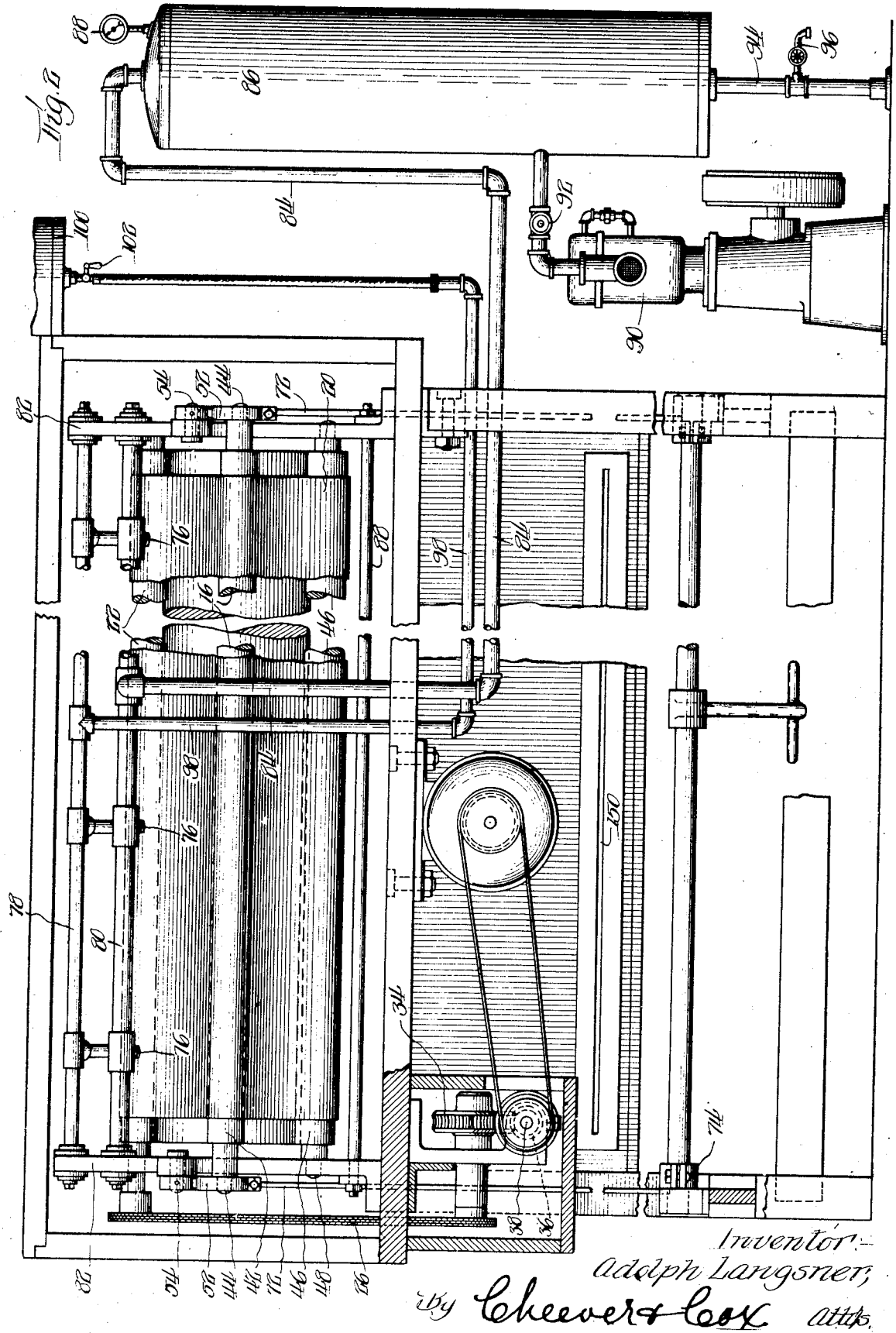
Inventor
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DEVELOPING APPARATUS WITH BLANKET ADJUSTMENT AND SPRAY APPLICATION OF LIQUID AMMONIA

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Fig. 2



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DEVELOPING APPARATUS WITH BLANKET ADJUSTMENT AND SPRAY APPLICATION OF LIQUID AMMONIA

Filed Jan. 9, 1928 3 Sheets-Sheet 3

Fig. 4.

