

A. VALENTIN, J. ZERREISS & H. GEORGES.
PRINTING MACHINE.

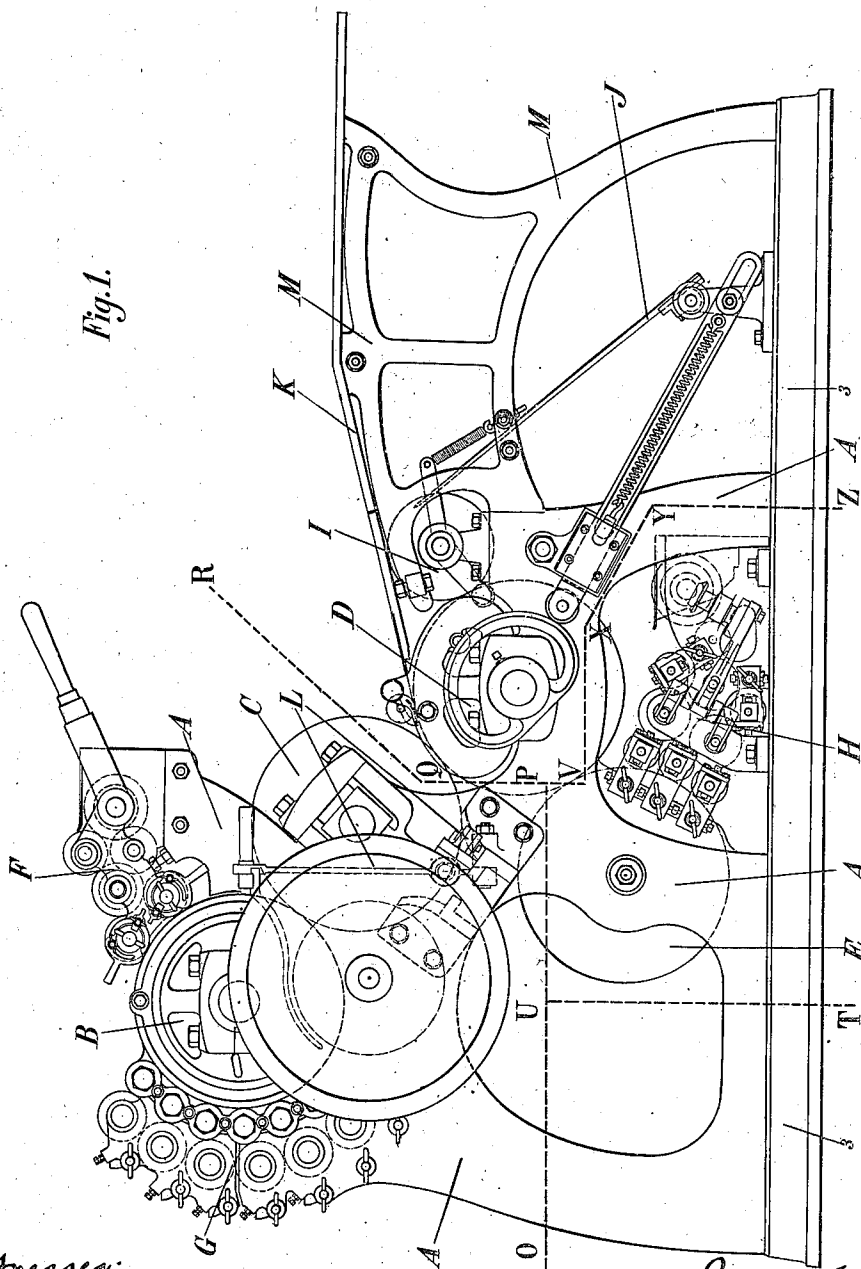
1,014,923.

APPLICATION FILED FEB. 24, 1910.

Patented Jan. 16, 1912.

14 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

L. Hayman.
J. Kasper.

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14 SHEETS—SHEET 2.

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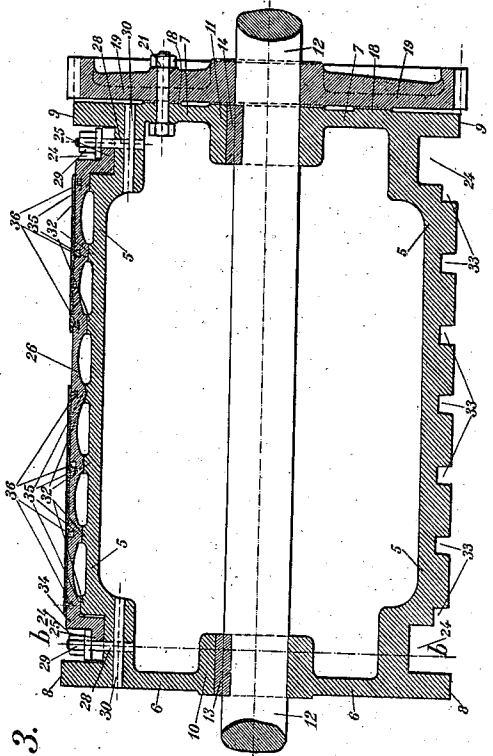


Fig. 3.

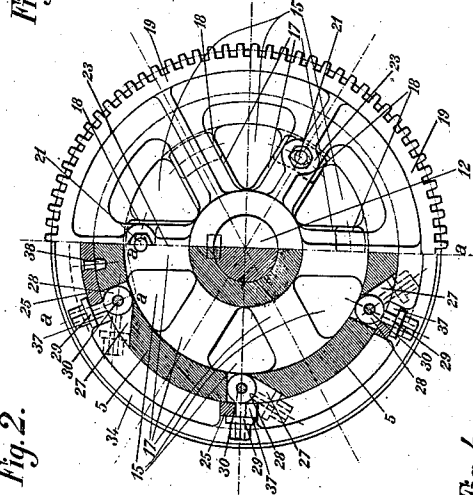


Fig. 2.

Witnesses:
H. Krayman.
F. Kasper.

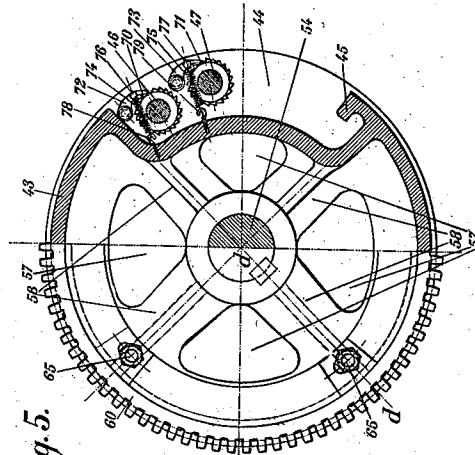


Fig. 5.

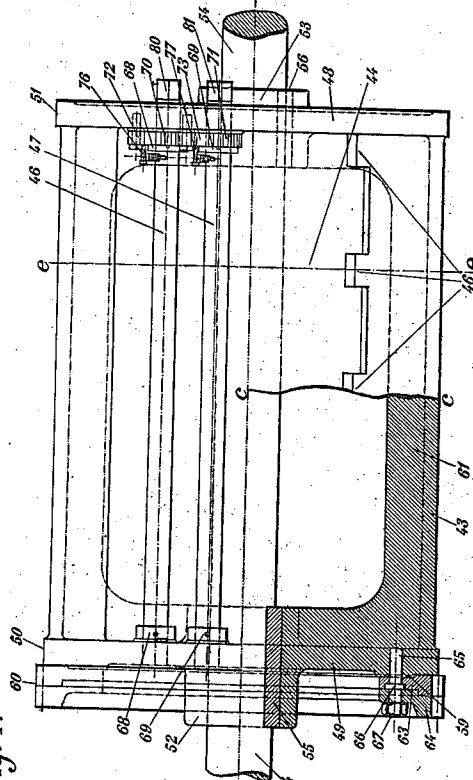


Fig. 4.

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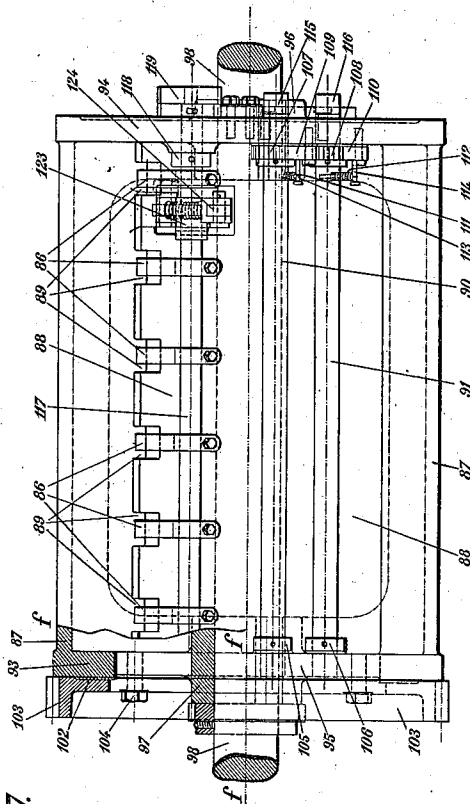


Fig. 7.

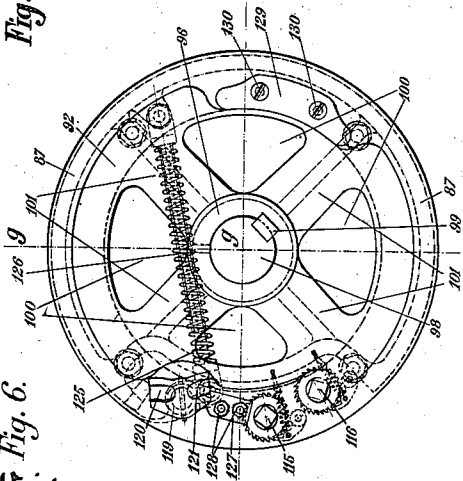


Fig. 6.

Witnesses:
G. Hayman.
F. Kasper.

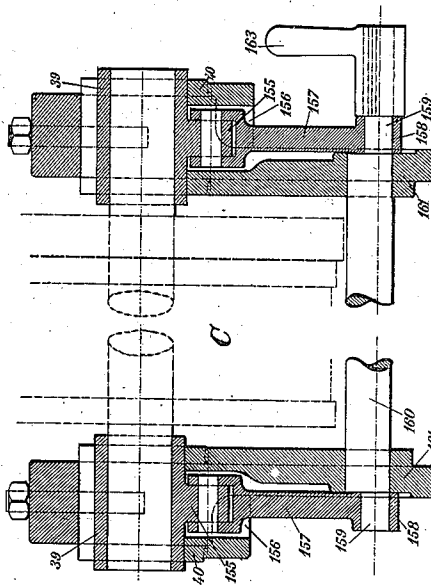


Fig. 9.

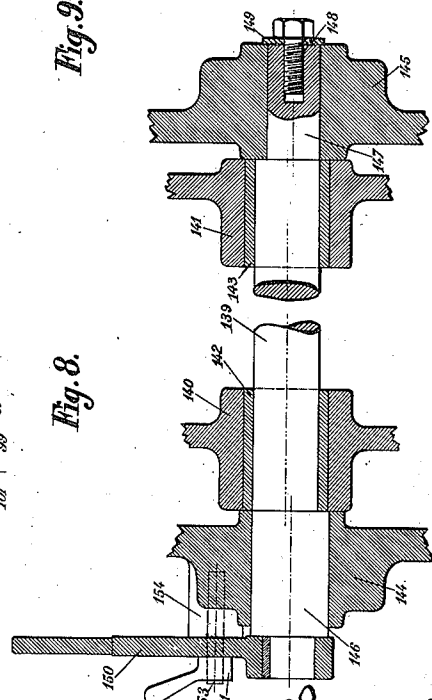


Fig. 8.

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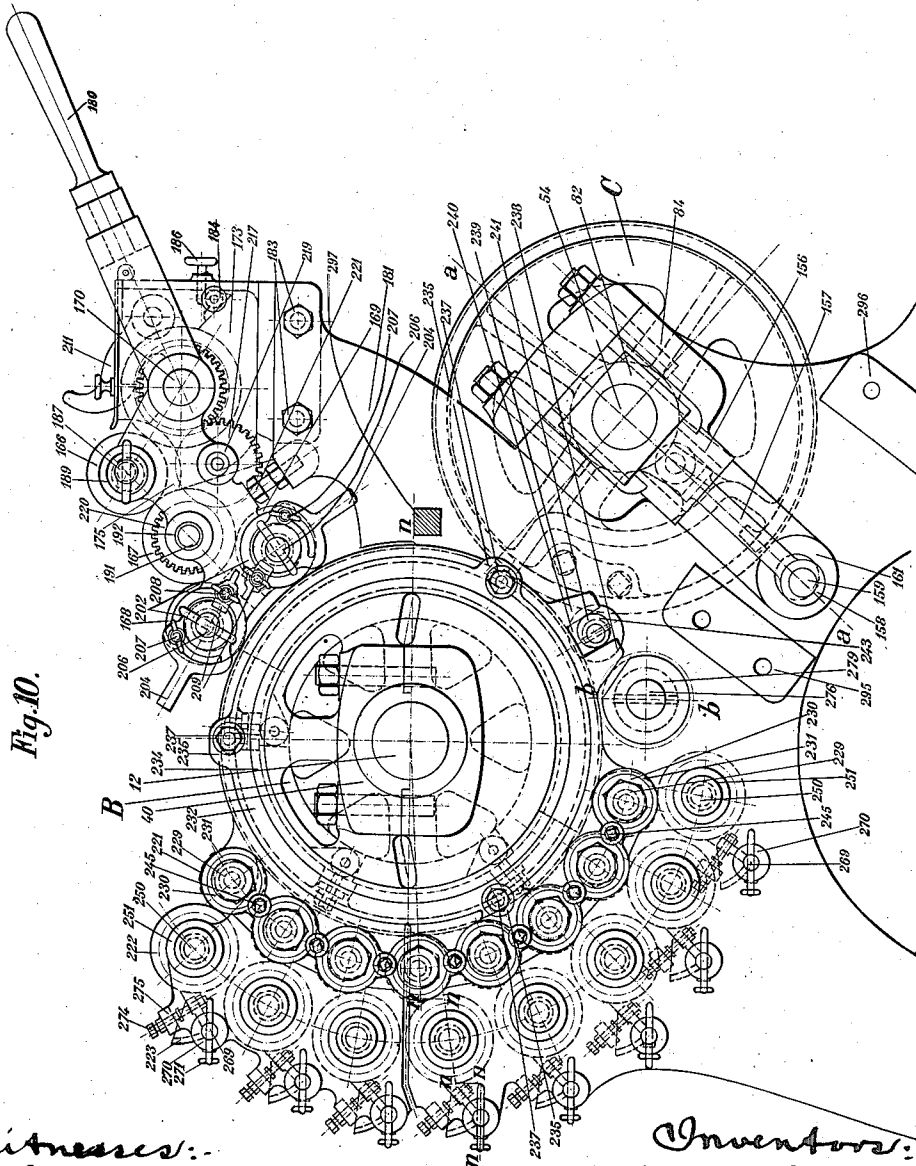


Fig. 10.

