

No. 878,651.

PATENTED FEB. 11, 1908.

G. W. MASCORD.
PRINTING MACHINE.

APPLICATION FILED NOV. 7, 1903.

8 SHEETS—SHEET 1.

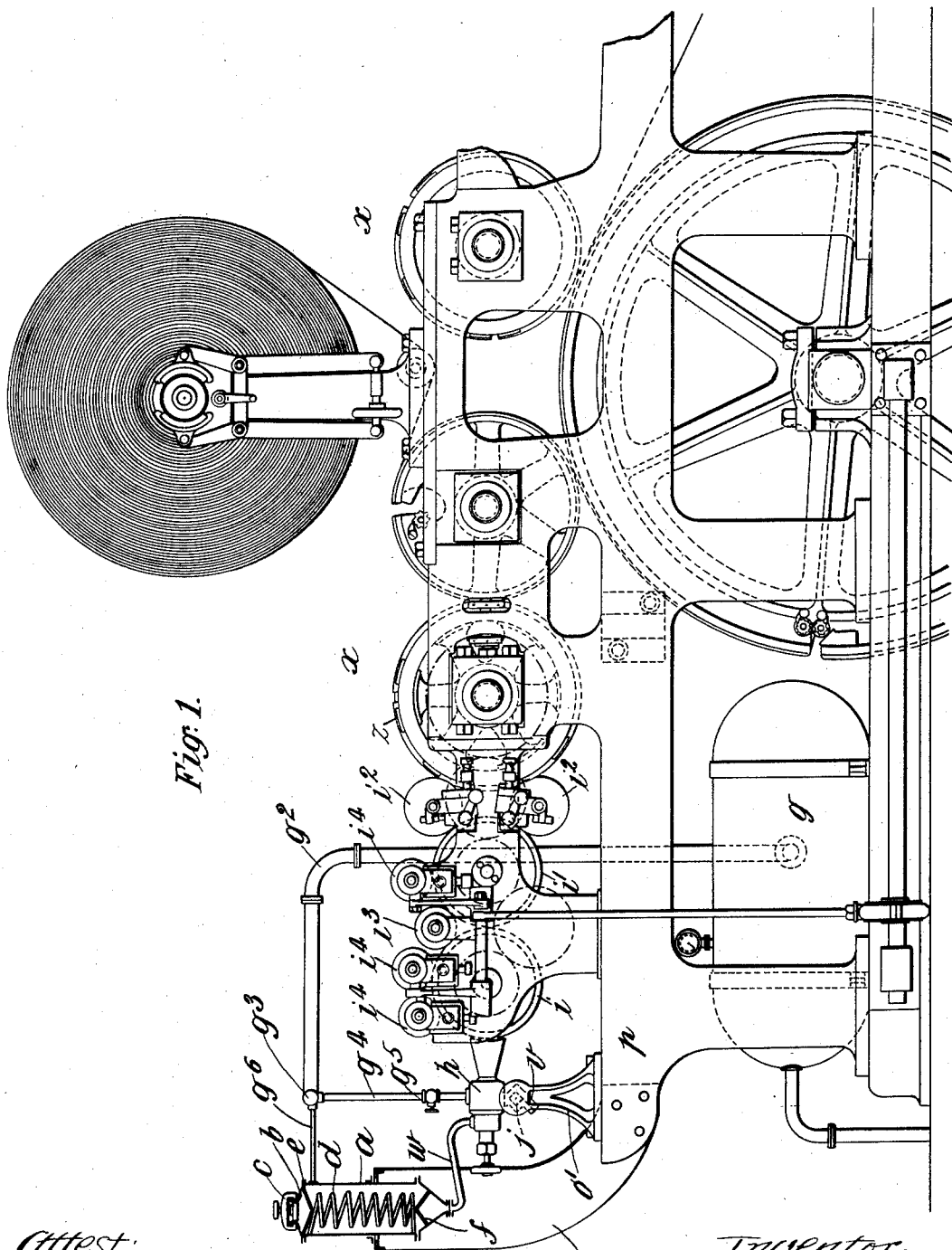


Fig. 1.

Attest:
Commaector
Edward Sartor

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George W. Mascord.
By *Swiss Gear Company*
Attest

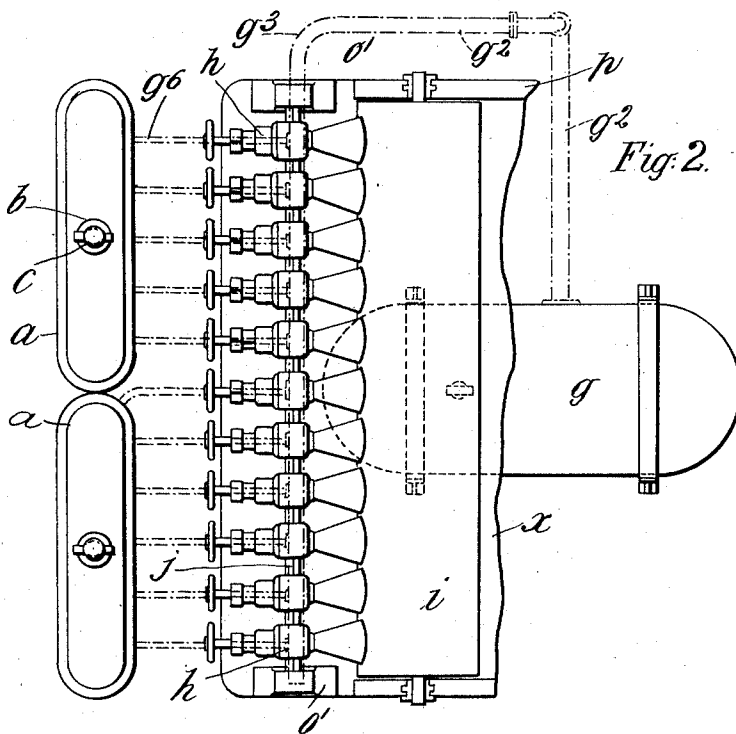
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8 SHEETS—SHEET 2.