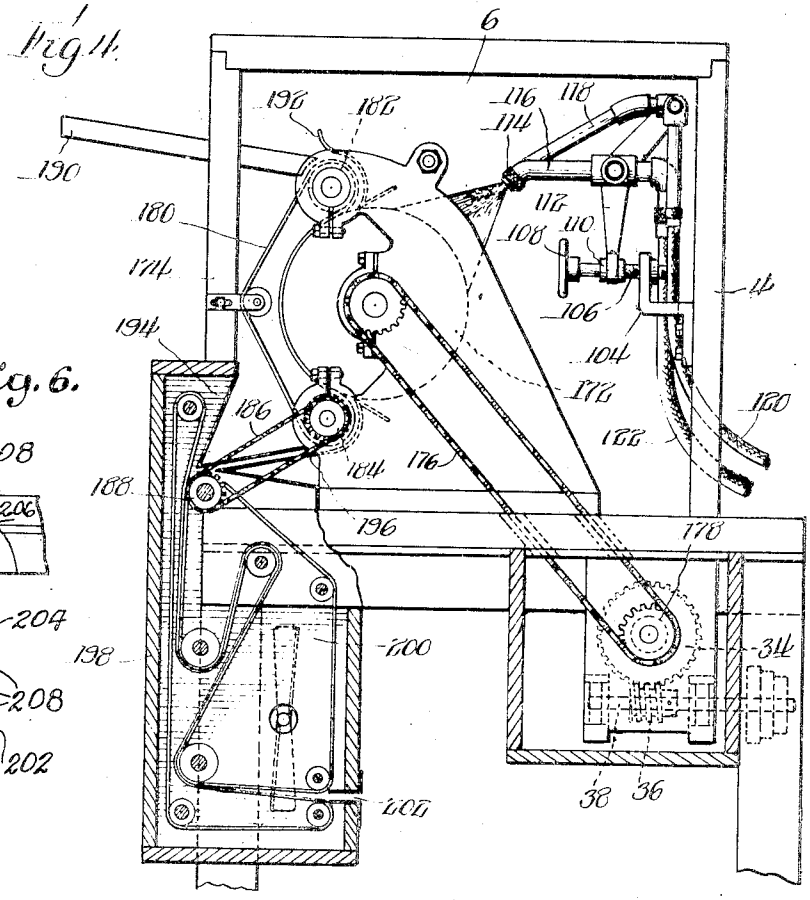


Fig. 6.

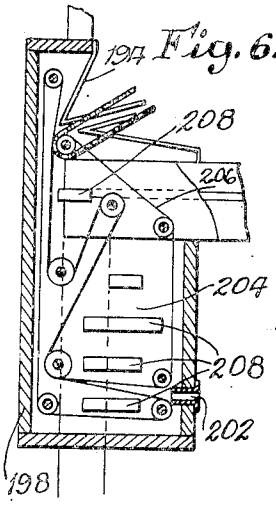
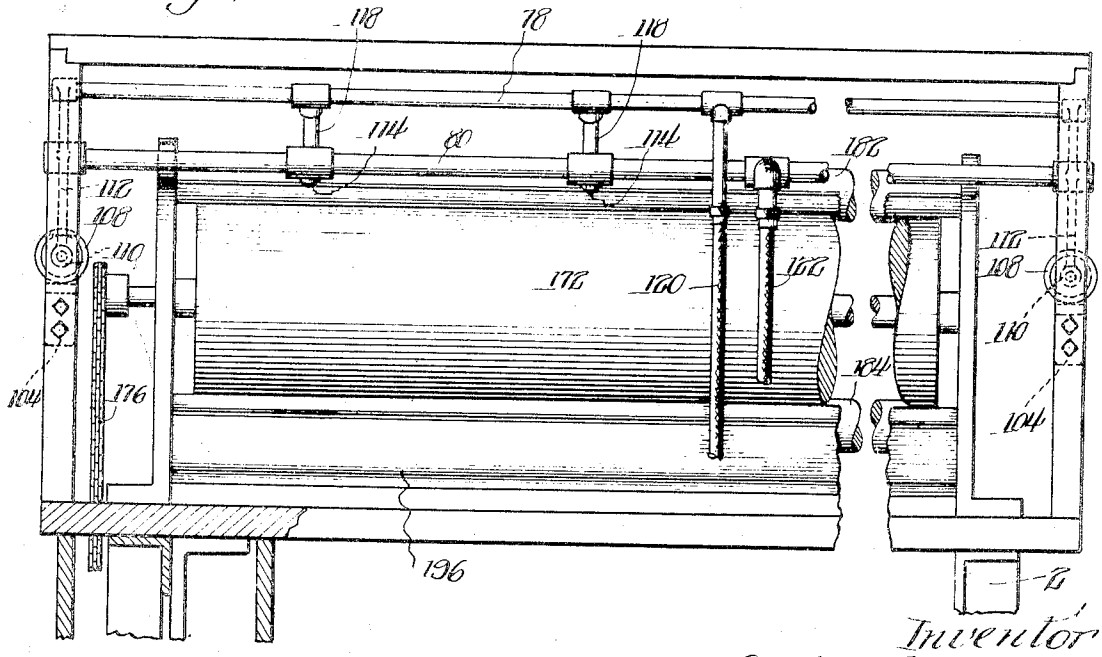


Fig. 5.