Witnesses:
H. Hayman.
F. Kasper.

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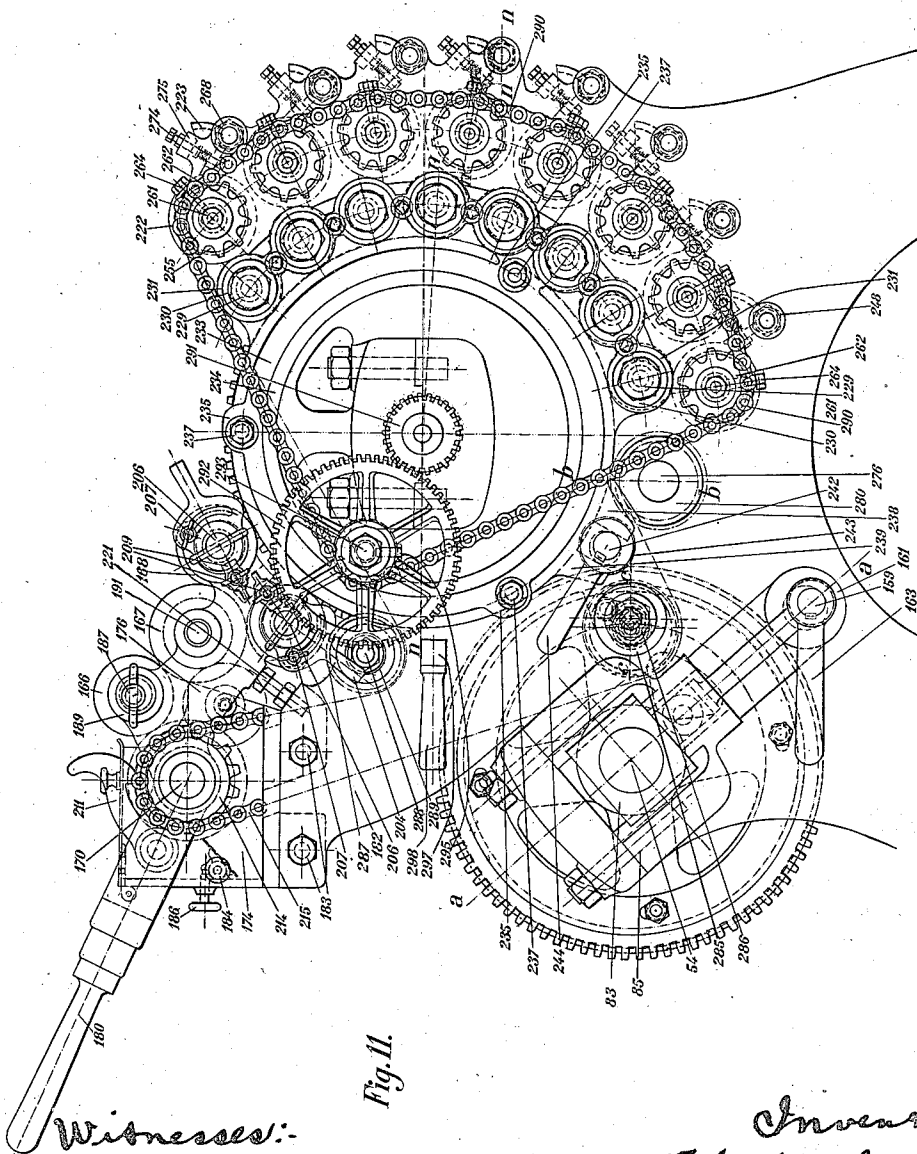


Fig. 11.

Witnesses:-

H. Hayman.
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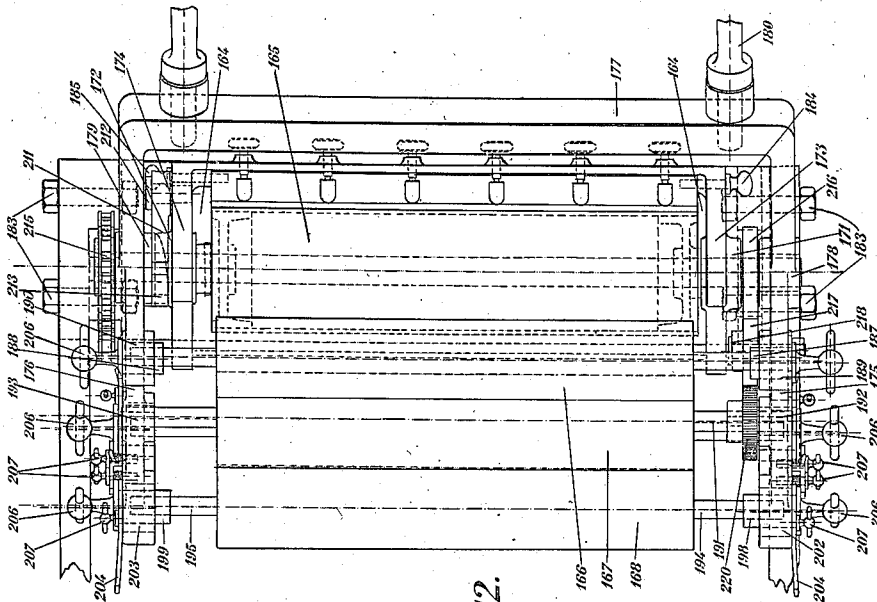


Fig. 12.

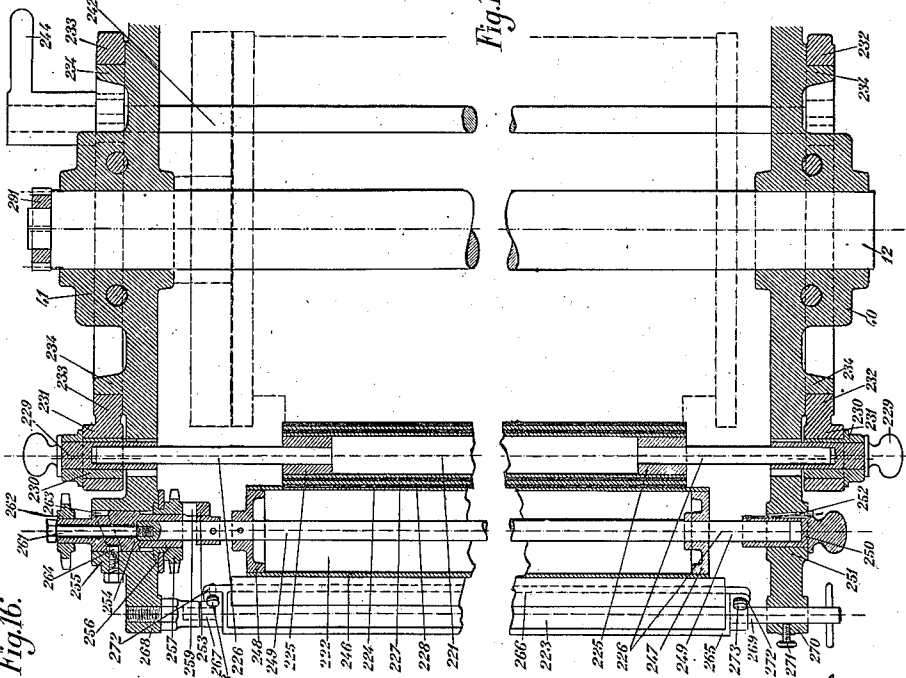


Fig. 16.

Witnesses:

G. Hayman.
F. Kasper

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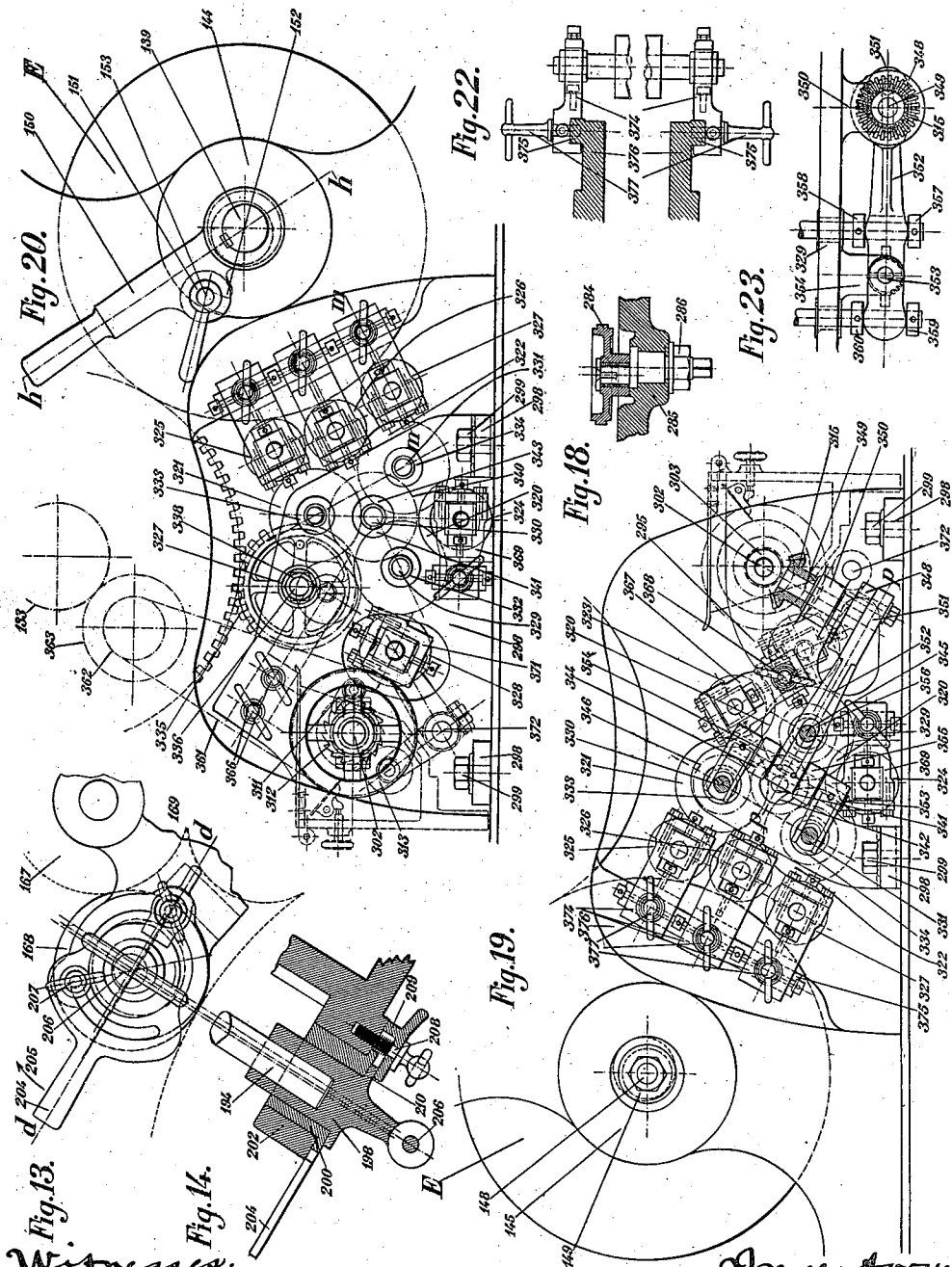
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14 SHEETS-SHEET 7.



Witnesses:
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APPLICATION FILED FEB. 24, 1910.

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14 SHEETS—SHEET 8.

1,014,923.

Fig. 17.