Attest:

Chas. M. Mason

Edward Sartor

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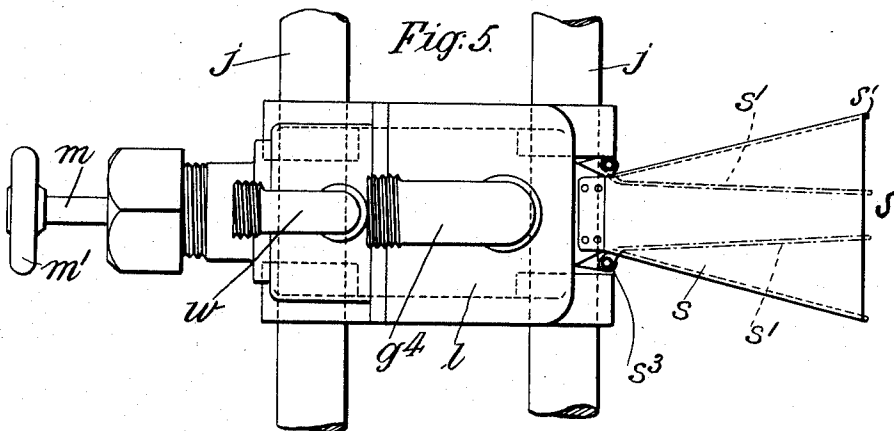
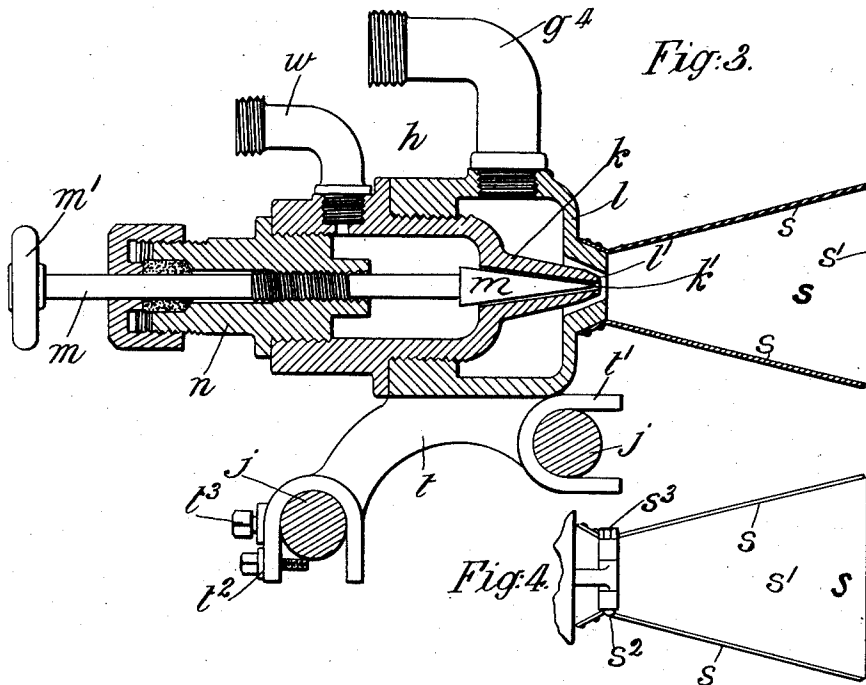
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8 SHEETS—SHEET 3.