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Patented May 12, 1931 1,804,793

UNITED STATES PATENT OFFICE

ADOLPH LANGSNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO EUGENE DIETZGIN COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

DEVELOPING APPARATUS WITH BLANKET ADJUSTMENT AND SPRAY APPLICATION OF LIQUID AMMONIA

Application filed January 9, 1928. Serial No. 245,333.

My invention relates to the development of light sensitive paper by the use of an alkaline developing agent such for instance as ammonia and preferably in liquid form, such as aqua-ammonia, although the construction shown is equally adaptable for the developing agent in gaseous form such for instance as ammonia gas.

One of the objects of my invention resides in a new and improved method and means for projecting the developing agent onto the material to be developed, such as light sensitive paper, in a very fine mist or in a very fine breath-like form so that the paper to be developed will not run, will not be warped and particularly so that in a short time or travel of the paper with this developing agent applied thereto, it will not only be fully developed but will be substantially dry due to the evaporation of the developing agent when applied in liquid form, thereby eliminating the necessity of an additional drying means.

Still another object of my invention resides in providing a spraying device for projecting a breath-like spray of developing liquid, such as aqua-ammonia, onto a traveling blanket or belt and in arranging the belt to drag or feed paper across a complemental or backing surface during which time the paper is fully developed. An ancillary object of my invention resides in the provision of a preferably rotatable drum about which the traveling feed blanket moves and including the provision of means for feeding sheets or continuous strips of light sensitive material between the traveling blanket and the cylinder whereby the light sensitive material is dragged or fed by the travel of the blanket and by the application of a very fine projection of the developing agent upon either the blanket or cylinder and preferably upon the blanket.

Still another object of my invention resides in the provision of means for projecting the developing medium, such as either liquid or gaseous ammonia, in a very fine, breathlike state or mist onto either the blanket or complemental feed surface such as the cylinder or both, and particularly in the utilization of a source of pressure and specifically the use of air pressure for projecting either the liquid developer or gaseous developer in this fine mist form through appropriately designed nozzles.

Still another object of my invention resides in the provision of a feed blanket or in the construction of the re-active feed surface such for instance as the cylinder, of relatively porous material, such for instance as soft rubber so that the developing gases will be occluded in the surface of such member whereby effectively to contact with the contiguous developing material after it is dragged or fed between the blanket and the re-active developing surface. An ancillary object of this part of my invention resides in the method of utilizing traveling surfaces of porous nature in which the occluded developing gases or liquid may be retained in a very fine film or mist-like form to effect developing in a short time or travel of the paper and without the necessity of a subsequent drying and with the insurance of an effective developing without possible danger of bleeding.

Yet another object of my invention resides in the provison of means for preventing the escape of the developing gas, and for removing the developing gases and particularly occluded developing gases from the developed light sensitive material after it is discharged from the developing chamber.

Another object of my invention resides in the provision of a novel method and apparatus for the chemical removal of the ammonia developing gas from the discharging light sensitive material or paper after it comes from the developing chamber and particularly in the utilization of copper sulphate crystals for this purpose.

Still another object of my invention relates to the means for adjusting the spray nozzles toward and from the traveling blanket or toward and from its re-active developing surface, such as the cylinder, for the purpose of adjusting the degree of projection of this spray.

Another feature resides in the means for

adjusting the relative degree of pressure of the air and developing liquid or the developing gas.

Yet another object of my invention resides in the arrangement of an enclosing housing about the traveling blanket and its re-active surface, preferably of cylindrical form, and the arrangement of spraying nozzles within said housing whereby to prevent the escape of the ammonia gases into the atmosphere. An ancillary feature of this invention resides in the arrangement of the ventilating chamber in the discharge end of the developing chamber including means for removing the ammonia gas and from preventing it escaping to the atmosphere, while at the same time causing the discharge of the developed material at a receiving station.

Yet another object of my invention resides in the arrangement of means for adjusting or releasing the blanket for the purpose of releasing or aligning the feed of the light sensitive material between the blanket and its re-active surface.

Yet another object of my invention resides in the novel means for maintaining the blanket in aligned position relative to its re-active surface, preferably the developing cylinder. An ancillary feature of this invention resides in the provision of re-active members, preferably friction rolls, opposite the guide strips on the blanket and the arrangement of the guide strips to co-operate with preferably shouldered portions on the cylinder and/or said rolls.

A further feature of my invention resides in the modified construction for projecting the developing spray directly upon the re-active developing surface for the blanket, preferably upon the cylinder, and in the arrangement of the blanket at an opposite surface of the cylinder for feeding or dragging the light sensitive material across the surface of the cylinder.