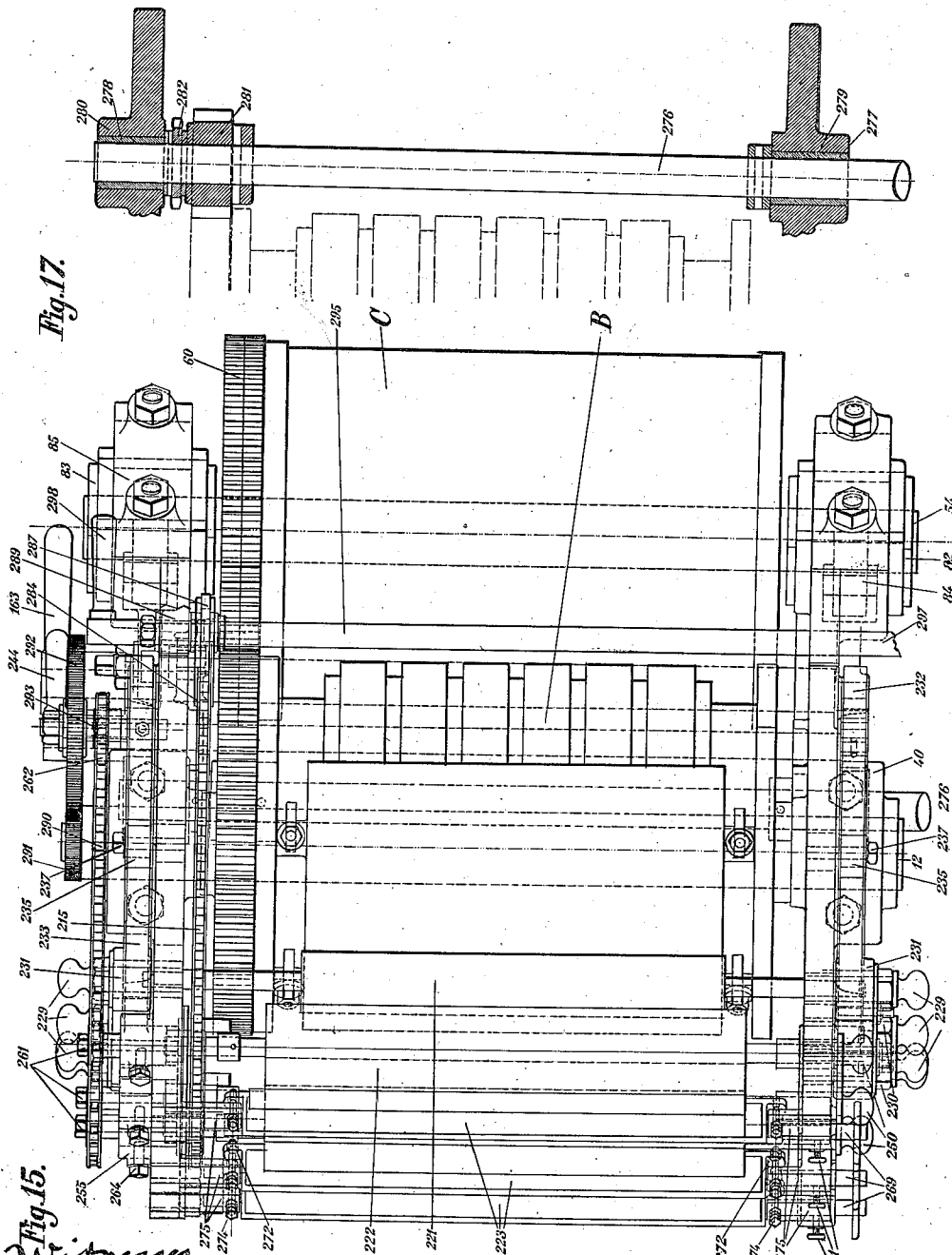


Fig. 15.

Witnesses
L. Hayman.
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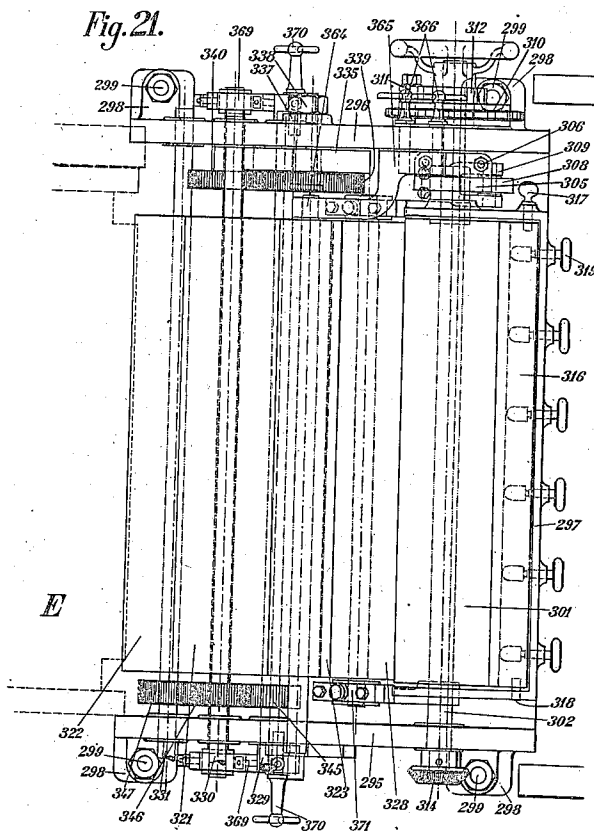
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Patented Jan. 16, 1912.

14 SHEETS—SHEET 9.



Witnesses:

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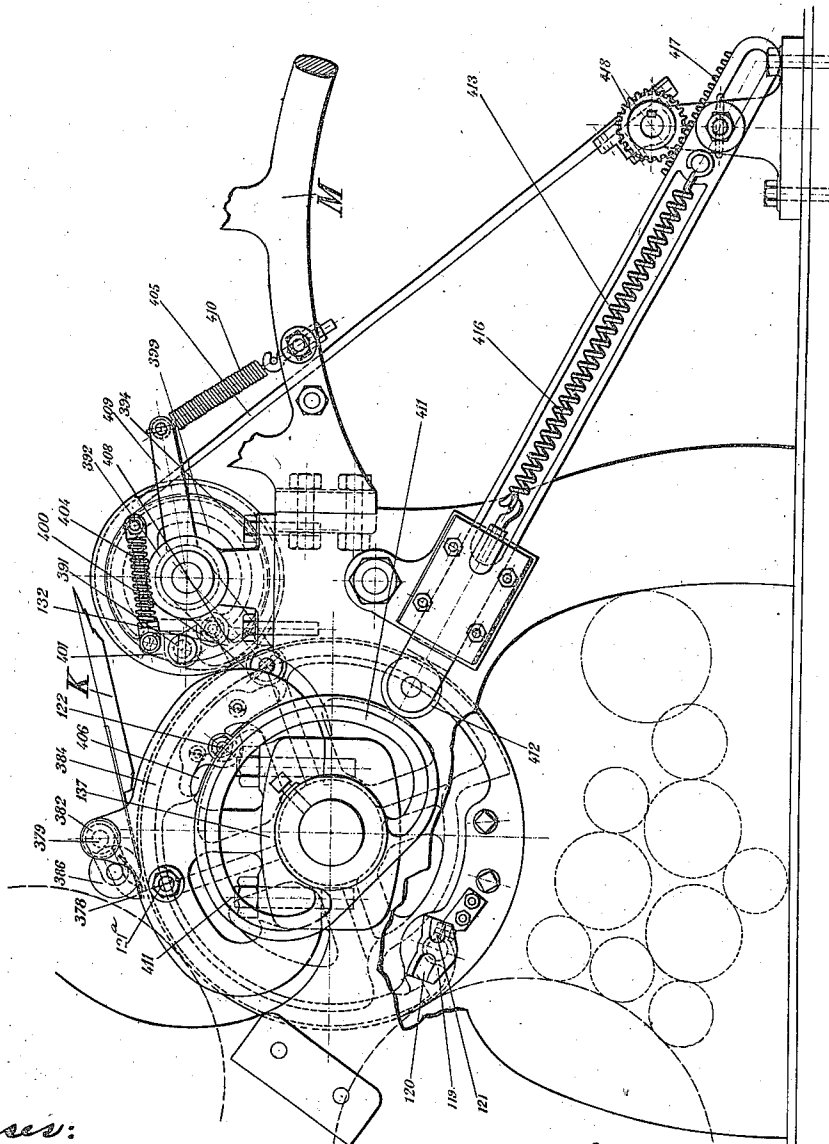
1,014,923.

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Patented Jan. 16, 1912.

14 SHEETS—SHEET 10.

Fig. 24.



Witnesses:

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APPLICATION FILED FEB. 24, 1910.

Patented Jan. 16, 1912.

14 SHEETS—SHEET 11.

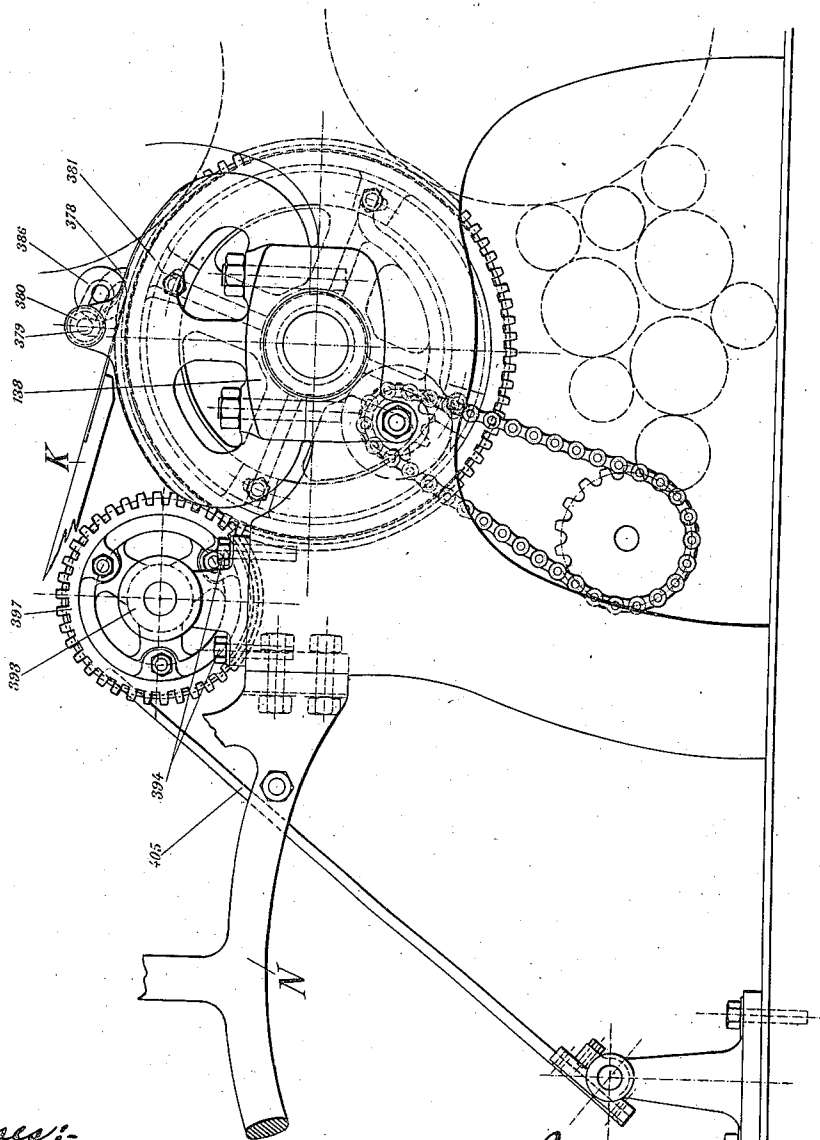


Fig. 25.

Witnesses:-

G. Heyman.
F. Kasper.

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PRINTING MACHINE.

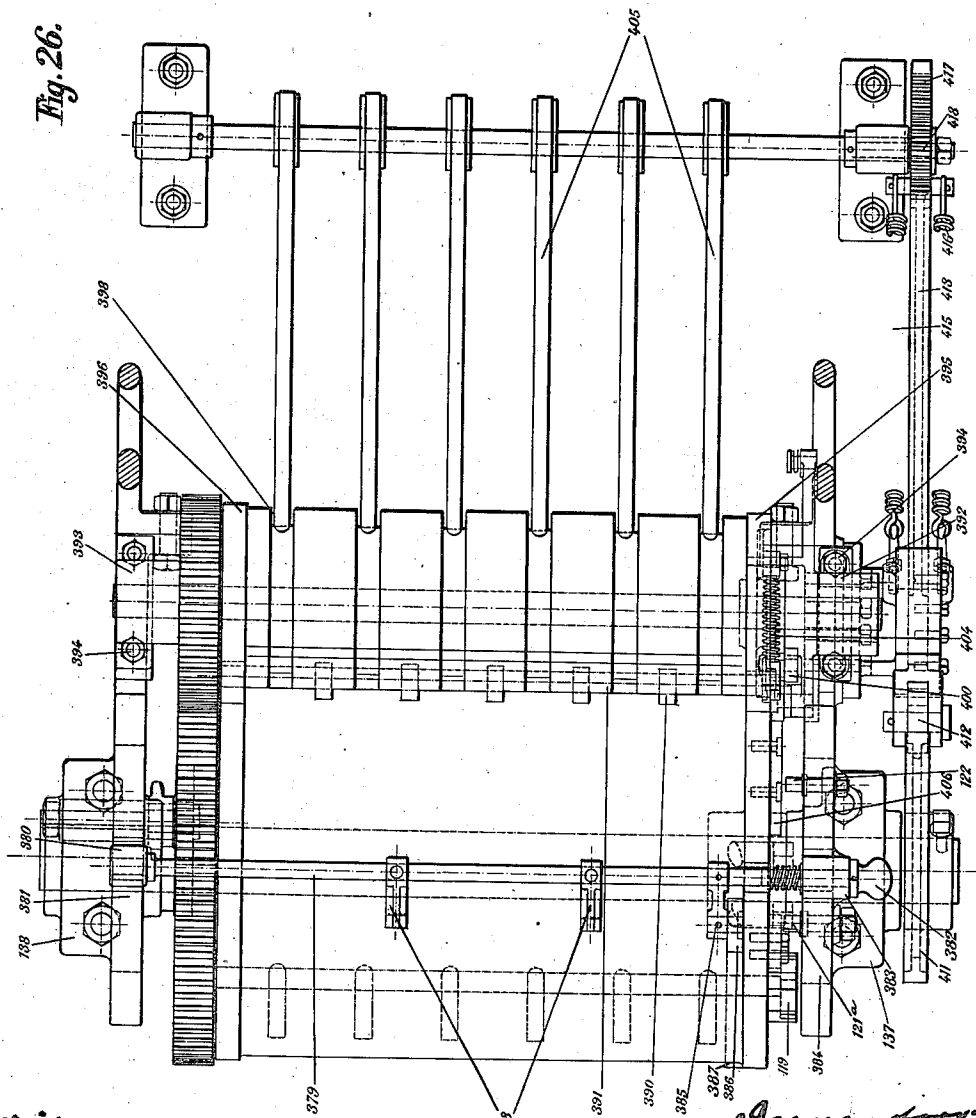
APPLICATION FILED FEB. 24, 1910.