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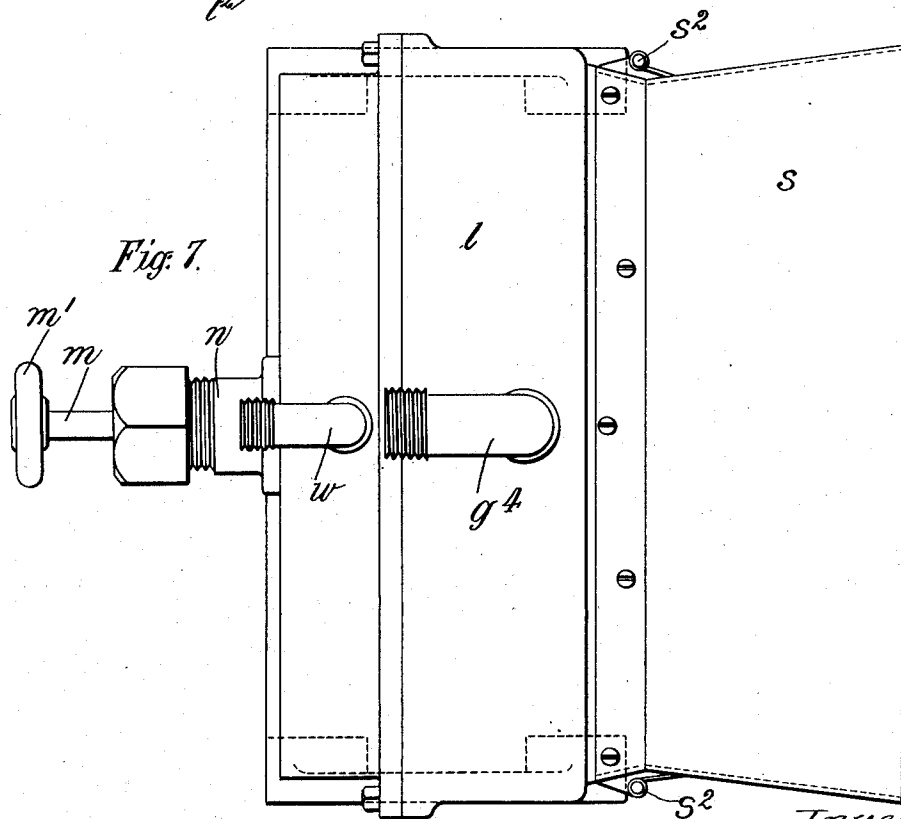
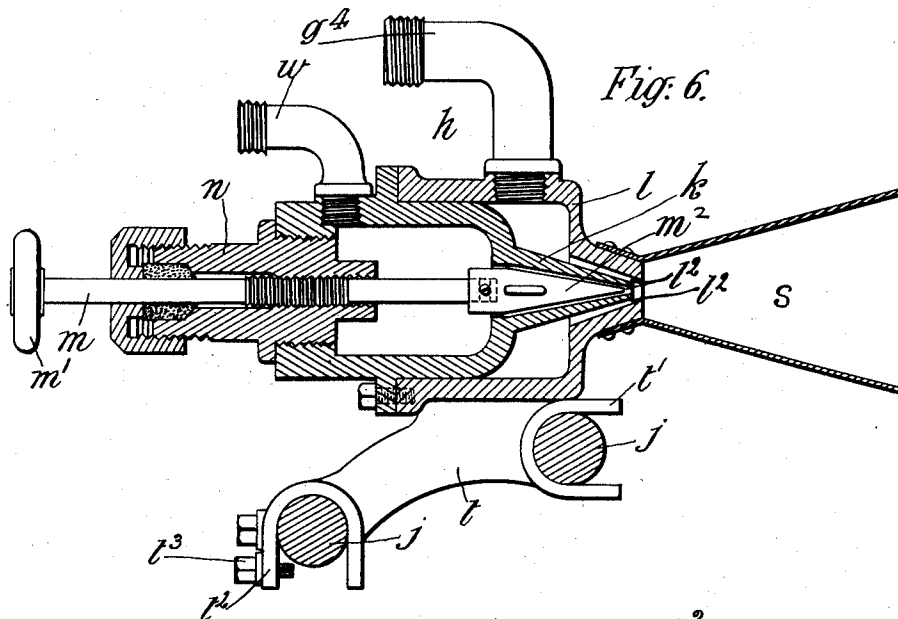
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8 SHEETS—SHEET 4.



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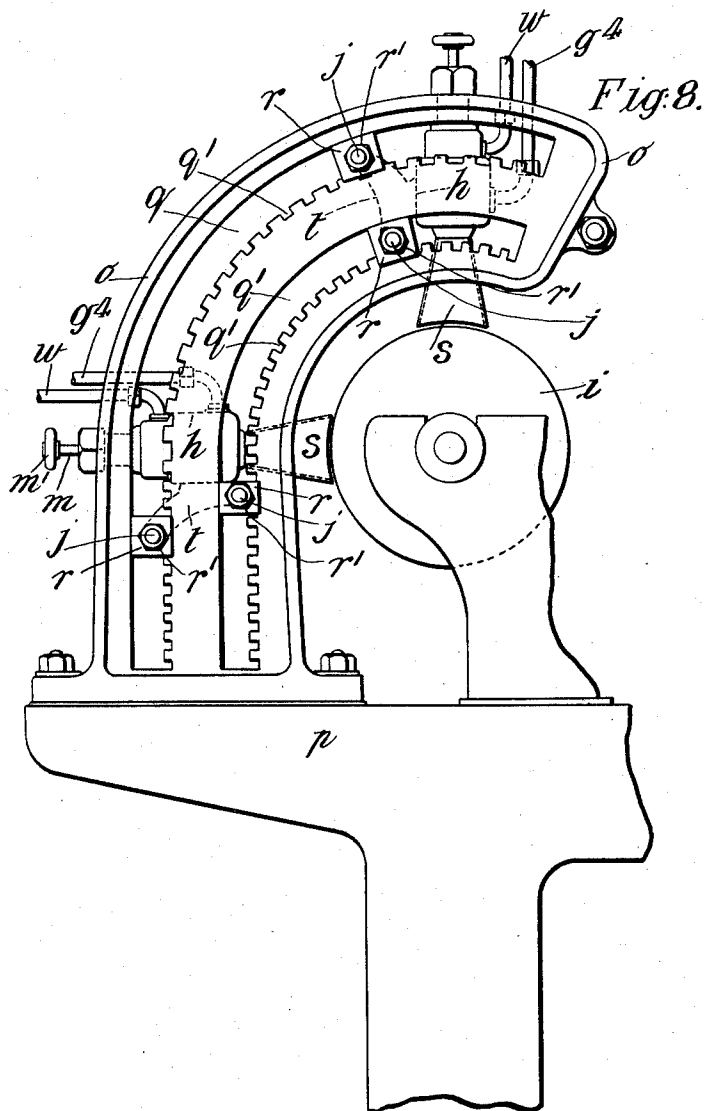
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APPLICATION FILED NOV. 7, 1903.