Yet another object of my invention resides in the convenient arrangement of supplementary blanket feeding members in the form of traveling belts at the discharge end of the developing blanket and cylinder feed for continuously receiving and feeding along the light sensitive material through a ventilating chamber. An ancillary feature of this invention resides in the means for driving these blankets, the main developing and feeding blanket and the cylinder from a single prime movement.

These and other objects of my invention will be apparent from a perusal of the following specification when taken in connection with the accompanying drawings wherein—

Fig. 1 is a side view partly in section of a preferred embodiment of my apparatus for carrying out my improved method;

Fig. 2 is a view on line 2—2 of Fig. 1;

Fig. 3 is a section through the means for keeping the blanket aligned;

Fig. 4 is a modified form of Fig. 1;

Fig. 5 is a view showing the adjusting means for the spray nozzles; and

Fig. 6 is a fragmentary view of a preferred arrangement of the degassing chamber.

Referring now to my invention generally, I accomplish the development of the light sensitive material, such for instance as paper, by applying thereto a very fine mist of substantially breath-like form of a aqua-ammonia, and in some instances ammonia gas, and I preferably accomplish this by spraying this breath-like developing medium, under controlled pressure, directly upon the feeding member or members for the light sensitive material so that as the members feed the light sensitive material along, a developing medium will be applied thereto in minimum amounts and in such finely distributed conditions so as to effectively develop the light sensitive material in a minimum time and travel of the same without danger of causing bleeding or running of the printed lines and without the necessity of a subsequent drying operation. In this manner the application of the developing medium and the escape of the gases therefrom is constantly under the control of the operator so that when developing is taking place, the application of the developing medium is cut off thereby eliminating possible escape of the ammonia gases into the atmosphere during non-developing periods.

The apparatus herein described for carrying out my improved methods embodies several important features of construction and includes additional means for preventing the escape of the occluded gases subsequent to development, the proper feed and particularly the drag feed of the light sensitive material through the developing zone so that continuous strips or sheets of light sensitive material, such as paper, may be fed in an interrupted or in a continuous manner through the machine, the improved means for projecting the spray of either liquid ammonia or gaseous ammonia and its application to the light sensitive material, the enclosure of this spraying and feeding mechanism in a gas-tight containing housing together with any other details providing a commercially operative machine, all of which are hereinafter set forth.

Referring now to the drawings in detail, my improved device comprises a suitable standard 2 forming a main or lower frame and an upper frame 4 mounted preferably upon the lower frame. At the front of the upper frame 4 which is preferably provided with closed sides 6 to provide an enclosing housing of substantially air-tight nature, I provide a bracket or shelf 8 upon which the light sensitive material, such as paper, may be fed forwardly into the apparatus. It will, of course, be appreciated that the paper may

come direct from any adjunctive device, such as the printing machine itself, so as to provide a continuous operation.

The rear portion of this shelf 8 registers with an aperture 10 in the front wall 12 of the enclosing housing 6 and there is provided a strip of felt or rubber 14 at the inside of this orifice so as to permit the inward feed of this light sensitive material while preventing the escape of the gases therefrom. Within this containing housing 6 I mount the developing apparatus proper which preferably comprises means for feeding either sheets or a continuous strip of the light sensitive material through this housing and means for applying a breath-like mist of developing medium, such as liquid ammonia or gaseous ammonia, to the light sensitive material. In the specific embodiment I prefer to feed the light sensitive material through the developing chamber by means of a traveling blanket, preferably of continuous form, and a re-active guide, backing and developing surface between which and the blanket the paper is fed so that the blanket, as it travels across this backing surface, feeds the paper therealong and through the developing chamber. Alternatively the paper may be fed by dragging it across a stationary surface which is preferably somewhat smooth. In the preferred form of my apparatus, I mount a relatively large cylinder or drum 16 on a shaft 18 having bars in the upper frame member 4 so that the cylinder 16 is mounted within the developing chamber. In addition I provide a traveling blanket which feeds across and about a majority of the periphery of the cylinder 16. This blanket 20 extends substantially the width of the developing chamber and is sufficiently wide to receive the maximum width of light sensitive paper to be developed. This blanket is preferably formed of rubberized textile material so as to prevent stretching and so as to be substantially non-absorbent. In some instances this blanket may be made of material such as a type of rubber which, while non-absorptive, is sufficiently porous to occlude ammonia gases in minimum amounts so as to effect and assist the developing operation by the contact of these occluded gases with the sensitive side of the light sensitive paper as the paper travels through the developing chamber. In the same manner the surface of the drum or cylinder 16 is preferably formed of rubber and while sufficiently smooth to permit of the drag feed hereinafter described, is also sufficiently porous to occlude the ammonia gases for effecting and assisting in the development of the light sensitive paper as the paper is dragged or fed around the desired arcuate length of the cylinder. It must be understood, of course, that in the operation of my device, if the cylinder be stationary, as in some instances it may be, the feeding action will be accomplished by having the traveling blanket drag the light sensitive paper across the peripheral surface of the cylinder. Obviously, this cylindrical surface 16 does not have to be cylindrical in all of the embodiments of my invention but, in the drag invention, is limited to a relatively smooth surface so as to permit of the dragging feature.