1,014,923.

Patented Jan. 16, 1912.

14 SHEETS—SHEET 12.

Fig. 26.



Witnesses:-

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Fig. 27.

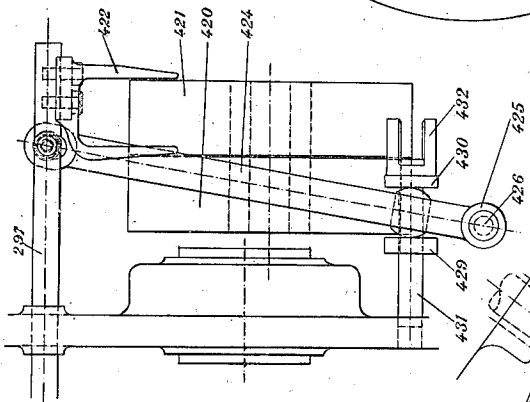
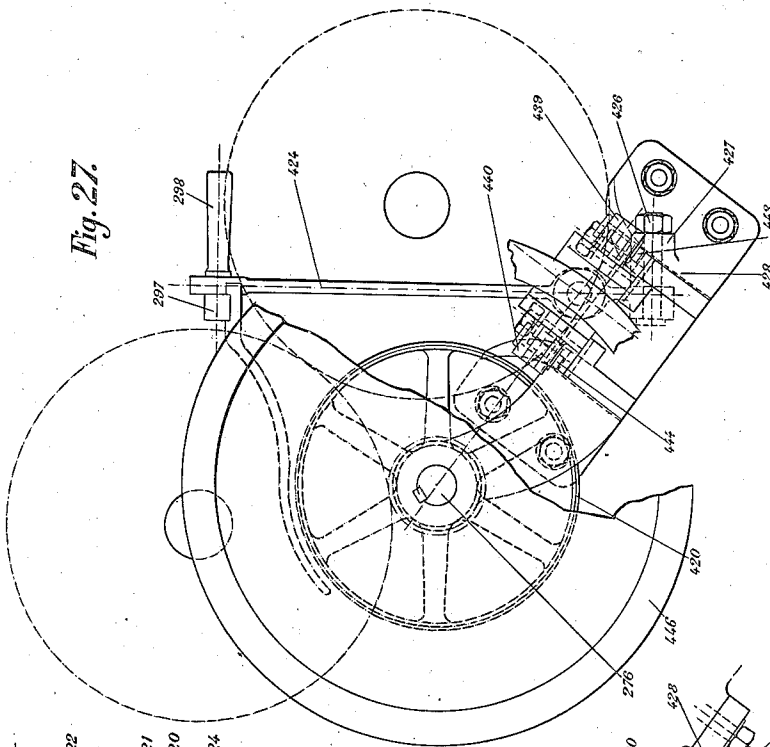
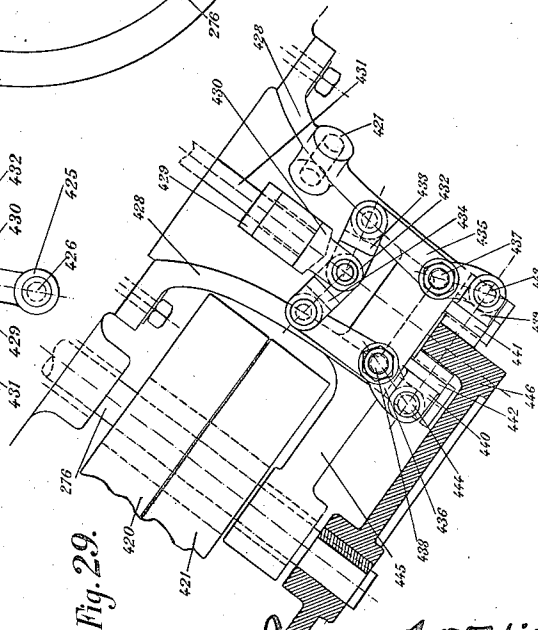


Fig. 29.



Witnesses:
L. Hayman.
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Attorney

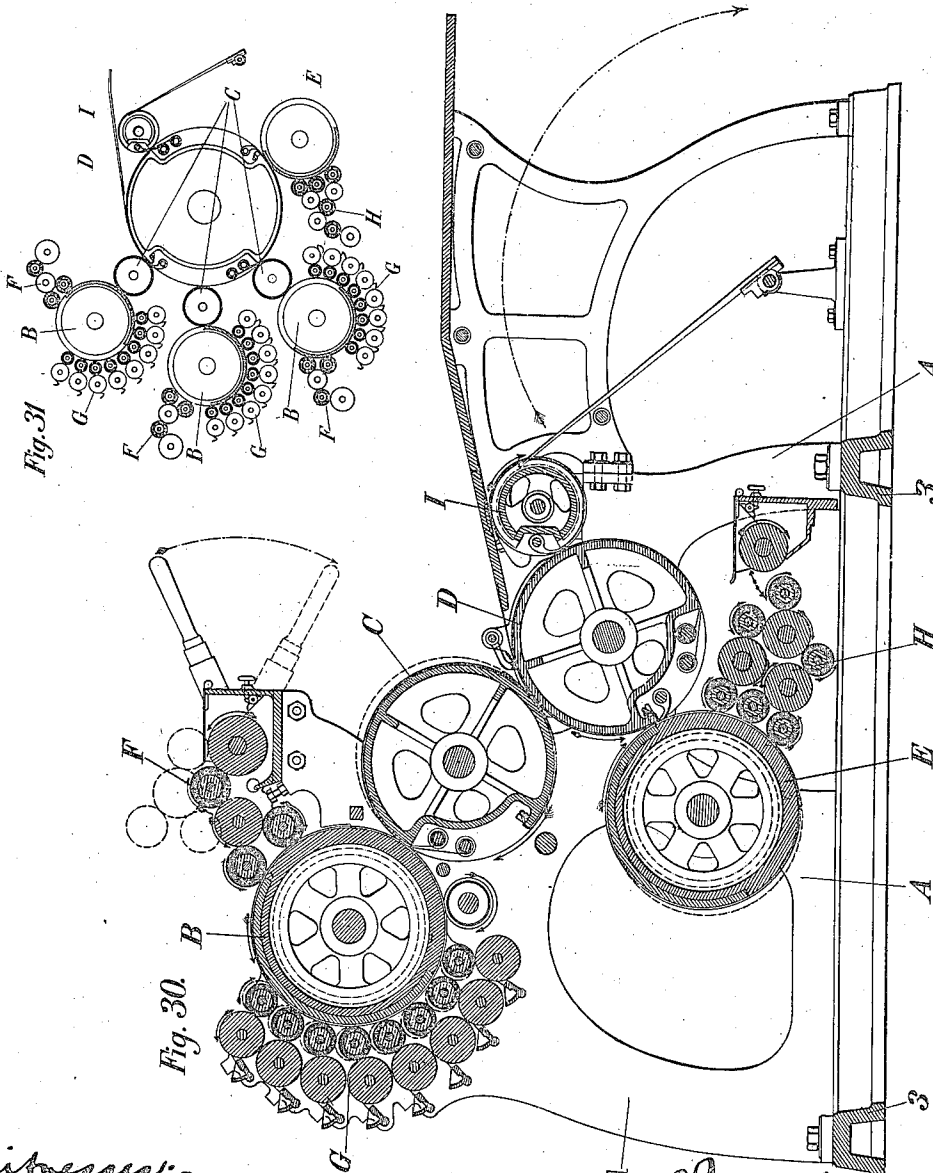
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14 SHEETS—SHEET 14.



Witnesses:-
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UNITED STATES PATENT OFFICE.

AUGUSTE VALENTIN, JEAN ZERREISS, AND HENRI GEORGES, OF PUTEAUX, FRANCE.

PRINTING-MACHINE.

1,014,923.

Specification of Letters Patent.

Patented Jan. 16, 1912.

Application filed February 24, 1910. Serial No. 545,684.

To all whom it may concern:

Be it known that we, AUGUSTE VALENTIN, JEAN ZERREISS, and HENRI GEORGES, citizens of the Republic of France, residing at Puteaux, in France, have invented new and useful Improvements in Printing-Machines, of which the following is a specification.

Plates engraved in intaglio by the process described in the French Patent No. 395300 or by similar processes, can be used at the same time for art printing, such as reproduction of pictures, photographs, engravings, etc., and for illustration of industrial printed matter of all kinds. For carrying out the numerous applications of the process, it is indispensable: 1. To be able to print engravings at a high speed by doing away with the long and difficult setting and registration of the present printing processes, while using paper of any quality. 2. To be able to print at the same time as illustrations, also the letterpress which accompanies them in the majority of cases.

It is in order to fulfil the above conditions that the machine hereinafter described, has been designed and constructed, and by means of the said machine it is possible: 1. To print at a high speed, by means of rubber, from intaglio plates on all kinds of paper, fabrics, etc. 2. To print at a high speed from typographic letterpress or blocks. 3. To print simultaneously at high speed, by means of rubber, from intaglio engraving plates, and to print direct at high speed from typographic letterpress or blocks on one sheet which is fed into the machine only once.

The invention is illustrated in the accompanying drawings in which:—Figure 1 is an elevation of the machine showing all of its essential parts; Fig. 2 shows on the left hand side, a half-section of the cylinder B on the line *b—b* of Fig. 3, and on the right hand side a half-front elevation of the toothed rim mounted on the cylinder; Fig. 3 is a sectional view taken on the line *a—a* of Fig. 2; Fig. 4 is a longitudinal elevation of the cylinder C, the portion *c—c* being a section on the line *d—d* of Fig. 5; Fig. 5 shows an end view of the cylinder C at the side of the rim, the right hand portion showing a section of one half of the cylinder on the line *e—e* of Fig. 4; Fig. 6 is an end view of the cylinder D; Fig. 7 is a longitudinal elevation of the same cylinder, the portion *f—f* being a section on the line *g—g*

of Fig. 6; Fig. 8 is a section on the line *h—h* of Fig. 20, and shows the mounting of the spindle carrying cylinder E on the frame, and the mounting of the cylinder E on its spindle; Fig. 9 is a section on the line *a—a* of Figs. 10 and 11, and shows the rising movement of the cylinder C; Figs. 10 and 11 show in elevation the parts for the rising movement of the cylinder C; Fig. 12 is a plan view of the inking mechanism; Fig. 13 is a front elevation showing the mounting of one of the contact rollers of the inking mechanism for intaglio plates; Fig. 14 is a section on the line *d—d* of Fig. 13, showing the mounting of one of the journals of a contact roller in the frame; Fig. 15 is a plan view of mechanism connected with the cylinders B and C; Fig. 16 is a section on the line *n—n* of Figs. 10 and 11; Fig. 17 is a section on the line *b—b* of Figs. 10 and 11; Fig. 18 is a section on the line *c—c* of Fig. 11; Fig. 19 shows a side elevation of certain portions of the machine hereinafter referred to; Fig. 20 is a side elevation taken from the other side of the apparatus shown in Fig. 19; Fig. 21 is a plan of the typographic inking device; Fig. 22 is a projection on a plane parallel to the line *m—m* (Fig. 20), of the bearings and of the contact rollers mounted on the frame of the machine; Fig. 23 is a projection on a plane parallel to the line *p—p* (Fig. 19), of the reciprocating mechanism for the distributing tables; Fig. 24 is a view of the portions R, Q, V, X, Y, Z, (Fig. 1) of the machine and shows the feed mechanism and the mechanism for reversing and receiving printed sheets; Fig. 25 shows the other side of the portion R, Q, V, X, Y, Z, (Fig. 1) of the face of the machine and comprises the other side of the feed mechanism and the mechanism for receiving printed sheets; Fig. 26 is a plan view of the mechanism shown in Figs. 24 and 25; Fig. 27 is a front elevation of the driving mechanism, disengagement device, and brake arranged on the machine as shown in Fig. 1; Fig. 28 is a side elevation of Fig. 13 showing the operating lever for the clutch disengaging device and brake; Fig. 29 is a plan of Fig. 27 showing the support, the brake mechanism and its action on the rim of the fly-wheel; Fig. 30 is a longitudinal section of the machine; Fig. 31 shows an arrangement when three cylinders B are used when printing with three colors.