8 SHEETS—SHEET 5.



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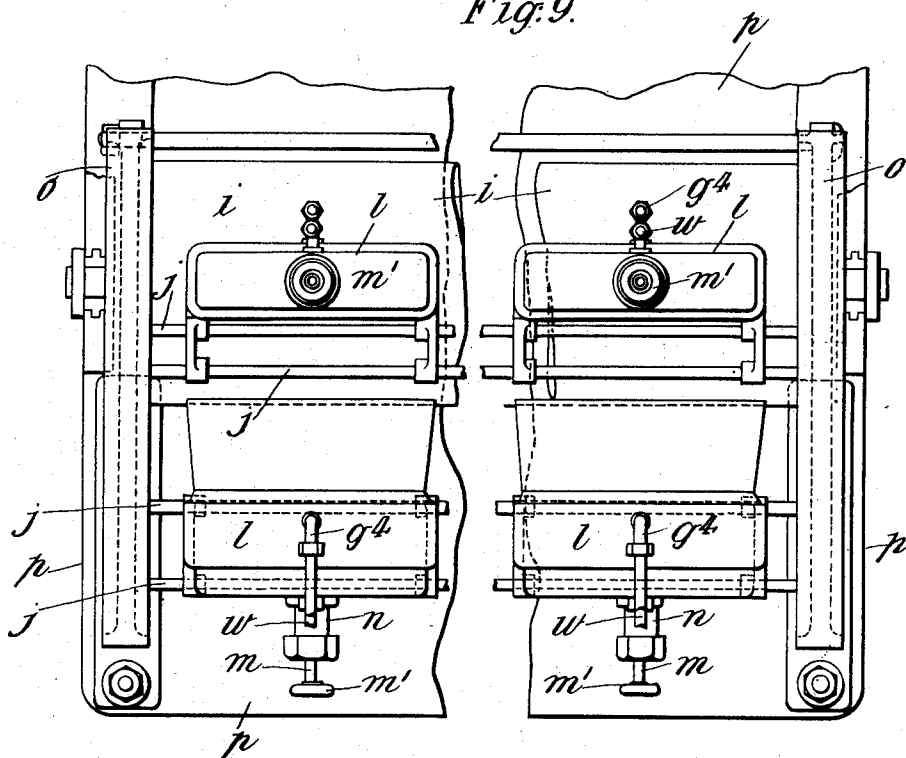
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Fig. 9.



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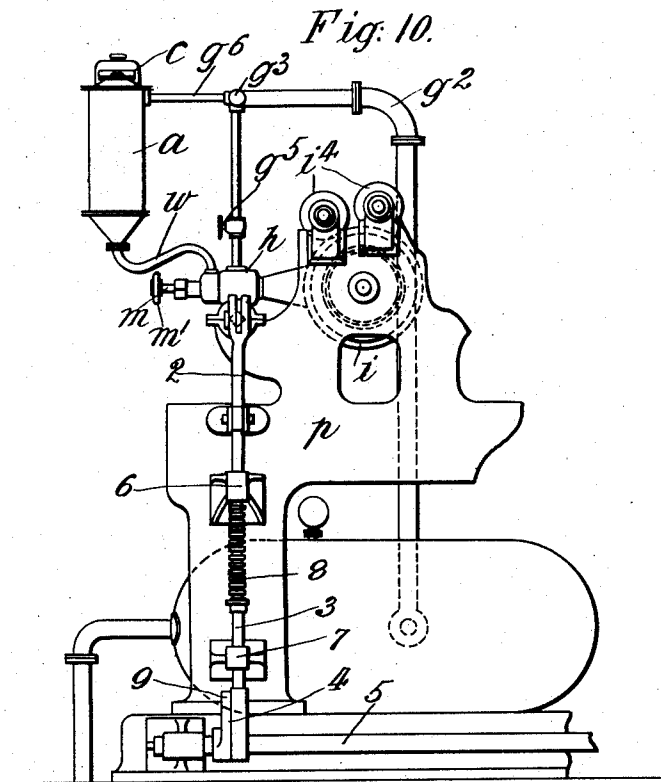
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APPLICATION FILED NOV. 7, 1903.