In the present embodiment of my invention wherein the cylinder 16 is rotatably driven as hereinafter described, the blanket 20 is arranged about a feed roller 22 rotatably mounted on the shaft 24 and preferably located adjacent the said opening 10 in the front of the apparatus. This feed roller 22 is driven by means of a chain 26 running about a sprocket 28 on the feed roller and in addition, running over another sprocket 30 on a shaft 32 which in turn is driven by a large worm gear 34 meshing with the worm 36 on the back shaft 38 which latter mechanism is enclosed within a suitable housing 40 on the lower frame 2. Belt 20 passes at the rear of the machine over a guide pulley 42 mounted on a shaft 44 carried on a swinging bracket hereinafter described. After passing over this guide pulley 42, the blanket 20 passes downwardly and forwardly of the machine around another guide pulley 46 mounted on a shaft 48 carried by a bracket 50 on the top of the standard 2. After passing over this pulley 46, the blanket then runs rearwardly about the lower surface of the cylinder 16, thence around the rear upper drive and guide pulley 22. In this manner, as the continuous blanket drives along, it also serves to rotate the cylinder 16. Obviously, if desired, this cylinder 16 may be stationary so as to provide a positive dragging feed as distinguished from the present feed wherein the light sensitive material is actually fed between the traveling blanket and the traveling cylinder 16.

Means is provided for causing the alignment of the light sensitive paper with relation to the blanket and the cylinder. It frequently happens that during the feeding the paper will become torn or wrinkled or will run out of alignment with the marginal edges of the blanket and the cylinder. In such cases it becomes necessary to release the blanket pressure about the cylinder and means for adjustment is provided to increase the tension of that side of the belt which tends to run off its guide pulley and this is done by use of the pivotally mounted arms 52, the outer arms of which carry the shaft 44 and the guide pulley 42. These arms 52 are pivotally mounted as at 54 upon suitable brackets 56 in the enclosing housing 6 and these arms 52 have laterally extending arms 58 connected by means of tension springs 60 connected to laterally extending arms 62 pivotally mounted on the brackets so as to constantly keep the guide roll 42 swinging out-

wardly toward the rear of the device whereby to keep the blanket under complete tension. An adjusting means 64 for each one of these springs is provided to regulate the tension of either spring and hence the tension of the blanket at either side. In addition I provide trip members 66 pivotally mounted on shafts 68 and having oppositely extending arms 70 connected by links 72 centrally located therebetween with a pedal 74 so that when the pedal is depressed the arms 66 will force the arms 58 of the bell-crank lever 52 forwardly whereby to release the tension of the blanket 20 so that the light sensitive material may be adjusted between the cylinder and the blanket.

I also provide within the developing chamber 6 the device for applying the very fine mist or breath-like form of liquid or gaseous ammonia to the light sensitive material. In the construction shown in Fig. 1 I prefer to apply this developing medium to the rubber surface of the blanket 20 as it travels in the developing chamber about the cylinder 16. In the form indicated there are provided a plurality of nozzles 76 extending at desirable intervals along the width of the developing chamber and spaced sufficiently close together that the sprayings from the separate nozzles will be distributed uniformly the width of the blanket. These nozzles 76 are spaced sufficiently close to the blanket and the nozzles are of such construction and arrangement as to provide a very fine breath-like distribution of the developing medium. The construction of each nozzle per se whereby the breath-like projection of the liquid or gas from the nozzle itself, forms another part of my present invention since these nozzles and the spray mechanism itself is well known except that its application and arrangement together with the method of utilizing it in connection with the development of light sensitive paper, is new and forms one of the important features disclosed in my invention herein. As shown in the drawing, each of these nozzles 76 is connected by means of two pipes 78 and 80 suitably mounted on a bracket 82. The lower pipe 80 connects by means of a pipe 84 with an air pressure tank 86 having a gauge 88. This tank is fed by means of an air compressor 90 and a suitable control valve 92 so that the pressure of the air is always under the control of the operator and may be adjusted to different degrees. The tank 86 is mounted on a tubular base 94 and includes a valve controlled outlet 96 for draining the tank either of air or any condensed moisture. The upper pipe 78 in turn connects with a pipe 98 running to a tank 100 and controlled by a valve 102. This tank contains liquid ammonia for accomplishing the developing. It will be understood, of course, that in the operation of this spray device, when the liquid ammonia is flowing from the tank 100 and the air from the tank 86, the liquid ammonia will be projected through the nozzles 76 under controlled pressure which pressure is regulated to communicate with the size of the orifices of the nozzles 76 so that the aerated liquid ammonia will be sprayed onto the traveling blanket in the form of a very fine mist whereby to provide a breath-like projection and distribution of the liquid ammonia onto the blanket. It will be understood, of course, that in some instances instead of using liquid ammonia, I may use the tank 100 for the purpose of containing pure ammonia gas and that I may project this gas through the nozzles by means of air pressure from the tank 86 or, if desired, I may in some instances, utilize pure ammonia gas under pressure and project it through the nozzles in the form of a fine mist or breath-like application of gas alone.