Description of the machine.—The ma-

chine hereinafter described comprises in principle (Fig. 1): 1. A frame A consisting of two cast iron parts secured to a cast iron bedplate 3. 2. A cylinder B to which are secured plates engraved in intaglio. 3. An intermediate cylinder C on which is stretched a soft rubber blanket. 4. A pressure cylinder D provided with a hard rubber blanket and carrying the pincers for seizing and driving the paper during the printing. 5. A cylinder E to which are secured the typographic blocks or letterpress, suitably curved. 6. An inking mechanism F for intaglio plates. 7. A wiping mechanism G for intaglio plates. 8. An inking mechanism H for typographic plates. 9. A feeding mechanism and a mechanism for reversing and receiving the printed sheets, consisting of the reversing cylinder I and the taking off or delivery frame J. 10. A driving mechanism with clutch and brake.

Frame A.—The frame consists of two lateral cast iron parts secured to a cast iron base 3. These different parts of the frame have been designed and arranged as shown in the drawings, so as to enable the different parts of the machine to be fitted up. The details of the frame will be described at the same time as the parts in connection with it.

Cylinder B, Figs. 2 and 3.—The cylinder B is a cylinder to which are secured the plates engraved in intaglio. The plates intended for printing are first beveled and suitably curved or bent so as to enable them to be secured to the circular surface of the cylinder by means of clamps usually employed for the purpose. The time required for securing the said plates can be fairly long, more particularly in the case in which the arrangement of the said plates presents a certain complication. During that time the machine stands still and does not do any work. It is in order to avoid that loss of time that the plates are arranged first on a semi-circular cast iron "armor" or casing which can be afterward easily placed on the cylinder without causing any loss of time.

The cylinder B is constituted by a circular cast iron rim 5. The two ends of the said rim are closed by two disks 6 and 7 which form at each of the said ends two circular tracks 8 and 9. These disks are provided at their centers with hubs 10 and 11 which enable the cylinder B to be secured to the spindle 12 by means of keys 13 and 14. The disks 6 and 7 are provided with openings 15 between which are left arms 17. The arms 17 of the disk 7 are provided with projections or bosses 18 on which are placed the projections or bosses of the toothed wheel 19. Three of the said arms, as shown in Fig. 2, are provided with holes through which pass bolts 21 used for securing the toothed wheel 19 which engages with the toothed rim of the cylinder C and with the

driving pinion 281 (Fig. 17). The arms 23 of the toothed wheel 19 are provided with oval holes corresponding to the bolts 21 of the disk 8, so as to enable the toothed wheel 19 to be easily fitted on the disk 7 of the cylinder B. The circular rim 5 is provided with circular grooves 24. It is at the bottom of the said grooves that will be situated the fixing lugs 25 of the semi-cylindrical casing 26. The bottom of the grooves 24 is provided with three mortises 27 into which are introduced the annular heads 28 of the fixing bolts 29 for the casing. Through the said annular heads pass suitably arranged pins 30 as shown in Figs. 2 and 3. The bolts 29 can be pivoted about the pins 30. The grooves are each provided at the bottom with holes into which are introduced register pins 38 secured to the upper attachment lugs of the casing.

The circular rim 5 of the cylinder B is provided on the half intended to receive the semi-circular casing 26 with semi-circular bosses or bearings 32 which are continued on the other half of the circular rim 5 by grooves 33 of which they form the bottom and which afford passage to the tool during the turning of the bosses or bearings. The other half of the rim is provided with semi-circular rings cast with the cylinder, and intended to balance the cylinder by compensating the weight of the armor or casing 26.

The casing 26 is constituted by a semi-circular cast steel rim 34. The concave portion of the said part is provided with bearings or bosses 35 which come to rest on the bearings 32 of the cylinder when the casing is put in place. The convex surface of the said casing is provided with dove-tailed grooves 36, into which are introduced dove-tailed heads of fixing claws for the beveled plates. These claws are similar to those generally used in printing presses. The casing is provided on both its lateral sides with attachment lugs 25 which have recesses 37 affording passage to bolts. Pins 38 are secured to the concave portions of the attachment lugs 25.

As will be readily understood, the putting in place and the removal of the armor or casing can be effected very quickly. The casing after having been provided with printing plates is placed on the cylinder in such manner that the pins 38 should engage with the holes intended to receive them. The fixing bolts which were in the reversed position shown dotted in Fig. 2, are raised and engage with the recess 37 of the attachment lugs 25. The casing is secured to the cylinder by suitably tightening the fixing bolts 29. The cylinder B keyed to the spindle 12, is arranged on the frame in such manner that the journals of the spindle 12 are situated in the bearings 39 of the brackets 40 and 41 of the frame.

Cylinder C, Figs. 4 and 5.—The cylinder C is an intermediate cylinder on which will be stretched a soft rubber blanket. This cylinder is constituted by a cast iron circular casing 43 provided with a longitudinal recess 44 in which are arranged hooks 45 to which is attached an iron bar secured to one of the ends of the blanket (which is applied to the circular surface of the cylinder). The other end of the blanket is wound around the tension spindle 47. In certain cases, in order to give more flexibility to the blanket, it may be advisable first to arrange on the cylinder a first blanket of harder rubber. For that purpose the hooks 45 have been designed so as to enable them to receive two bars, and a second tension spindle 46 has been arranged on the cylinder, around which second spindle is wound the end of the first blanket. The circular casing 43 is closed at each of its ends by means of disks 48 and 49 which form at each of the said ends two circular tracks 50 and 51. These two disks are provided at their centers with hubs 52 and 53 by means of which the cylinder C can be mounted on the spindle 54 by means of keys 55 and 56. The disks 48 and 49 are provided with openings 57 which leave between them arms 58 with inner ribs. The disk 49 is provided with a circular boss or bearing 59 on which is mounted the toothed rim 60.

The cylinder is strengthened inside by longitudinal ribs 61. The toothed rim is designed so that any wear or play can be taken up. It is constituted by two circular rims 63 and 64 joined at their faces the teeth being cut on both rims simultaneously. The rim 63 is mounted on the circular bearing or boss 59 of the disk 49 on which it is secured to the cylinder C by means of bolts 65 provided with collars or rings 66 and screwed into the disk 49. The rim 64 is secured to the rim 63 by means of nuts 67 of the bolts 65 on which it is placed. The tension spindles 46 and 47 can rotate in holes made in the disks 48 and 49. The collars 68 and 69 with pins prevent the said spindles from moving in the longitudinal direction. The tension spindles 46 and 47 are provided with two ratchet wheels 70 and 71 with the teeth of which engage pawls 72 and 73 held by springs 74 and 75 secured to the pawls by means of pins 76 and 77, and to the bottom of the recess 44 of the cylinder by means of screw hooks 78 and 79. The outer ends of the tension spindles are formed into square portions 80 and 81 which fit a spanner, so that by rotating the tension spindles, it is possible to wind the ends of the blankets, which will produce the tension of the latter.

The cylinder C secured to the spindle 54 by means of the keys 55 and 56, is mounted on the casing in such manner that the journals of the spindles 54 are disposed in the

bearings 82 and 83 of the brackets 84 and 85 of the frame, while the toothed rim of the cylinder C comes into engagement with the toothed wheel of the cylinder B.

Cylinder D, Figs. 6 and 7.—The cylinder D is a pressure cylinder on which will be stretched a blanket. The said cylinder carries the pincers 86. It is constituted by a cast iron circular rim or casing 87 provided with a longitudinal recess 88 in which are arranged hooks 89 to which is attached an iron bar secured to one of the ends of the blanket. The other end of the blanket is wound around the tension spindle 90. In certain cases, for causing the pressure to be more variable, it will be advisable first to arrange on the cylinder a felt blanket. It is for that reason that the hooks 89 have been arranged so as to be able to receive two bars, and that a second tension spindle 91 has been provided on the cylinder, about which second spindle is wound the end of the first blanket.

The circular rim or casing 87 is closed at each of its ends by disks 92 and 93 which constitute at each of the ends of the cylinder two circular tracks 94 and 95. These two disks are provided at their centers with hubs 96 and 97 which enable the cylinder D to be mounted on the spindle 98 by means of keys 99. The disks 92 and 93 are provided with openings 100 between which are left arms 101 with inner ribs. The disk 93 is provided with a circular boss or bearing 102 on which is mounted the toothed rim 103. The cylinder is strengthened inside by means of longitudinal ribs. The toothed rim 103 is mounted on the said bearing or boss 102 and secured to the cylinder by means of screws 104.

The tension spindles 90 and 91 can rotate in the holes made in the disks 92 and 93. The collars 105 and 106 provided with pins, prevent the said spindles from moving in the longitudinal direction. The tension spindles 90 and 91 carry ratchet wheels with the teeth of which engage pawls 109 and 110 held by means of springs 111 and 112 attached on the one hand to the pawls by means of pins 113 and 114, and on the other hand to the bottom of the recess 88 of the cylinder by means of screw hooks. The ends of the tension spindles are formed into square portions 115 and 116 on which the spanner fits, so that by rotating the tension spindles, the ends of the blankets can be wound and consequently the blanket stretched on the cylinder.

The pincers 86 are mounted on the spindle 117 arranged in the longitudinal recess 88 of the cylinder. One of the ends of the spindle 117 rotates in a hole made in the disks 93, and the other end passes through the disk 92. Longitudinal movement of the spindle 117 is prevented by the collar 118.

To the outer end of the spindle is secured by means of a pin a part 119 provided with grooves 120 and 121 with which will successively engage during the rotation of the cylinder, stationary pins 121^a and 122 (Fig. 24) which will open and close the pincers by reversing the part 119. The spindle of the pincers carries a handle 123 which is connected to the end 124 of the pivoted rod 125. The said rod can slide with a slight amount of friction in the hollow rod 126 the end of which is secured in the interior of the cylinder as shown in the drawing. Around the rod 126 is placed a spring which exercises pressure on the one hand on the outer hinge of the rod 126 and on the tenon 124 of the rod 125 placed in the crank 123, and after each closing movement of the pincers, forces the said pincers against the surface of the cylinder, and after each opening movement brings about the engagement of the reversing part with the stop 127 suitably arranged on the disk 92 to which it is secured by means of screws 128. To the circular rim 92 is secured a cam 129 by means of screws 130. This cam during the rotation of the cylinder, comes into engagement with the roller 407 of the lever 408 (Fig. 24) and insures, as will be hereinafter explained, the closing of the pincers of the reversing cylinder.

The cylinder D is mounted on the spindle 98 by means of keys 99. To the spindle 98 is keyed a toothed pinion 133 secured by means of a screw 234. This pinion is used for driving the typographic inking device H (Fig. 1) as will be hereinafter described. The cylinder D keyed to the spindle 98, is arranged on the frame of the machine so that the journals of the spindle 98 are introduced into the bearings 137 and 138 (Figs. 24-26) and so that the toothed rim 103 engages with the toothed rim of the cylinder C.

Cylinder E.—The cylinder E is similar to the cylinder B. Like the latter, it is provided with a semi-circular armor or casing. On the other hand, the toothed wheel of the cylinder B is replaced by a circular toothed rim secured to the cylinder, as was already explained for the cylinder D. The cylinder E being tangent to the cylinder D at the moment of printing of typographic plates, must be adapted to be moved away from the cylinder D when no typographic printing is to be effected. This movement is obtained by mounting the cylinder on a spindle with eccentric journals 139 (Figs. 19, 20 and 8). Fig. 8 shows the mounting of the spindle 139 of the cylinder E on the frame, and the mounting of the cylinder E on the spindle 139. The cylinder E, the hubs 140 and 141 of which are provided with brass rings 142 and 143, rotates on the spindle 139. This spindle is mounted in sockets 144 and 145 of the frame on eccentric journals 146

and 147 rotating with a slight amount of friction in the sockets 144 and 145. The longitudinal movement of the spindle is prevented by the screw 148 and the washer 149. The lever 150 keyed to the end of the spindle, enables the spindles 139 to be rotated, and the cylinder E to be eccentrically moved either for bringing it into a tangent position with the cylinder D when it is desired to make a typographic impression, or for moving it away when that kind of printing is not required. This lever is held by tightening the thumb nut 151 when the lug 152 of the lever comes to engage with the screw threaded rod 153 secured to the boss 154 of the frame.

Movement of the cylinder C.—The cylinder C mounted in the manner described, must be brought into a position tangential to the cylinder B and the cylinder D. In various cases, more particularly when it is desired to use the machine merely for typographic printing, it is advisable to do away with the tangential arrangement of the cylinder C relatively to the cylinders B and D, which is effected by raising the cylinder C along the axis *a-a* (Figs. 10 and 11). This rising movement of the cylinder is brought about in the following manner. The bearings 82 and 83 are provided with lugs 155 arranged in cages 156 provided in the bearings or brackets 84 and 85. These lugs are pivoted to the connecting rods 157, the other ends 158 of which engage with the eccentric journals 159 of the spindle 160. The said spindle which passes through the machine in the direction of its width, is mounted in the trunnion pins 161 of the frame. To the end of the trunnion or journal 159 is keyed a lever 163 by means of which the spindle 160 can be rotated, and in that way the trunnions 159 can be raised eccentrically and the bearings 82 and 83 raised by means of the connecting rod 157, and consequently the cylinder also.

