

E. MERTENS.
 INTAGLIO PRINTING MACHINE MECHANISM.
 APPLICATION FILED DEC. 1, 1910.

1,057,073.

Patented Mar. 25, 1913.
 3 SHEETS—SHEET 1.

Fig. 1

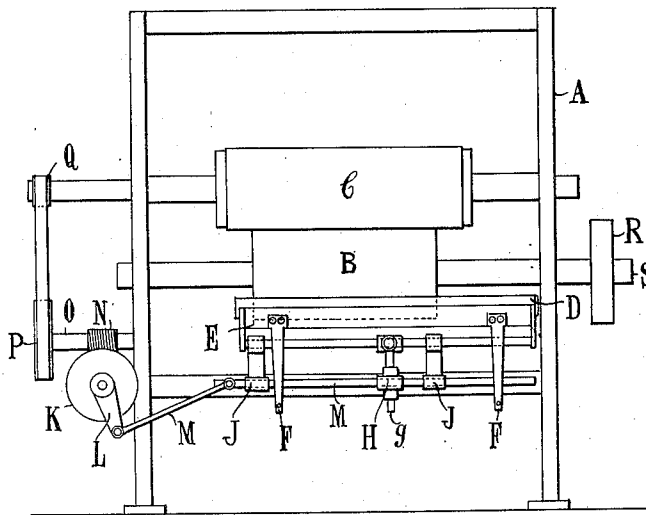
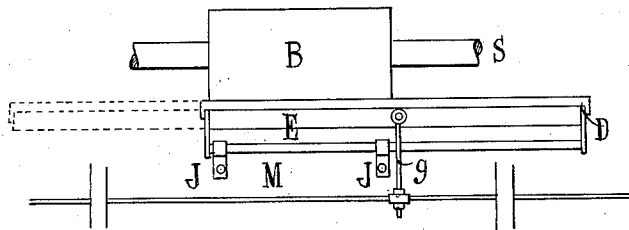


Fig. II



Witnesses

E. M. Morse
L. E. Buckley

Inventor

per:

Eduard Mertens
Frank. Annemay

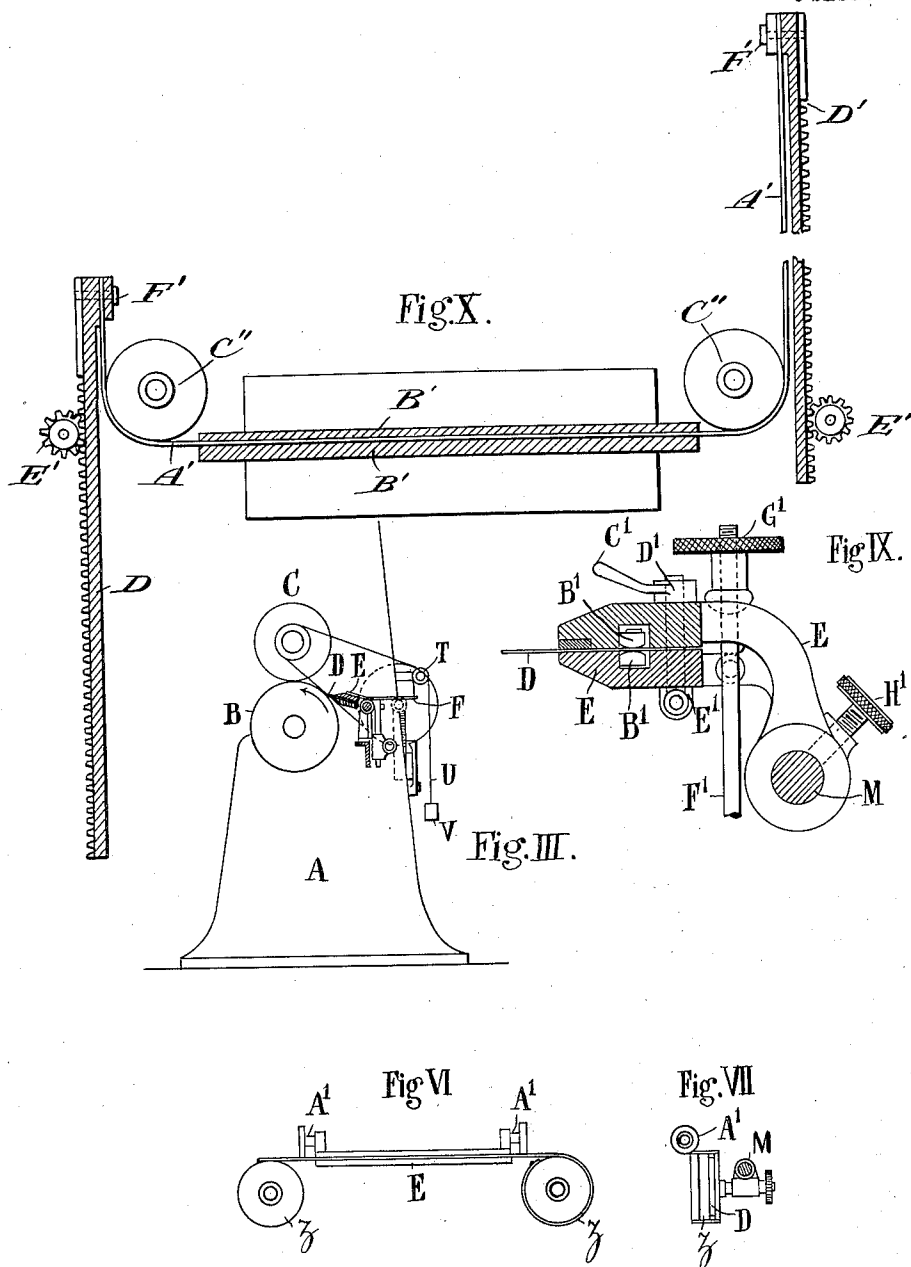
Attorney.