In the form of my invention illustrated in Figures 4 and 5, I show a modified construction of these spray nozzles which includes a means for adjusting the distance of the nozzles toward and from the cylinder or blanket or the paper itself, if preferred. In this form the housing or standard 4 is provided with a bracket 104 to receive a threaded member 106 having a turning wheel 108 and on this threaded member is mounted a nut 110 adapted to travel as the wheel 108 is turned. This nut carries an arm 112 which forms a bracket on which are mounted the nozzles 114, the pipes 116 and 118 which pipes connect by means of flexible tubing 120 and 122 with the pipes 84 and 98 respectively leading to the ammonia and air tanks so that by means of this construction, by shifting the wheel 108, the bracket 112 may be moved toward or from the cylinder or blanket so as to adjust the position of the nozzles.

In order to provide means for removing the occluded gases from the developed paper as it discharges from the developing chamber 6 and especially from the discharge of the traveling blanket 20 and the cylinder 16, I provide an additional housing 122 at the front of the apparatus and adjacent the lower portion of the housing 6 which encloses an additional feeding device for carrying the sheets or continuous strips of light sensitive material from the developing chamber through this additional housing and discharging them at a convenient receiving station, and I provide this additional housing 122 with means therein for removing the occluded gases from the light sensitive material. In the form of my apparatus shown in Fig. 1 of the drawings, this comprises a mechanical means consisting of a plurality of traveling blankets or belts into which the paper from between the blanket 20 and the cylinder 16 is discharged. To this end I pro-

vide two continuous blankets 124 and 126. One of these blankets 126 passes over a pulley 128 driven by means of a chain 130 from the sprocket wheel 46. This blanket thence passes over another wheel 132 located beneath the guide roll 128 and thence passes over another guide roll 134 and thence downwardly over another roll 136, thence it passes rearwardly over another roll 138, thence upwardly to complete its circuit. In like manner the other blanket 124 passes out over an upper guide roll 140, thence into contact with the blanket 126 which is passing over roll 128 from which point the two blankets travel together around roll 132 thence around roll 134 and 136 to a point where blanket 124 passes singly around a lower roll 142 immediately below roll 138 thence forwardly to a roll 144 at the front part of housing 122, thence upwardly back to roll 140 so as to complete its circuit. It will thus be seen that these two blankets travel together for a certain portion of their travel and travel alone for another portion of their travel and during their travel in contact with each other they will feed the paper along and therebetween. These blankets or belts 124 and 126 are preferably formed of textile material of relatively large meshes or they may be formed of any other open meshed flexible material that is resistant to ammonia gases or, if desired, they may be formed of parallel strands of cords. In the upper portion of the ventilating cabinet 122 are arranged spaced apart guides 146 and 148 which connect the discharge end of the cylinder 16 with the opening between the meeting points of the two belts 124 and 126 so that the paper discharge from between the cylinder and blanket 20 will be directed continuously between these belts 124 and 126 as they travel together. It will also be noticed that the two rolls 138 and 142 are arranged opposite a discharge orifice 150 from which the light sensitive material, fully developed, will discharge onto an inclined receiving trough 152 located therebeneath and will fall in coiled formation downwardly against a flange 154 located in the front of the machine, from which it may be removed. If desired, the opening 150 may be provided with felt flaps which are arranged to permit the discharge of the light sensitive paper while preventing the escape of gases therefrom. This chamber 122 is provided with an air inlet at one end, shown in dotted lines, and with an opening at the opposite end connecting to a suction fan, also shown in dotted lines, by means of which a current of air is worked through this ventilating chamber to remove the occluded gases from the light sensitive material.

My invention also comprises means for keeping the blanket 20 in alignment with the guide rolls and in alignment with the cylinder 16. One form of such means consists in providing the under surface of the belt 20 with strips 156 and 158 of material which provide continuous flanges or shoulders along the marginal edges on the underside of the blanket and which flanges 156 and 158 cooperate with shoulder portions 160 and 162 formed on the guide rollers 22, 42 and 46 and also preferably on cylinder 16. In addition I provide re-active members for backing up these flanged marginal portions of the belt preferably consisting of the plurality of rollers 164 rotatably mounted on axles 166 which axles are adjustably threaded at bracket 168 carried by the frame immediately above their friction bearings 170 for the rolls such as 16 shown in Fig. 3 of the drawings.