Inking mechanism F for intaglio plates.—This mechanism comprises an inking box 164, an inking cylinder 165, a distributing roller 166, a distributing table constituted by the cylinder 167 and two contact rollers 168 and 169. The inking cylinder is mounted on a spindle 170 rotating in the sockets 171 and 172 arranged at the narrow sides 173 and 174 of the inking device. The distributor 166, the distributing table 167 and the two contact rollers 168 and 169 are mounted in the sockets of a fork-shaped cast iron frame consisting of two sides 175 and 176 connected together by a cross-bar 177 cast with them. The fork-shaped frame is mounted on the spindle of the inking cylinder in sockets 178 and 179, so that the frame can oscillate about the spindle 170 when it is desired to do away with the contact of the rollers 168 and 169 with the cyl-

inder B provided with intaglio plates. To that end, one of the levers 180 is lowered. The ink box is mounted on brackets 181 and 182 of the frame of the machine. It is 5 secured to the said brackets by means of bolts 183. This inking box is provided inside with an inking knife or palette pivoted at each of its ends to rods 184 and 185. The contact between the inking knife and 10 the inking cylinder is regulated or adjusted by means of a set screw 186. The distributor 166 is faced with gelatin; the journals of the said distributor rotate in eccentric rings 186 and 188 provided with handles, 15 which are adjusted in the sockets 189 and 190 of the frame. The eccentric rings enable the roller to be regulated or adjusted so as to bring it into a position tangential to the inking cylinder 165 and to the distributing cylinder 167. It will be easy to 20 remove the distributor by taking out the eccentric rings 187 and 188. The distributing cylinder is mounted on a spindle 191, the journals of which rotate in the sockets 192 25 and 193. The contact rollers 168 and 169 are provided with gelatin. The journals 194 and 195 of the said contact rollers rotate in eccentric rings 198 and 199 with handles. These eccentric rings are mounted in other 30 eccentric rings 200 and 201 (Figs. 13 and 14).

The mounting or arrangement of the contact rollers in the double eccentric rings 198 and 200 has for its object to enable the rollers to be regulated or adjusted, on the 35 one hand, with the distributing cylinder 167, and on the other hand with the surface of the plates engraved in intaglio and mounted on the cylinder B.

By turning the handle 204 of the eccentric ring 200 in the direction of the arrow 205, 40 the contact roller will be brought nearer to the distributing cylinder 167, and by rotating the handle 206 of the eccentric ring 198, the contact roller will be brought nearer to the surface of the cylinder B. By manipulating the handles 204 and 206, it will be, 45 therefore, possible to regulate or adjust the contact rollers in a suitable manner. This adjustment having been effected, the ring 200 will be locked by means of the screw 50 207, and the ring 198 by means of the screw 208 which will be tightened after having brought the pawl 209 into engagement with the shoulder 210 of the ring. As shown 55 in the drawing, it will be easy to remove the contact rollers 168 and 169 by removing the eccentric rings 108.

For disengaging the cylinder B when putting in place the armor or casing provided 60 with the plates to be printed, the inking device will be raised by pivoting it about the spindle of the inking cylinder on which it is mounted, this being done by means of the levers 180. The whole will be held in the 65 raised position by means of the hook 211

secured to the narrow side of the inking box by means of the bolt 212 and engaging with the tooth 213 arranged on the socket 199 of the fork-shaped frame. When the inking mechanism is brought back into its contact 70 position, the sides of the frame will rest on stops 221 suitably adjusted.

Operation of the inking device, Figs. 10, 11 and 12.—The spindle of the inking cylinder is provided with a chain pinion 214 75 Fig. 11 engaging with a chain 215 and rotating the inking cylinder. As will be seen from its arrangement, it is easy to take off the chain pinion 214 for replacing it by a smaller or larger pinion, and consequently 80 for obtaining different speeds for the inking device and for the contact rollers which are used in the different cases, as will be hereinafter explained under the title "inking and wiping of plates in intaglio". The 85 spindle 170 of the said cylinder is provided with a pinion 216 engaging with the intermediate pinion 217 mounted on a journal 218 secured to the sleeve or socket 219 of the frame, so that the intermediate pinion 90 217 rotates loosely on the said journal. The pinion 217 engages with the pinion 220 keyed to the spindle of the distributing cylinder 167 which it drives. The distributing roller 166 and the two contact rollers 168 95 and 169 are driven by their contact with the inking cylinder and the distributing cylinder 167.

Wiping device G for plates in intaglio, Figs. 10, 11, 15 and 16.—In Fig. 16 is shown 100 in plan the spindle 242 by means of which the rings 233 can be operated. The wiping mechanism comprises eight wiping contact rollers 221, eight wiping cylinders 222 and 105 eight scrapers 223. The eight contact rollers are constituted by hollow iron mandrels 224 (Fig. 16) closed at both ends by means of disks 225 provided with journals or spindles 226. These mandrels are first of all 110 covered with a layer of hard rubber 227. They are turned and covered with a layer of soft rubber 228, then with a new layer of hard rubber, after which they are turned and polished. These rollers are mounted by 115 placing the journals into rings with handles 229, arranged in eccentric rings 230 with nuts mounted in the sockets 231 of the rims 232 and 233. The rims or casings 232 and 233 are mounted on circular bearings or projections 234 cast with the frame, on which 120 bearings they can rotate. These rims are provided with three lugs 235 with oval holes with which engage fixing screws 237 and which enable the socketed rims 232 and 233 to make a circular movement. The rims in 125 question are each provided with two teeth 238 and 239 Fig. 10 which leave between them hollows 240 in which are placed eccentrics 241 (Fig. 10) arranged at each end of the transverse spindle 242 (Fig. 16) mount- 130

ed in the sockets 243 of the frame (Figs. 10 and 11). By acting on the lever 244 Fig. 11 arranged at the end of the spindle 242 there will be produced, owing to the rotation of the eccentrics 241, a circular movement of the rims, and consequently a circular movement of the contact rollers which will enable the said rollers to be brought into contact with the wiping cylinders 222. It will be understood at once how the said wiping contact rollers are regulated or adjusted: They are first adjusted so as to bring them into tangential contact with the plates arranged on the cylinder B, by means of eccentric rings 230 provided with nuts. This adjustment having been obtained, the screws 245 (Figs. 10 and 11) will be tightened, and they will fix or lock the eccentric rings 230 with nuts. Then the contact of the contact rollers with the wiping cylinders 222 is obtained by manipulating the lever 244 which, by producing a circular movement of the rims 232 and 233, will bring the wiping contact rollers into contact with the wiping cylinders 222. This result having been obtained, the rims 232 and 233 will be locked by tightening the screws 237.

The wiping cylinders 222 are constituted (Fig. 16) by hollow steel tubes 246 closed at both ends by means of disks 247 and 248. They are mounted on spindles 249, and their surfaces are turned and perfectly polished. These cylinders are mounted on the machine in the following manner. The journals of the cylinders are arranged at one side on rings 250 with handles (Fig. 16) mounted in the sockets 251 of the frame. These rings are held by means of a spring clamp 252. At the other side, the journals provided with a driving tappet 253, are mounted in the ring 254. This ring is mounted in the socket 255 of the frame. On the inner end 256 of the ring in question, is mounted a chain pinion 257 which rotates loosely on the ring and is held by a collar in which it rotates. The pinion in question is provided on its face with two driving teeth 259 between which the tappet 253 engages. The rotation of a wiping cylinder is, therefore, insured by the rotation of the chain pinion 257. As will be seen from its arrangement, it will be easy, after having removed the wiping cylinders, to take off the pinions 257 from the wiping cylinders and to replace them by other pinions of different dimensions by means of which it will be possible to obtain for the wiping cylinders, and consequently for the wiping contact rollers, different speeds which may be useful in various cases, as will be hereinafter explained under the title: "Inking and wiping of plates in intaglio."

In order to obtain a more regular wiping, and in order to insure a regular wearing of the blade of the scraper, the wiping cylinder

is given a reciprocating transverse movement produced in the following manner: The ring 254 is bored axially and a bolt 261 engages with the hole without friction the said bolt 261 being screwed to the end of the journal 249 of the wiping cylinder. This bolt can, therefore, rotate in the hole of the ring 254 without driving the said ring. If the ring 254 is given a reciprocating movement, the same movement will be produced on the cylinder. This movement is obtained by the rotation of the said ring at a low speed, as will be hereinafter explained, by means of the chain pinion 262 keyed to the end of the ring. As the ring 254 is provided with a helical groove 263 with which engages the stud 264 screwed into the socket 255 of the frame, the movement of rotation of the ring 254 will produce the movement of advance or reciprocating movement of the wiping cylinder.

The scrapers 223 are constituted by a cast iron right-angled part 265 closed at both ends and forming a trough or cup. To the said trough or cup is secured a suitably sharpened blade 266 which is brought into thorough contact with the wiping cylinder.

The mounting of the scrapers is effected at one side by means of pins 267 which are screwed into the sockets 268 of the frame, and at the other side, by means of pins 269 which pass through the sockets 270 of the frame and are secured in the said sockets by means of screws 271. The ends of the scrapers are provided with lugs 272 on which are mounted spring bolts 273. Against the heads of the said bolts press the screws 274 with lock nuts Fig. 11, which are screwed into the attachments or lugs 275 cast with the frame. The said screws 274 enable the contact of the scrapers with the wiping cylinders to be regulated.

As shown in the drawings, the wiping contact rollers, the wiping cylinders and the scrapers can be easily taken off, which enables the surface of the cylinder B to be disengaged, and facilitates the putting in place of the casing carrying the plates, on the cylinder B.

Driving, Fig. 11.—The rotation of the machine is produced by the rotation of the spindle 276 (Fig. 17) produced as will be hereinafter explained when describing the driving mechanism. In Fig. 17 is shown the fitting of the spindle on the frame and the mounting of the driving pinions on the said spindle. The spindle 276 which passes through the machine, rotates in the rings 277 and 278 of the sockets 279 and 280 of the frame. The said spindle carries a toothed pinion 281 engaging with the toothed rim of the cylinder B and produces the rotation of the said cylinder. The toothed rims of the cylinders B, C, D, E engaging with each other, it follows that the rotation of the cyl-

Under B brings about the rotation of all the cylinders of the machine in the direction indicated by the arrows in Fig. 30. The spindle 276 carries a chain pinion 282 over which passes the driving chain 215 Fig. 11, for chain pinions 257 Fig. 16, of the wiping cylinders and chain pinion 214 of the inking cylinder. The chain 215 driven by the pinion 282, passes over the tension roller 284 mounted in the socket 285 Fig. 11 of the frame, as shown in Fig. 18. In Fig. 18 is shown the method of mounting the tension roller which is locked in the tension position by tightening the nut 286. The chain 215 then passes over the pinion 214 which it drives. It then passes over the guide roller 287 Fig. 15 rotating loosely about the pin 288 secured to the socket 289 of the frame. The said chain then passes successively over the pinions 257 of the wiping cylinders and produces the rotation of the latter which drive the wiping contact rollers by contact with the same. The slow rotation movement intended to bring about the transverse reciprocating movement of the rings 254 of the wiping cylinders, is produced by the chain 290 Fig. 15 and Fig. 11.

The pinion 291 Fig. 15 keyed to the end of the spindle of the cylinder B, drives the toothed wheel 292 keyed to the spindle 293 to which is keyed the chain pinion 290. As it is keyed with a sliding fit the pinion 292 can reciprocate on the spindle 293 the said reciprocation being produced by the chain. The said spindle overhangs the socket of the frame and rotates there. It is stopped by the stud 295 (Fig. 11) which engages with a circular groove of the spindle 293 and is secured to the socket cast with the frame.

Typographic inking mechanism H.—Fig. 19 shows a side elevation of the part T, U, P, V, X, Y, Z (Fig. 1) of the machine, the said portion comprising a side elevation of the machine. Fig. 20 is a side elevation from the other side of the portion T, U, P, V, X, Y, Z (Fig. 1) of the machine, the said portion comprising the other face of the typographic inking device. The typographic inking mechanism is also shown in Figs. 21, 22 and 23.

The typographic inking device H of the machine is a cylindrical inking device with three contact rollers. It consists of a frame constituted by two cheeks 295 and 296 Fig. 21 connected together by the inking box 297 and secured to the bed-plate of the machine by means of attachment lugs 298 by means of bolts 299. It comprises an inkpot or trough in which rotates an inking cylinder 301 mounted on a spindle 302. This spindle rotates in the sockets 303 and 304 of the frame and carries a cam 305 made of two parts and mounted on the spindle by means of bolts 306. The roller 308 of the lever 309 regulating the contact of the taking device,

rolls on the cam in question. The spindle 302 carries a chain driving pinion 310 on which is mounted a pawl 311 Figs. 20 and 21 which is placed in the teeth of the ratchet wheel 312 which is a portion of the hand wheel 313 keyed to the spindle 302. The driving pinion 310 rotates loosely on the spindle, and the driving of the inking spindle will take place when the pawl 311 is brought into engagement with the teeth of the ratchet wheel 312. This device will enable the inking roller to be turned by hand by manipulating the hand wheel 313 during operation, and allows a greater quantity of ink to be obtained at any desired moment. To the end of the spindle 302 is keyed a bevel pinion 314, Fig. 21 which controls the pinion 315 of the reciprocating motion for the distributing tables.

In the inking device is arranged the inking knife or palette 316 mounted on pins 317 and 318, which is adjusted on the inking cylinder by means of set screws 319.