8 SHEETS—SHEET 7.



Attest:
C. Middleton
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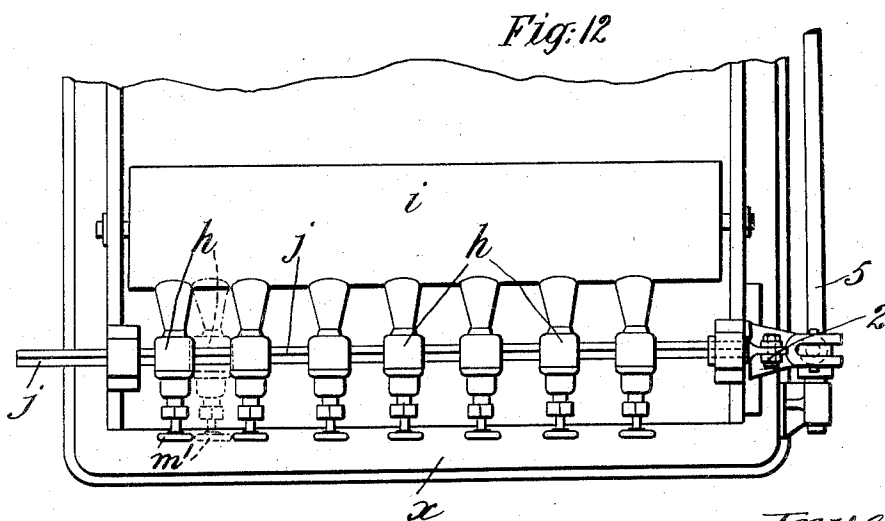
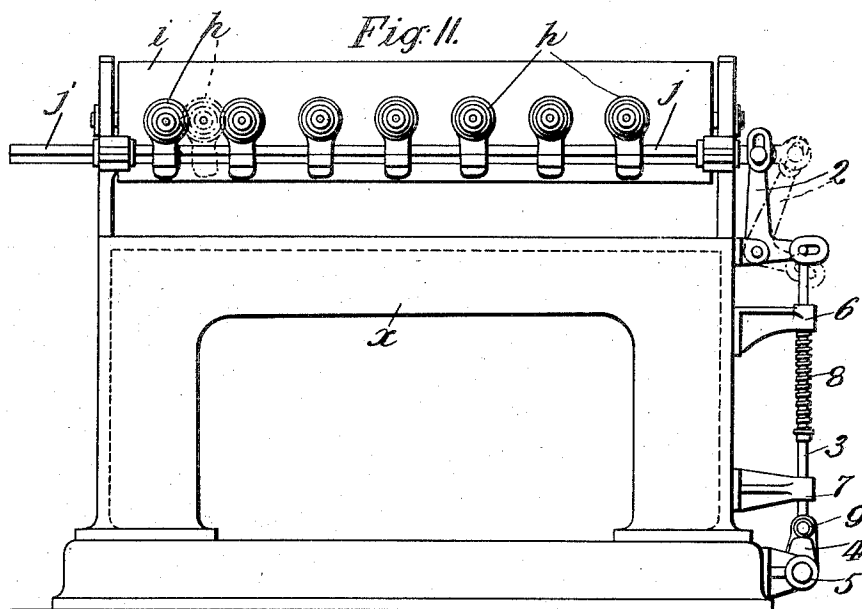
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8 SHEETS—SHEET 8.



Attest:
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UNITED STATES PATENT OFFICE.

GEORGE WILLIAM MASCORD, OF LONDON, ENGLAND.

PRINTING-MACHINE.

No. 878,651.

Specification of Letters Patent.

Patented Feb. 11, 1908.

Application filed November 7, 1903. Serial No. 180,259.

To all whom it may concern:

Be it known that I, GEORGE WILLIAM MASCORD, a subject of the King of Great Britain and Ireland, residing at 5 The Crescent, Church Road, Barnes, London, S. W., England, have invented certain new and useful Improvements in and Relating to Printing-Machines, of which the following is a specification.

This invention relates to printing machines, and while of general application to letter-press, lithographic, and other printing presses, has special reference to printing machines of the rotary type wherein an endless web or roll of paper or other material is operated upon.

In the inking mechanism of rotary printing machines, as usually provided, the distribution of ink is necessarily imperfect, by reason of the fact that the conveyance of ink from the duct by the ductor roller does not usually take place more than once at least in every three revolutions of the machine, as the resulting impact and vibration even at that speed causes excessive and rapid wear and tear of the composition ductor roller employed, and it is impossible wholly to eradicate this defect or to produce a perfect distribution by the employment of additional distributing rollers. Furthermore, fluff and other foreign matter is carried back to the ink duct by the ductor roller and there accumulates and contaminates the ink so that imperfect printing results, while the duct as a consequence requires periodic cleansing and thereby considerable waste of time and of material is occasioned.

The invention has for its object to overcome these and other disadvantages attendant upon inking apparatus as usually employed, and to provide means for insuring uniformity in the supply and distribution of ink, so that the quantity of ink or color supplied and distributed may be regulated with the greatest exactness.