E. MERTENS.
 INTAGLIO PRINTING MACHINE MECHANISM.
 APPLICATION FILED DEC. 1, 1910.

1,057,073.

Patented Mar. 25, 1913.

3 SHEETS-SHEET 2.



Witnesses
 E. Moore.
 H. C. Clark.

per:

Inventor.
 Eduard Mertens
 Frank Applemay
 Attorney.

E. MERTENS.
 INTAGLIO PRINTING MACHINE MECHANISM.
 APPLICATION FILED DEC. 1, 1910.

1,057,073.

Patented Mar. 25, 1913.

3 SHEETS—SHEET 3.

Fig.V

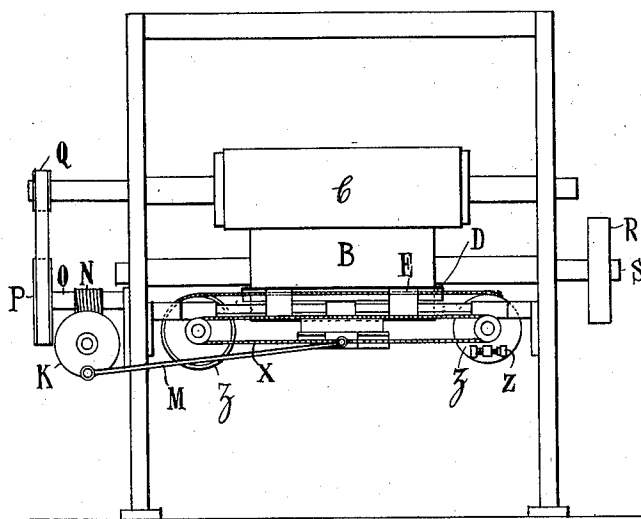


Fig.VIII

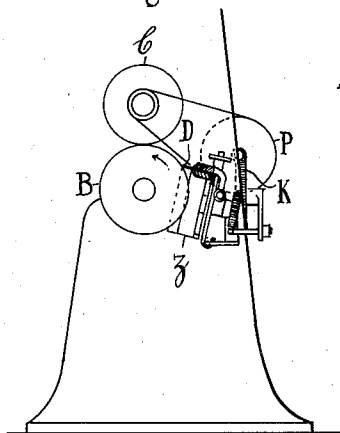
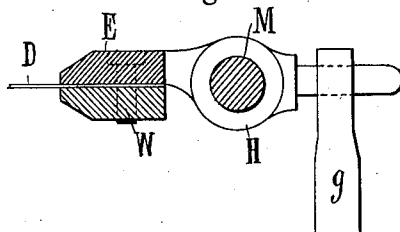


Fig.IV



Witnesses
 E. M. Moore.
 L. E. Berkley.

per

Inventor
 Eduard Mertens
 Frank Schlemmer
 Attorney.

UNITED STATES PATENT OFFICE.

EDUARD MERTENS, OF FREIBURG, BREISGAU, GERMANY.

INTAGLIO-PRINTING-MACHINE MECHANISM.

1,057,073.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed December 1, 1910. Serial No. 595,098.

To all whom it may concern:

Be it known that I, EDUARD MERTENS, a subject of the Emperor of Germany, residing at 60 Freiaustrasse, Freiburg, Breisgau, in the German Empire, have invented certain new and useful Improvements in Intaglio-Printing-Machine Mechanism, of which the following is a specification.

This invention relates to improvements in intaglio printing machine mechanism for color printing and the like on paper, calico, oil cloth and so forth.

Referring to the accompanying drawings; Figure I is an elevation of the printing machine. Fig. II is a plan view of part of Fig. I. Fig. III is a transverse section of Fig. I. Fig. IV shows a detail. Fig. V is a diagram of a machine with reciprocating knife band. Fig. VI shows a vertical longitudinal section of the knife band with the grinding device. Fig. VII a vertical transverse section of the knife band. Fig. VIII is a diagram in transverse section of the printing machine. Fig. IX shows a vertical transverse section of the knife band and its holding mechanism. Fig. X shows a vertical section of a knife which is carried upward beyond the mechanism for guiding the knife.