The inking device comprises three distributing tables 320, 321 and 322 Fig. 19, two distributors 323 and 324, three contact rollers 325, 326 and 327 and one taking device 328. The distributing tables are polished steel cylinders mounted on spindles 329, 330 and 331 rotating in the sockets 332, 333 and 334 of the frame. These distributing tables are controlled in the following manner: The pinion 335 Figs. 20 and 21 rotates loosely on a journal 336 secured to the socket 337 of the frame by means of the bolt 338. The pinion in question which engages with the toothed rim of the pressure cylinder D, is coupled by means of a screw to the toothed pinion 339 Fig. 20. The pinion 339 controls the pinion 340 mounted on a spindle 341 passing through the machine and rotating in the sleeves or sockets 342 and 343 of the frame. The spindle 341 carries another pinion 344 engaging with the three wide pinions 345, 346 and 347 (for the purpose of making possible the engagement during the longitudinal reciprocating movement of the distributing tables) keyed to the spindles of the distributing tables, and produces the rotation of the latter.

The reciprocating movement of the distributing tables is produced by the crank disk 348 Fig. 19 mounted on the spindle 349 of the bevel pinion 315 engaging with the bevel pinion 314 keyed to the end of the inking cylinder spindle 302. The spindle 349 rotates in the socket 350 cast with the frame. The crank of the disk 348 is placed in the guide for the head 351 of the connecting rod 352 Fig. 19. The said connecting rod is mounted on the spindle 353 which can oscillate in the holes of the socket 354 and 355 cast together with the frame in which it is mounted. The connecting rod 352 is pro-

vided with an oval hole 356 with which engages the end of the spindle 329 of the distributing table 320. The end of the said spindle engaging with the hole 356, is held longitudinally by collars 357 and 358. To the ends of the spindle 353 are keyed two small levers with forks in which are held by means of the collars 359 and 360, the ends of the spindles 330 and 331 of the distributing tables 321 and 322. During the rotation of the crank disk 348, the oscillating connecting rod oscillates the spindle 353 and produces the longitudinal reciprocating movement of the distributing tables.

Low speed rotation of the inking spindle is produced by means of the chain 361 Fig. 20 engaging with the chain pinion 310 of the inking device spindle. The chain 361 is driven by the pinion 362 mounted on the spindle of the pinion 363 engaging with the pinion 133 keyed to the spindle of the pressure cylinder (Fig. 7).

The distributor 323 is mounted at one side in the socket 364 of the part 365 secured to the frame by screws 366 with handles, and at the other side in the adjustable bearing 367 mounted on the frame to which it is secured by means of screws 368 with handles. The distributor 324 is mounted in bearings of adjustable brackets 369 secured to the frame by means of screws 370 with handles.

The taking roller 328 Fig. 20 is mounted in adjustable bearings 371 arranged at the ends of the levers mounted on the transverse spindle 372. This taking roller is brought into contact successively with the inking cylinder and with the distributing table 320 by the reciprocation of the lever 309, the roller of which travels on the cam 305 and which produces the movement of the taking roller by the oscillation of the spindle 372.

The contact rollers are mounted in adjustable bearings 374 mounted on guides 375 of ribs 376 of the frame and secured by means of screws 377 with handles.

Feed mechanism—mechanism for reversing and receiving printed sheets, Figs. 24, 25 and 26.—The sheets are placed on the feed table K supported by a frame M and N (Fig. 1), so as to strike against the margin tappets 378. These margin tappets are mounted on a spindle 379 arranged at one of its ends in the socket 380 of the cap 381 of the bearing 138, and at the other side, in the whole of the spring socket 382 mounted in the boss 383 of the cap 384 of the bearing 137. The spring socket enables the spindle with the margin tappets to be easily removed. The small lever 385 secured by pins to the spindle 379, carries the roller 386 traveling on the cylinder, so as to rise when it meets the boss 387 Fig. 26 arranged on the cylinder, whereby the rising of the lever is brought about at the moment when the pincers have closed for driving the pa-

per, and the rising of the margin tappets is effected as soon as, the pincers having been closed, the paper is taken by the said pincers.

Movement of the pincers.—During the rotation of the cylinder, the part 119 keyed to the spindle of the pincers of the pressure cylinder, successively strikes the pins 122 and 121^a. In the position shown in Fig. 24, it will first meet during the rotation, the pin 122, and the mortise 121 will engage with the said pin. The result will be an oscillating movement of the part 119 which will bring about the opening of the pincers, and at the same time will bring the mortise 120 of the part 119 on the circle of the pin 121, so that the mortise will come into engagement with the pin 121, which will produce a new movement of oscillation of the part 119 and the closing of the pincers over the paper arranged on the margin table against the margin tappets which at that moment will be raised, and the sheet will be carried away for printing.

Reversing cylinder.—This is a cast iron cylinder provided in the longitudinal direction with a longitudinal recess in which are arranged pincers 390 mounted on the spindle 391. The cylinder is mounted in the bearings 392 and 393 secured to the frame by means of screws 394. This cylinder is provided with tracks 395 and 396 which roll tangentially on the tracks of the pressure cylinder. It also carries a toothed rim 397 engaging with the toothed rim of the pressure cylinder. The latter cylinder is provided with circular grooves 398 arranged opposite the pincers of the pressure cylinder and enabling the said pincers to open at the moment when the sheet is seized by the pincers of the reversing cylinder. This seizing of the sheet is effected in the following manner: The closing of the pincers of the reversing cylinder takes place along a curve which enables the said pincers to come behind the paper at the moment when the pincers of the pressure cylinder are ready to open in order to release the sheet. The closing movement of the pincers of the reversing cylinder is regulated by the cam 399 which acts on the roller 400 of the bell crank lever 401 mounted on the spindle of the pincers. The compression spring 404 acts on the lever for insuring the closing of the pincers. When the roller 400 rises on the boss of the cam 399, the spring contracts, and the pincers open in order to close again under the action of the spring 404 as soon as the roller leaves the boss of the cam.

The adjustment of the opening movement of the pincers of the pressure cylinder, and of the closing movement of the pincers of the reversing cylinder, is calculated so that the sheet released by the pincers of the first cylinder should be seized by the pincers of the reversing cylinder which drives the sheet

on to the taking off or delivery device 405. The reversing cylinder being of a diameter equal to half the diameter of the pressure cylinder, the pincers of the reversing cylinder will be opened twice at each revolution of the pressure cylinder. As already stated, the said pincers are opened in such manner as to seize a sheet from the back. It follows that if the first opening of the pincers takes place on the arrival of the pincers of the pressure cylinder, the pincers of the reversing cylinder will open into the longitudinal recess of the pressure cylinder, and that the second opening will take place at the moment of the passage of the solid surface of the cylinder, which is impossible. It is, therefore, necessary that the pincers of the reversing cylinder should arrive in closed position once every two revolutions before they can meet the surface of the pressure cylinder. It is for that reason that the closing of the pincers of the reversing cylinder has been advanced to the second revolution. This advanced closing is obtained by means of the cam 406 which on meeting the roller 407 of the lever 408 connected to the socket of the cam which forms a ring around the spindle in the bearing, advances the boss of the cam and thus produces an advanced closing of the pincers. The lever 409, also connected to the socket of the cam, causes the latter to return to its original position under the action of the spring 410.

Movement of the taking off or delivery devices.—The sheet carried by the reversing cylinder, is released by the pincers on to the delivery devices 405. At that moment the free portion of the cam 411 Fig. 24 keyed to the spindle of the pressure cylinder, comes before the roller 412 mounted at the end of the guide 413, and the springs 415 and 416 exercising a traction on the guide, cause the same to rise. The teeth 417 act on the teeth of the pinion 418 mounted on the spindle of the delivery device and produce by the rotation of the pinion 418, the folding down of the delivery devices which deposit the printed sheet on a suitably arranged receiving table.

Driving, disengagement and brake, Figs. 27, 28 and 29.—The driving is effected, as already stated, on the spindle 276 (Figs. 10, 11 and 17). This spindle carries two pulleys: 420, which is loose, and 421, which is the driving pulley, and the fly wheel 446. The disengagement is effected by means of the fork 422 through which the driving belt passes and which is operated by means of handles 298 arranged at each side of the machine and mounted on the cross-bar 297 sliding in two holes at two sides of the frame. To the said cross-beam is hinged or pivoted on the handle 298 the upper end of the lever 424, the other end 425 of which is pivoted to the journal or pin 426 mount-

ed in the socket 427 of the bracket 428. The lever 424 engages between the collars 429 and 430 of the rod 431, the fork 432 of which is pivoted to the levers 433 and 434. These levers are themselves pivoted to the ends of the bell crank levers 435 and 436 pivoted to the journals or pins 437 and 438. The ends of the levers 435 and 436 engage with hinges 439 and 440 of the brake blocks in which they are pivoted about the pins 443 and 444. The working of the brake will be readily understood, when in order to stop the machine, the clutch is caused to slide, the belt will pass from the fast pulley on to the loose pulley, and at the same time the lever 424 will pull the rod 431 guided in the hole of the frame, and will produce the jamming of the brake blocks against the rim of the fly wheel and consequently will stop the machine. The driving shaft 276 is supported by the bracket 445 cast with the bracket 428.

Inking and wiping of intaglio plates.—The wiping of intaglio plates can be obtained by sliding on the surface of plates, a hard wiping body, which, as it does not penetrate into the hollows will not deprive them of ink. That is the case when wiping is done with a scraper which is a suitable tool when it is desired to wipe the continuous surface of a cylinder engraved in intaglio. The wiping obtained by the rolling of a hard wiping body on the surface of plates will certainly not be as perfect, for, if we consider a hollow or recess of the plate provided with ink, and a hard roller is rolled on its surface, the ink is not cut as in the previous case, and the roller will remove not only the ink lying on the surface of the plate, but also a portion of the ink contained in a recess, in accordance with the nature and consistency of the ink. It will not be the same if the roller were sliding on the surface to be wiped. In that case the advantages of the scraper would be retained, but experience has shown that the sliding of a hard roller on the surface to be wiped does not remove ink from the said surface to a sufficient extent, while the rolling of a hard roller pressing on the surface of the plates, wipes that surface very easily. For that reason, in the machine described, the wiping is done by means of sliding rollers combined with a wiping by rolling. In this construction, the first wiping contact rollers which come into contact with the ink plates, have a tangential speed slightly greater than the tangential speed of the cylinder carrying the plates. It is that difference of speed which produces the sliding of the wiping contact rollers on the plates. The machine enables the said sliding to be easily adjusted by the change of the chain pinions driving the wiping cylinders which themselves drive the wiping

contact rollers. The other rollers constituting the wiping device, will rotate with the same tangential speed as the cylinder carrying the intaglio plates, and consequently will roll without sliding on the surface. The first sliding rollers are provided with a softer paste or composition, and by regulating the said rollers to a certain pressure on the plates of the cylinder, a cutting of the ink arranged in the recesses, will be produced and will take place to a small extent below the surface of the plate. The other wiping rollers, acting by rolling, are provided with a harder composition. In spite of their pressure against the plates, their surface will, therefore, be unable to reach the surface of the ink remaining in the hollows after the passage of the sliding rollers, and the wiping will also take place on the whole surface of the plates without an injurious effect in the hollows or recesses. The sliding of the contact rollers of the inking device can also be obtained in a very simple manner. It is sufficient to replace the chain pinion driving the inking cylinder, by a pinion of a different diameter which, by modifying the tangential speed of the contact rollers, will insure the sliding of the inking contact rollers on the surface of the plates, and produce an inking by sliding which has great advantages. It is obvious that in any case the sliding of the rollers must be very slight and arranged for each size of the screen used for producing the plates. The machine described has three sets of chain pinions enabling the sliding of the rollers to be adjusted for the most usual sizes of frame, without producing an injurious heating of the rollers.

Working of the machine, Fig. 30.—This figure shows in section the essential parts which play a part in the printing proper, and enables the different stages of the said printing process to be followed. As already stated, the machine as described, enables: 1. Intaglio engraved plates to be printed indirectly and separately. 2. Typographic letterpress or blocks to be printed directly and separately. 3. Plates engraved in intaglio to be printed together with the printing of typographic letterpress or blocks. The working of the machine will be now examined in these three cases.

Indirect and separate printing of intaglio engraved plates.—In the description of the operation of the machine, we will assume that the inking mechanism for intaglio plates is raised into the position shown in dotted lines; that the casing of the cylinder B has been removed; that the wiping contact rollers have been moved away from the wiping cylinders; that the intermediate cylinder C provided with the rubber blanket, has been raised; that the typographic cylinder E has been removed from the ink-

ing mechanism and from the pressure cylinder D.

Indirect and separate printing of intaglio plates.—The inking device is provided with ink, and admission of ink is insured by the adjustment of the inking knife. The contact of the contact rollers with the distributor is adjusted, and the machine is started for making sure that ink is uniformly distributed on the rollers of the inking mechanism. After that, the machine having been stopped, the armor provided with the plates to be printed, is secured to the cylinder B. The speed of the wiping cylinders is adjusted by mounting suitable chain pinions for insuring a given speed, as already stated, and the contact of the wiping contact rollers with the surface of the plates is adjusted. The scrapers are adjusted on the wiping cylinders; the inking mechanism is lowered, and the contact rollers are adjusted.

Machine for printing in several colors.—The same essential parts described for the construction of the machine described, can be arranged in groups so as to make possible printing in several colors. Fig. 31 shows the arrangement of a machine which enables: 1. Intaglio plates to be printed indirectly in three separate colors. 2. Printing to be done in three separate colors. 3. Direct separate typographic printing to be effected.