In the modified construction shown in Fig. 4 of the drawings, instead of applying the spray of developing medium onto the traveling blanket, I prefer to apply it directly to the cylinder 172 mounted on a shaft 174 and power driven by means of the chain 176 from the power driven sprocket wheel 178 and in addition I provide the said belt 180 which, in this construction is arranged substantially at the opposite side of the cylinder 172 and in a manner so as to carry the light sensitive material from a point at the entrance of the cabinet 6 preferably around said cylinder and between it and the blanket to a lower discharge point. To this purpose there is mounted within the housing a guide roller 182 around which the blanket passes and this roll 182 is located preferably at the top adjacent the periphery of cylinder 172 so that as the blanket 180 travels about this roll 182, it will thence pass into contact with the cylinder 172. Another roll 184 is located substantially below the cylinder 172 and this roll 184 is connected by means of a sprocket chain 186 to another roll 188 so as to drive the latter. The blanket 180 passes around this lower guide roll 184 and thence again into contact with the cylinder. A feed-in chute 190 is located adjacent the top of the housing 6 and connects with a deflector 192 constructed and arranged to feed the light sensitive material directly into position between the periphery of the cylinder 172 and the blanket 180 and there are two additional guides or deflectors 194 and 196 arranged at the discharge end of the combined blanket and cylinder feed so as to discharge the developed light sensitive material into the separate feeding mechanism contained in the additional housing 198 arranged at the front of the apparatus for this purpose. The feeding belt within this housing is constructed and arranged substantially similar to that shown in Fig. 1 of the drawing for conducting the light sensitive material in a substantial tortuous path through the ventilating chamber 200 which is provided with a connection to a suction exhaust and an oppo-

sitely located ventilating opening so as to create a current of air therethrough to carry away the occluded gases from the light sensitive material which, in turn, is discharged as heretofore at 202 in the manner and as described in Fig. 1.

As an alternative means for removing the occluded ammonia gases from the developed light sensitive material as it is discharged from the belt and cylinder feeding and developing mechanism, I may use, in lieu of the ventilating chamber hereinbefore shown, a chamber 204, shown in Fig. 6 of the drawings, into which the developed paper is discharged and fed by means of belts 206 provided with relatively large meshes, over a container 208 holding a dry, solid granular mass of pumice-stone containing crystals of hydrated copper sulphate which has a peculiar avidity for ammonia gas. It will be appreciated that various arrangements may be used for carrying out my method of conveying the developed light sensitive paper with the occluded ammonia gases thereon through the enclosing chamber containing the crystals of copper sulphate.

By reference to the foregoing description it will be seen that I have provided a very compact, useful and commercial type of method and apparatus for developing light sensitive material either in sheets or continuous strip form by passing it through a developing chamber wholly enclosed from the atmosphere and wherein the developing medium is applied to the material to be developed in finely distributed form and in such minimum quantities so that while effectively developing the latter in minimum time and particularly in minimum travel of the feeding operation, it is applied in such a manner as to preclude bleeding and as to eliminate the necessity of the drying operation, and in addition, by my improved invention I am enabled to control the application of the developing medium so as to prevent its escape into the developing chamber only when desired, that is, during the feeding operation. It will be further evident that by reason of my various adjusting devices, I am enabled to control the quantity of liquid ammonia sprayed onto the blanket or cylinder or paper as it travels along and I am able to control not only the air pressure and the amount of liquid or gas passed, but also the proximity of the spray nozzles with relation to the cylinder, the belt or the paper, and in a like manner by controlling the speed of the motor or prime movement for driving the belt and cylinder or the travel of the paper, I am enabled to control the amount of developing medium that may be sprayed upon any of these members. So also, by reason of the movement of the manually controlled releasing mechanism of the blanket, I am enabled to conveniently and quickly release the belt feed and permit the alignment and possible stop of the feed in case the paper becomes torn, wrinkled or out of alignment. Furthermore, by the location of the auxiliary chamber at the discharge end of the developing chamber, I am enabled to continuously feed the sheet or strip of light sensitive material from the developing chamber through a second chamber containing either the ventilating apparatus, such as the air suction device, or the upper suction compartment for removing the ammonia gases carried out in occluded form by the light sensitive material and also those gases which escape into the chamber, and this latter mechanism includes appropriate feeding devices, one form of which is shown as the foraminated or meshed belts for feeding the paper through these degasing chambers. In addition, by reason of the novel construction of the belt and the guide mechanism therefor, I am enabled to keep the belt or blanket in proper alignment with the cylinder and guide rolls at all times during its travel.