According to the invention, the ink or color of whatever kind desired to be used on any particular machine is contained within a closed receptacle, ink duct, or fountain, being thus out of contact with free air so that oxidation and pollution is to a great extent avoided. From this receptacle it is ejected and sprayed on to a distributing cylinder or surface whence the ink or color is further conveyed to the actual printing surface by suitable means. The ejector or spraying device is of any particular form according to

requirements, where black ink or one color alone is to be used a single ejector or spraying device with a plurality of ejector orifices may be used of a total width corresponding to that of the inking cylinder, while as for example in multicolor presses a number of separate spraying devices may be employed in horizontal or vertical series, or in both horizontal and vertical series, with means for lateral or vertical adjustment, so that the particular ink or colors required may be sprayed on to the cylinder and associated or blended together to the extent and in the manner that may be required for the particular work to be done. The ink or color as well as the pressure of air or other medium that may be employed for spraying the ink or color, may be capable of regulation as required. Furthermore, according to the invention, a governor may be employed for the purpose of quickly cutting off the supply of color or spray to the cylinder as the speed of the press is varied, or as it is stopped, or started, or generally, the regulating or cut off apparatus may be arranged to work from and in connection with the starting lever or device of the electrical or other motor controller used for driving the machine. By such an arrangement a continuous supply and uniform distribution of ink or color is attained to an extent that may be capable of regulation with exactness, while moreover, the ink or color is not appreciably exposed to the atmosphere, and the disadvantages attendant upon ordinary method of inking common to the inking apparatus generally employed are thereby obviated.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a general elevation of a web printing machine to which the invention is shown as applied. Fig. 2 is a part plan corresponding to Fig. 1. Figs. 3 and 5 are respectively sectional elevation and plan of one of the spraying devices such as employed in the construction illustrated in Figs. 1 and 2, but in this case the respective spraying devices are shown mounted upon two longitudinal rods disposed parallel to the inking cylinder, as shown in the arrangement of a modified form illustrated in Figs. 8 and 9. Fig. 4 is a detailed elevation of the spraying funnel illustrated in Figs. 3 and 5. Figs. 6 and 7 illustrate in sectional elevation and plan respectively, a modified form of spraying device designed for use where only one,

two, or other small number of spraying devices are employed. Figs. 8 and 9 illustrate a detailed side elevation and plan respectively of an arrangement in which a series of two or more spraying devices are employed which are capable of fixture in any angular position as may be required. Figs. 10, 11, and 12, illustrate in side elevation end elevation, and plan respectively, a modified arrangement in which the spraying devices are given a lateral movement, so that their number may be minimized.

In carrying the invention into effect in its application to a rotary press as illustrated in Figs. 1 to 12, I may provide upon the press or machine, or in a position adjacent thereto a closed receptacle, ink duct or fountain *a* for containing the ink or color, the said receptacle being provided with a suitable inlet *b* for filling, and being provided with a cover *c* by which it may be tightly closed, in order that air under pressure may be employed to force out the ink or color as required. The said receptacle *a* may be conveniently connected by piping to a main reservoir or source of ink or color supply, communication between which may be regulated by a plug cock or other suitable means. The closed receptacle duct or fountain *a* may be provided with means such as an internal coil *d* through which water or hot air may be circulated for warming the ink or color or for maintaining it at a uniform temperature.

For the purposes of the present invention it is of the greatest importance that the ink supply shall be entirely free from solid particles which might settle in the spraying orifices and thus prevent the uniform spraying of the ink or color. For this object the closed receptacle, duct or fountain *a* is provided with strainers *e* at the top through which the ink on introduction passes; as well as with strainers *f* over the outlet advantageously of finer mesh than the former, so that thus the passage of any solid particles into the piping is absolutely precluded.

The air compressor and the reservoir *g* may be mounted in the press *x* so as to be driven from its counter shaft or from any other suitable part of the machine for the purpose of providing air under pressure for spraying the ink or color and for forcing the ink or color from the closed receptacle *a* aforesaid, into the spraying device or devices *h*; so that thus the air for spraying is forced, if required, with the same pressure as the ink or color; or instead, an independent motor and compressor may be provided for the purpose which may be common to a number of presses and to a number of ink or color supply receptacles, ducts, or fountains.

According to one method of carrying the invention into effect I connect up the air reservoir *g* to an air pipe mounted adjacent

and parallel to the inking cylinder, through which air pipe a number of branches issue according to the number of independent ejectors or spraying devices that are employed. These ejectors or spraying devices are thus, according to this arrangement, provided in horizontal series but they may also be in some circumstances as desired, arranged in vertical series as in the arrangement hereinafter described.

Instead of providing a common air pipe, a rod *j* a number of rods, or a slide bed may be arranged adjacent and parallel to the inking cylinder *i* upon which rod, rods or slide bed, the respective spraying devices *h* may be capable of lateral adjustment and sliding movement; and if necessary an intermittent or continuous lateral sliding or vibrating movement may be communicated to them, as hereinafter more particularly described with reference to Figs. 10 to 12; and means in addition may be provided for the vertical adjustment of each of such spraying devices *h* as hereinafter more particularly described with reference to Figs. 8 and 9.

The air supply to the spraying nozzles may be capable of regulation by such means as a plug cock or valve having a hand wheel or toothed segment mounted upon its outer extremity, which is operated by means of a toothed rod whose longitudinal movement is effected by means of a hand wheel, thumb screw, or other means either automatically or by hand. The spraying nozzle for the air is surrounded by a casing with an orifice in which said nozzle is approximately centrally set or adjusted and into which the ink or color passes under pressure and is atomized by the efflux of air, and is thus sprayed outwardly on to the cylinder or distributing surface, which is arranged in front of the nozzle. Such nozzle or orifice may also have an additional casing or jacket into which steam or hot air is introduced for softening or liquefying the ink or coloring matter if such is too thick or viscous owing to climatic conditions or other causes.