Indirect printing of intaglio plates in three colors combined with direct printing of typographic plates and obtained on one sheet which is fed into the machine but once.—In Fig. 31, the cylinders B are the three cylinders each with a casing carrying the three monochrome intaglio plates. The inking devices F are inking devices for intaglio plates. The mechanisms G are mechanisms for wiping intaglio plates. The cylinders C are intermediate cylinders provided with rubber blankets. The cylinder D is a pressure cylinder provided with two pincers. The cylinder E is the cylinder carrying the typographic letterpress or plates. The cylinder I is the reversing cylinder. The machine will be rotated a few turns so as to make sure of the proper inking and wiping of the plates, whereupon the rubber cylinder will be lowered and will become impressed on contact with the inked plates and will transfer that impression to the paper provided with a suitable margin on the pressure cylinder. The printing will be continued in the usual manner.

Printing of typographic letterpress or blocks.—The typographic inking device is provided with ink, admission of ink is produced by regulating the inking knife, the machine is started for making sure of the perfect distribution of ink on the rollers of

the typographic inking mechanism, whereupon the armor provided with the plates, is arranged on the cylinder E which is brought into contact with the pressure cylinder. The contact rollers are adjusted, and the printing is proceeded with in the usual manner.

Combined printing.—The printing of the intaglio plates and the printing of typographic letterpress or blocks is adjusted as stated, and after having brought the cylinders into contact, the printing is proceeded with in the usual manner. The paper fed into the pressure cylinder, will receive the impression of the intaglio plates on the rubber blanket of the cylinder C and will obtain direct the impression of the typographic letterpress or block in its passage under pressure over the typographic cylinder, and it will come out by means of the reversing cylinder on the taking off or delivery device which will deposit it on the receiving table.

We claim:—

1. In a printing machine, a cylinder, an armor or casing attached to a portion of the surface of said cylinder, said armor or casing being adapted to carry plates engraved in intaglio, inking mechanism for said intaglio plates, ink wiping mechanism for said intaglio plates, a pressure cylinder, a cylinder intermediate said pressure cylinder and said first named cylinder carrying a soft rubber blanket, a reversing cylinder coacting with said pressure cylinder, said pressure cylinder being provided with means for seizing and driving the paper to be printed, mechanism for feeding paper to said pressure cylinder, a cylinder coacting with said pressure cylinder for carrying typographic blocks, and inking mechanism for said last named cylinder.

2. In a printing machine, a cylinder, an armor or casing attached to a portion of the surface of said cylinder, said armor or casing being adapted to carry plates engraved in intaglio, means for fastening said armor or casing on said cylinder, inking mechanism for said intaglio plates, means for raising said inking mechanism from contact with said intaglio plates, ink wiping mechanism for said intaglio plates, a pressure cylinder, a cylinder intermediate said pressure cylinder and said first named cylinder carrying a soft rubber blanket, a reversing cylinder coacting with said pressure cylinder, said pressure cylinder being provided with means for seizing and driving the paper to be printed, mechanism for feeding paper to said pressure cylinder, a cylinder coacting with said pressure cylinder for carrying typographic blocks, and inking mechanism for said last named cylinder.

3. In a printing machine, a cylinder, an armor or casing conforming to the curvature

of the said cylinder carrying plates engraved in intaglio, grooves at the end of said cylinder into which a portion of said armor or casing enters, fastening means disposed in said grooves for holding said armor or casing in position, inking mechanism for said intaglio plates, means for moving said inking mechanism to and from contact with said intaglio plates, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said wiping contact rollers, a plurality of scrapers adjustable with reference to said wiping cylinders, a pressure cylinder, pincers on said pressure cylinder for seizing and driving the paper during printing; and an intermediate cylinder between said pressure cylinder and said first named cylinder, said last named cylinder being provided with a soft rubber blanket.

4. In a printing machine, a cylinder, an armor or casing conforming to the curvature of the said cylinder carrying plates engraved in intaglio, grooves at the end of said cylinder into which a portion of said armor or casing enters, fastening means disposed in said grooves for holding said armor or casing in position, inking mechanism for said intaglio plates, means for moving said inking mechanism to and from contact with said intaglio plates, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said wiping contact rollers, a plurality of scrapers adjustable with reference to said wiping cylinders, a pressure cylinder, pincers on said pressure cylinder for seizing and driving the paper during printing, an intermediate cylinder between said pressure cylinder and said first named cylinder, said last named cylinder being provided with a soft rubber blanket, a reversing cylinder coacting with said pressure cylinder, a cylinder coacting with said pressure cylinder carrying typographic blocks, and inking mechanism for said typographic cylinder.

5. In a printing machine, a cylinder, an armor or casing conforming to the curvature of the said cylinder carrying plates engraved in intaglio, grooves at the end of said cylinder into which a portion of said armor or casing enters, fastening means disposed in said grooves for holding said armor or casing in position, inking mechanism for said intaglio plates, a pressure cylinder, pincers on said pressure cylinder for seizing and driving the paper during printing, an intermediate cylinder between said pressure cylinder and said first named cylinder, a reversing cylinder coacting with said pressure cylinder, and paper discharging means coacting with said reversing cylinder.

6. In a printing machine, a cylinder, an armor or casing carrying plates engraved

in intaglio attached to a portion of the surface of said cylinder, inking mechanism for said intaglio plates, means for moving said inking mechanism to and from contact with said intaglio plates, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said contact rollers, scrapers for said wiping cylinders, a rim or casing attached to the frame of the machine, bearings for said wiping contact rollers eccentrically mounted in said rim, a pressure cylinder, pincers disposed on said pressure cylinder for seizing and driving the paper during the printing, an intermediate cylinder between said pressure cylinder and said first named cylinder, means on said cylinder for holding a soft rubber blanket, a reversing cylinder coacting with said pressure cylinder, and paper discharging means coacting with said reversing cylinder.

7. In a printing machine, a cylinder, an armor or casing carrying plates engraved in intaglio attached to a portion of the surface of said cylinder, inking mechanism for said intaglio plates, means for moving said inking mechanism to and from contact with said intaglio plates, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said contact rollers, scrapers for said wiping cylinders, a rim or casing attached to the frame of the machine, rings mounted within said rim, bearings for said wiping contact rollers mounted eccentrically within said rings, means for imparting reciprocating transverse movement to said wiping cylinders, a pressure cylinder, pincers on said pressure cylinder for seizing and driving the paper during the printing, a reversing cylinder coacting with said pressure cylinder, discharge mechanism for the paper actuated by said pressure cylinder, an intermediate cylinder arranged between said pressure cylinder and said first named cylinder, a soft rubber blanket arranged on said intermediate cylinder, and means on said cylinder for placing said soft rubber blanket under the required tension.

8. In a printing machine, a cylinder, an armor or casing carrying plates engraved in intaglio attached to a portion of the surface of said cylinder, inking mechanism for said intaglio plates, means for moving said inking mechanism to and from contact with said intaglio plates, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said contact rollers, scrapers for said wiping cylinders, a rim or casing attached to the frame of the machine, rings mounted within said rim, bearings for said wiping contact rollers mounted eccentrically within said rings, means for imparting circular movement to

said rim, a pressure cylinder, pincers on said pressure cylinder for seizing and driving the paper during the printing, a reversing cylinder coacting with said pressure cylinder, discharge mechanism for the paper actuated by said pressure cylinder, an intermediate cylinder arranged between said pressure cylinder and said first named cylinder, a soft rubber blanket arranged on said intermediate cylinder, and means on said cylinder for placing said soft rubber blanket under the required tension.

9. In a printing machine, a cylinder, an armor or casing carrying plates engraved in intaglio attached to a portion of the surface of said cylinder, inking mechanism for said intaglio plates, means for moving said inking mechanism to and from contact with said intaglio plates, a series of wiping contact rollers engaging said cylinder, a series of wiping cylinders engaging said contact rollers, a series of blades adjustable with reference to said wiping cylinders, a bearing for each of said wiping cylinders, a groove in said bearing, a projection entering said groove, means for rotating said wiping cylinder at a low speed, whereby reciprocating movement will be imparted to said wiping cylinder by the engagement of said projection in said groove, a pressure cylinder, pincers on said pressure cylinder for seizing and driving the paper during the printing, a reversing cylinder coacting with said pressure cylinder, an intermediate cylinder arranged between said pressure cylinder and said first named cylinder, a soft rubber blanket arranged on said intermediate cylinder, and means on said cylinder for placing the said blanket under the desired tension.

10. In a printing machine, a cylinder, an armor or casing carrying plates engraved in intaglio arranged on a portion of the surface of said cylinder, means for detaching said armor or casing from said cylinder, inking mechanism for said cylinder, means for moving said inking mechanism to and from contact with said cylinder, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said contact rollers, a plurality of scrapers coacting with said wiping cylinders, a rim or casing attached to the frame of the machine, bearings for said contact rollers eccentrically mounted in said rim, a pair of projections on said rim, a cam arranged between said projections, a cam shaft and means for turning the same whereby circular movement will be imparted to said rim, a pressure cylinder, pincers arranged on said pressure cylinder for seizing and driving the paper during the printing, a reversing cylinder coacting with said pressure cylinder also carrying pincers for seiz-

ing the paper, paper discharging means co-acting with said reversing cylinder, and an intermediate cylinder disposed between said pressure cylinder and said first named cylinder carrying a soft rubber blanket.

11. In a printing machine, a cylinder, an armor or casing carrying plates engraved in intaglio arranged on a portion of the surface of said cylinder, means for detaching said armor or casing from said cylinder, inking mechanism for said cylinder, means for moving said inking mechanism to and from contact with said cylinder, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said contact rollers, a plurality of scrapers coacting with said wiping cylinders, a rim or casing attached to the frame of the machine, bearings for said contact rollers eccentrically mounted in said rim, a pair of projections on said rim, a cam arranged between said projections, a cam shaft and means for turning the same whereby circular movement will be imparted to said rim, a pressure cylinder, pincers arranged on said pressure cylinder for seizing and driving the paper during the printing, a reversing cylinder coacting with said pressure cylinder also carrying pincers for seizing the paper, paper discharging means coacting with said reversing cylinder, a cylinder carrying typographic blocks coacting with said pressure cylinder, inking mechanism for said typographic cylinder consisting of an inking roller, distributing rollers and contact rollers, means for imparting reciprocating movement to said distributing rollers, an intermediate cylinder disposed between said pressure cylinder and said first named cylinder, a soft rubber blanket disposed on said cylinder, and means on said cylinder for placing said blanket under the desired tension.

12. In a printing machine, a cylinder, an armor or casing carrying plates engraved in intaglio arranged on a portion of the surface of said cylinder, means for detaching said armor or casing from said cylinder, inking mechanism for said cylinder, means for moving said inking mechanism to and from contact with said cylinder, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said contact rollers, a plurality of scrapers coacting with said wiping cylinders, means for imparting reciprocating transverse movement to said wiping cylinders, a pressure cylinder, said cylinder being provided with a recess, a pincer-carrying member arranged in said recess, stops arranged to engage said member to turn it on its axis so that the pincers may engage and disengage the paper to be printed, a reversing cylinder coacting

with said pressure cylinder, paper feeding mechanism coöperating with said pressure cylinder and said reversing cylinder, and an intermediate cylinder disposed between said pressure cylinder and said first named cylinder carrying a soft rubber blanket.

13. In a printing machine, a cylinder, an armor or casing carrying plates engraved in intaglio arranged on a portion of the surface of said cylinder, means for detaching said armor or casing from said cylinder, inking mechanism for said cylinder, means for moving said inking mechanism to and from contact with said cylinder, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said contact rollers, a plurality of scrapers coacting with said wiping cylinders, means for imparting reciprocating transverse movement to said wiping cylinders, a pressure cylinder, said cylinder being provided with a recess, a pincer-carrying member arranged in said recess, means for engaging said member to turn it on its axis so that the pincers may engage and disengage the paper to be printed, a reversing cylinder coacting with said pressure cylinder, pincers for engaging the paper arranged on said reversing cylinder, cam mechanism for operating said pincers, discharge mechanism for the printed paper operated by the movement of the pressure cylinder, and an intermediate cylinder disposed between said pressure cylinder and said first named cylinder carrying a soft rubber blanket.

14. In a printing machine, a cylinder, an armor or casing carrying plates engraved in intaglio arranged on a portion of the surface of said cylinder, means for detaching said armor or casing from said cylinder, inking mechanism for said cylinder, means for moving said inking mechanism to and from contact with said cylinder, a plurality of wiping contact rollers engaging said cylinder, a plurality of wiping cylinders engaging said contact rollers, a plurality of scrapers coacting with said wiping cylinders, means for imparting reciprocating transverse movement to said wiping cylinders, a pressure cylinder, said cylinder being provided with a recess, a pincer-carrying member arranged in said recess, means for engaging said member to turn it on its axis so that the pincers may engage and disengage the paper to be printed, a reversing cylinder coacting with said pressure cylinder, pincers for engaging the paper arranged on said reversing cylinder, cam mechanism for operating said pincers, discharge mechanism for the printed paper operated by the movement of the pressure cylinder, an intermediate cylinder disposed between said pressure cylinder and said first

named cylinder carrying a soft rubber blanket, a cylinder carrying typographic blocks coacting with said pressure cylinder, inking mechanism for said typographic cylinder consisting of an inking roller, distributing rollers and contact rollers, and means for imparting reciprocating movement to said distributing rollers.

In testimony whereof we affix our signatures in presence of two witnesses.

AUGUSTE VALENTIN.
JEAN ZERREISS.
HENRI GEORGES.

Witnesses:

DEAN B. MASON,
JULIUS CAVENY.