I do not herein claim the features of my invention which are set forth and claimed in my following co-pending applications: Serial No. 240,157, filed December 15, 1927, for Developing apparatus; Serial No. 246,137, filed January 12, 1928, for Developing apparatus; Serial No. 248,744, filed January 23, 1928, for Developing apparatus; Serial No. 248,745, filed January 23, 1928, for Developing apparatus; Serial No. 253,558, filed February 11, 1928, for Developing apparatus; Serial No. 282,792, filed June 4, 1928, for Developing apparatus; Serial No. 287,139, filed June 21, 1928, for Developing apparatus; Serial No. 304,773, filed September 8, 1928, for Developing apparatus; Serial No. 327,242, filed December 20, 1928, for Developing apparatus.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a developing apparatus, the combination of an enclosing casing, carrier members mounted therein, means for driving same, means introducing light sensitive material between said carrier members, a spray nozzle in said casing, a pipe connected with said spray nozzle and connecting to a source of air pressure, a second pipe connected to said spray nozzle and connected to a source of liquid ammonia, said spray nozzle being constructed and arranged to project the liquid ammonia, in the form of a fine breath-like mist, onto said carrier members.

2. In a developing apparatus, the combination of an enclosing casing cooperating carrier members mounted therein, for gripping light sensitive material between said carrier members, means to move said carrier members, a spray nozzle in said casing, a pipe connected with said spray nozzle and con-

necting to a source of air pressure, a second pipe connected to said spray nozzle and connected to a source of liquid ammonia, said spray nozzle being constructed and arranged to project liquid ammonia from said source, in the form of a fine breath-like mist, onto one of said carrier members and means for adjusting the nozzle toward and from the said carrier members.

3. In a developing apparatus, the combination of an enclosing casing, cooperating carrier members mounted therein, for gripping light sensitive material between said carrier members, means to move said carrier members, a spray nozzle in said casing, a pipe connected with said spray nozzle and connecting to a source of air pressure, a second pipe connected to said spray nozzle and connected to a source of liquid ammonia, said spray nozzle being constructed and arranged to project liquid ammonia from said source, in the form of a fine breath-like mist, onto one of said carrier members and means for controlling the flow of said air or liquid ammonia to said nozzles.

4. In a developing apparatus, the combination of an enclosing casing, cooperating carrier members mounted therein, for gripping light sensitive material between said carrier members, means to move said carrier members, a spray nozzle in said casing, a pipe connected with said spray nozzle and connecting to a source of air pressure, a second pipe connected to said spray nozzle and connected to a source of liquid ammonia, said spray nozzle being constructed and arranged to project liquid ammonia from said source in the form of a fine breath-like mist, onto one of said carrier members and means for controlling the amount of liquid ammonia projected.

5. In a developing apparatus, the combination of an enclosing casing, a cylinder rotatably mounted in said casing, a continuous blanket wrapping about a portion of said cylinder and over guide rolls in said casing, means for driving said blanket, means for introducing light sensitive material between said cylinder and blanket, means for applying liquid ammonia to said light sensitive material, a second casing communicating with said first mentioned casing, a series of guide rolls in said second casing, a plurality of continuous conveyors passing over said guide rolls, said continuous conveyors being constructed and arranged to travel together during a portion of their path of travel and at a point located contiguous to the discharge from said cylinder and blanket in the first mentioned casing and guides for guiding the light sensitive material from the discharge of said cylinder and blanket to said second mentioned continuous conveyors and means in said second casing for removing the occluded gases from said light sensitive material as it passes therethrough.

6. In a developing apparatus, the combination of a support having means forming an enclosing casing thereon, a shaft on said support driven from a source of power, a cylinder on said support, a drive roll mounted adjacent the periphery of said cylinder, a drive connection from said shaft to said drive roll, a plurality of guide rolls, one of which is mounted adjacent the periphery of said cylinder at a point remote from said drive roll, a blanket passing over said guide rolls and about a portion of the periphery of said cylinder, means for introducing a developing gas into said casing, means for introducing light sensitive material into said casing and between the blanket and cylinder, a second casing communicating with said first casing, a plurality of guide rolls in said second casing, a plurality of conveyors traveling about said guide rolls in said second casing and adapted to travel together from the discharge of the cylinder and belt in the first casing to a remote discharge point, in the second casing, and a drive connection from one of said guide rolls in the second casing to one of the guide rolls in the first casing.

In witness whereof, I have hereunto subscribed my name.

ADOLPH LANGSNER.

8

CERTIFICATE OF CORRECTION.

Patent No. 1,804,793. Granted May 12, 1931, to

ADOLPH LANGSNER.

It is hereby certified that the name of the assignee in the above numbered patent should have been written and printed as "Eugene Dietzgen Company", instead of "Eugene Dietzgin Company", as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of July, A. D. 1931.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)