The ink or color may be conveyed or carried from the closed receptacle, duct, or fountain *a* by suitable piping to a tube which may be horizontally arranged adjacent to and parallel with the inking cylinder from which it passes to the spraying device, or instead the ink may pass direct from the receptacle into the spraying device under control of a cock.

I may dispense with the continuous air and ink or color pipes along the length of the ink distributing cylinder *i* and I may provide a series of nozzles such as *k* (Figs. 3 to 5) within a casing *l* through which nozzle the ink or color passes, being introduced through supply tubes *w*, and issues out through a conical or tapered orifice *k'* in which a conical or tapering valve spindle *m* is provided which

is carried within a plug *n* screwed at the rear of the nozzle *k*, so that on the turning of the valve spindle *m* by means of a hand wheel *m'* provided upon its rearwardly projecting extremity, any desired adjustment of the orifice may be effected. The air may be introduced within the casing *l* which surrounds the ink or color casing or nozzle *k* of the spraying device, and this casing or nozzle *k* may be screwed to the main casing *l* or otherwise mounted thereon, and the latter may be provided with a mouth *l'* leaving an annular space around the nozzle *k* through which the air may pass, so that the ink or color passes through this annular space and is sprayed out.

The spraying devices *h* may be mounted upon two rods *j j* (Figs. 3 and 5, 6 and 7, and 8 and 9) which in turn may be carried in brackets *o* secured to each of the side frames *p* of the press (Figs. 8 and 9). These brackets *o* may be so provided as to permit of the vertical adjustment of each of the carrying rods *j j* so that the spraying devices *h* may be adjusted into any vertical position or into any angular position corresponding to it. For example, the respective side brackets *o* may be provided with slots *q* (Figs. 8 and 9) having a series of recesses *q'* on each side into which carrying plates *r* provided with corresponding bosses or projections may be fitted according to the relative vertical position of the rods *j*. The carrying rods *j* are supported by the carrying plates *r*, and nuts *r'* may be screwed upon the extremities of the rods *j* when the respective carrying plates *r* have been fitted into any particular position as required.

It will thus be understood that a number of spraying devices *h* may be so disposed as illustrated in Figs. 8 and 9 to direct the spray radially in relation to the ink distributing cylinder *i*.

Upon the respective spraying devices *h*, a trumpet shaped mouth *S* (Figs. 3 to 5) is provided which is preferably formed of an upper and a lower spring plate *s s* with lateral hinging sides *s' s'* upon the edges of which the upper and lower spring plates *s s* bear, so that as the respective sides *s' s'* are brought into any particular angular position as required, to reduce or to increase the area of the spray, the upper and lower spring plates *s s* will always bear closely upon the edges of the said side plates and prevent the escape or leakage of the spray. The side plates *s' s'* aforesaid are hinged upon a bolt *s²* (Fig. 4), which is provided with nut *s³* by means of which they may be secured in the particular position in which they are adjusted by contact therewith of the spring plates *s s*.

Instead of arranging two rods *j* for carrying the spraying devices *h*, as illustrated in Figs. 3—9, I may employ only one which may advantageously be formed of a substan-

tially square or other irregular section as illustrated in Figs. 1 and 2, and the casing of the spraying devices may be provided with a clipping bracket *v* by means of which they may be firmly fixed in any lateral position in which they may be adjusted upon the said rod. Such an arrangement is advantageous especially where a lateral movement may be required to be given to the spraying devices.

The rods *j* may be mounted upon brackets *o'* (Figs. 1 and 2), which may be capable of adjustment within a **V** or **D** groove suitably provided upon the machine frame, and where two rods such as *j* are employed, as in the construction illustrated in Figs. 8 and 9 the brackets *t* by means of which the spraying devices *h* are carried upon the rods, may at one end *t²* (Figs. 3 and 6), be provided with a fork opening downwardly and a stop pin or pins *t³*; and at the opposite end *t¹* with a fork opening laterally, so that thus any of the spraying devices *h* may be readily taken from their position on the rods *j* for cleaning or repair.

Instead of providing a number of spraying devices *h* in horizontal series in the manner as hereinbefore described, and as illustrated in Figs. 1 and 2 and 3 to 5, one or two sprayers only, may be employed as illustrated in Figs. 6 and 7, and 8 and 9, through which the spray is ejected for the whole length or for half or other portion of the length of the ink distributing cylinder *i*. In such a case the spraying device would consist of a casing *l* as illustrated in Figs. 6 to 9 into which the ink passes as hereinbefore described, and instead of a conical valve spindle *m* (Fig. 3), a taper valve plate *m²* of a width corresponding to that of the casing may be provided, while similarly the casing *l* into which the air passes is of a corresponding length, and forms with the nozzle *k* through which the ink or color passes, two mouths *l²* through which the air under pressure passes. It will thus be understood that such an arrangement is substantially the same as where a number of spraying devices are employed.

Air under pressure is taken from the reservoir or receiver *g* through the pipe *g²* (Figs. 1 and 2) into a pipe *g³* arranged above and parallel to the distributing cylinder *i*, through which air under pressure passes to the respective spraying devices *h* by means of separate tubes *g⁴* which are provided with valve cocks *g⁵* for the regulation of the supply. Tubes *g⁶* of relatively small diameter, connect the longitudinally disposed tube *g³* with the upper part of the receptacle *a*, so that the pressure within the said receptacle will be the same as that in the receiver.

The receptacles *a* may be mounted in a supporting bracket *y* in the manner illustrated in Fig. 1.

The ink may be further distributed and ap-

plied upon the type cylinder or cylinders in such manner as is usual in printing presses, for example as illustrated in Fig. 1. The ink may be carried from the distributing cylinder *i* upon which it is sprayed by the spraying devices *h*, to the inking cylinder *i'* through the inking roller *i''*, and from the distributing roller *i'* to the type cylinder *z* by the rollers *i'''*; laterally reciprocating rollers *i''''* being provided upon the respective distributing rollers and operated in any suitable well known manner such as that illustrated in Fig. 1.

According to the modification illustrated in Figs. 10 to 12, means are provided for reciprocating the spraying devices *h* so that their number may be minimized, and for the purpose the single rod *j* which is advantageously of square section is connected to a bell crank lever 2, whose opposite extremity 20 is connected to a rod 3 which rides upon a cam 4 mounted upon the shaft 5 whose rotation is effected through the gear of the press. The rod 3 is guided in brackets 6 and 7 and has a spiral spring 8 applied upon it by means of which the roller 9, carried upon its lower forked extremity is always held in contact with the cam 4 and so as thus to return the rod *j* to its position to the right (by reference to Fig. 11) after it has been forced to the left by the operation of the cam 4. The furthest position to the left is indicated in Figs. 11 and 12, in full lines, by the representation of the spraying devices *h*, while the furthest position to the right is indicated in the same figure by the representation of the spraying devices and the bell crank lever 2 in dotted lines. By such means one half the number of spraying devices that otherwise would be employed is required.

Apparatus provided according to the invention may be provided in units in which the receptacle for the ink or color and the spraying device are integrally provided and capable of being placed or adjusted in any particular place or position, for instance upon horizontal rods adjacent and parallel to the cylinder or to the web. A number of such units may be used for applying ink to one distributing cylinder, or at one point in the course of the web and the air supply may be conveniently provided for each unit by means of a flexible connection with a common main pipe leading from the main reservoir as also the ink or color receptacle.

Ordinarily it is preferred to employ flexible piping between the air reservoir and the ink or color receptacle and the spraying devices, so that the latter may be conveniently and readily removed as required.

The invention is not limited to the specific constructions which are hereinbefore specified, as these may be substantially modified without departing from the essential features of the invention as hereinbefore de-

finied. For example, any suitable means may be provided for the regulation of the ink supply and the air supply independently, which means may be convenient of operation by the operator attending the machine, or means may be provided for simultaneously varying the pressure of air and the quantity of ink or color passed. Similarly, instead of the inking apparatus being arranged in front of or in the rear of the inking cylinder, or distributing surface the inking apparatus may be carried immediately above the same, or beneath it, as may be desirable in particular cases.

It will be understood that speed gear may be employed for effecting the movement of the shields and sprayers at various speeds according to requirements. It will be furthermore understood that pressure within the closed ink or color receptacle may be varied as required as also may the pressure for the spraying.

The one apparatus may be employed both for spraying ink on the distributing cylinder and upon the web, separate spraying devices being however employed.

Where several sets of apparatus are employed piping connections may be provided so that ink from one set of apparatus may be formed to the sprayers of the web.

The shields may be of any shape with perforations or not as in particular cases may be required.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a printing press an inking roller journaled in stationary bearings, a plurality of spray nozzles located in proximity to said roller, a closed ink containing tank having pipe connections to said nozzles, and means for applying air pressure upon the ink within the tank, substantially as described.

2. In a printing press, an inking roller, a plurality of spray nozzles located in proximity thereto, a closed ink containing tank having pipe connections to said nozzles, a heating coil in said tank for keeping the ink at the required degree of fluidity and means for creating fluid pressure in the tank to expel the ink therefrom, substantially as described.

3. In a printing press, an inking roller, standards in proximity to the ends of said roller, spray nozzle supporting means adjustably carried by said standards, a plurality of nozzles supported by said supporting means, a closed tank having pipe connections to said spray nozzles and means for producing air pressure within said tank, substantially as described.

4. In a printing press an inking roller, standards in proximity to the ends thereof, having portions concentric with the roller, horizontally disposed nozzle carrying means

adjustably carried by said standards, and means for supplying ink to said nozzles, substantially as described.

5 In a printing press, an inking roller, standards located in proximity to the ends thereof having portions concentric with the roller, horizontal rods having their ends adjustably supported by the standards, spray nozzles adjustably mounted on said rods, 10 and means for supplying ink to said nozzles, substantially as described.

6. In a printing press, an ink roller, an ink spraying device in proximity thereto comprising a flaring funnel and concentrically 15 arranged ink and air ejectors opening into said funnel, means for supplying ink under

pressure to said ink ejector and means for supplying air under pressure to said air ejector, substantially as described.

7. An ink spraying device for printing 20 machines comprising an ink ejector nozzle, having a controlling valve, an air casing surrounding said nozzle, and an expansible and contractible mouth carried by said casing, 25 substantially as described.

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

GEORGE WILLIAM MASCORD.

Witnesses:

WALTER J. SKERTEN,
WILLIAM EDWARD EVANS.