With intaglio printing machines with moving scraper or knife as hitherto constructed, it is found in practice, especially in the printing of pictures in which the pictorial forms are unequally distributed over the surface of the printing roller, that the color knife tends to wear unequally, which gives rise to injurious results.

In my present invention the limited motion of the knife in a direction parallel to the axis of the roller, which has hitherto been usual, is altogether changed. The aforesaid motion has hitherto effected a sidewise sliding of the knife of at the most 10 cm. to each side. The present invention is based upon the causing of this sidewise displacement to take place to such an extent that it amounts to approximately half the width of the printing roller surface to each side respectively or even more. Thus, for instance, supposing the printing surface of an intaglio printing roller to possess a width of 60 cm. then according to my improvement the color knife will move not as hitherto usual, to a maximum of 10 cm. right and left during the printing, but it will move to each side from 30 to 60 cm. or even

more. Moreover, instead of moving in a straight line the color knife, which is conveniently in the shape of the usual steel blade, can be carried upward in an arc beyond the ordinary means for guiding the color knife provided within the reach of the printing roll; this is especially advantageous if the construction of the machine does not permit of so wide a displacement of the knife in a straight line; instead moreover of moving the color knife parallel to the printing roller axis it can be caused (in the manner already known in connection with calico printing,) to slide spirally over the roller. By means of this extensive sidewise motion of the knife, I attain the result that each part of the color knife is worn away uniformly or approximately uniformly by the various engravings or etchings of the roller.

The motion of the knife band is not necessarily a reciprocating one, but may also take place in one direction only, the band being endless and traveling along the printing roller during the printing, guided by the knife holder and sliding in this holder. In this case also the motion of the knife can be caused to be a reciprocating one. During the motion, the knife can come in contact with a cleaning and grinding device. If the motion of the color knife band takes place not in one direction only but reciprocates then the band need not be endless.

The usual auxiliary apparatuses for driving, guiding, cleaning and grinding the knife are assumed to be already well known in the art, and are therefore not here described in detail. Some of them are indicated in the drawings which show a construction of the invention for a retilinear sidewise motion of the knife, and also for a motion in which the knife band is carried upward in an arc beyond the means for guiding the color knife.

Referring more in detail to Figs. I and II, A indicates the supports of the machine, B the printing roller, C the impression cylinder, D the knife which is held in the holder E to which holder are attached the two levers F. The holder E is moved to and fro parallel to the roller B by means of the rod G in the socket H which is itself moved by the shaft M supported horizontally in the bearings J and drawn to and fro by the worm wheel N turning the wheel K, crank L and rod M. The worm wheel N is fixed

upon the shaft O which also bears the wheel P which is driven from a pulley Q on the prolonged axle of the cylinder C. The actuation of the whole mechanism is effected
5 by means of the tooth wheel R and the shaft S.

Fig. III shows a transverse section of Fig. I. T indicates a roller which supports the weight V by means of a band U attached to V and passing over T, the other
10 end of the band being attached to the free ends of the levers F. This tension device has the purpose of pressing the knife against the printing roller B.

Fig. IV illustrates the method of compressing together the upper and the lower part of the knife holder by means of the
15 screw W.

Fig. V shows a reciprocating knife-band which is wound alternately to the right and to the left upon the two drums z, so that each point of the knife gradually slides over the entire printing roller. X is a chain which controls the motion of the wheels of
20 the drums z and which is driven by means of the actuating mechanism N K M, already referred to. Z indicates a tension device on the roller z whereby the tension of the color knife may be adjusted. R is the driving
25 wheel of the printing machine and S the shaft of the printing cylinder.

Fig. VI shows a vertical section of the knife-band. A' indicates a sharpening device driven in any suitable manner, for example by a special motor or by the machine
30 itself, which touches the knife band during its passage.

Fig. VII shows a vertical cross section of the knife-band in which the grinding device
40 A' is more clearly shown.

Fig. VIII shows a vertical cross section of the intaglio printing apparatus, and Fig. IX shows a vertical cross section of the band shaped knife and holder. B' indicates two rolls by means of which the knife
45 band D glides in the holder E. C' indicates

a lever by means of which the screw D' of the shaft K' is tightened or loosened in order to enable the two jaws of the holder E to open out for the removal of the knife
50 D. F' and G' indicate the screw device which presses the knife D against the roller B. H' is a set screw for fastening the holder E upon the shaft M.

Fig. X shows a reciprocating knife band 55 which is carried upward in an arc beyond the mechanism for guiding the knife. A' is the color knife led through guides B' and which is passed over rollers C''. The knife A' is secured at its ends F' to racks 60 D' meshing with toothed wheels E' which are revolved first in one direction and then in the other direction for the purpose of oscillating the color knife A'.

What I claim as my invention and desire 65 to secure by Letters Patent is:—

1. An improved intaglio printing machine consisting of a rotating printing cylinder, an oscillating flexible color band knife pressing thereon, an adjustable knife guide,
70 means for horizontally moving said color knife more than a quarter of the width of the printing surface of the printing cylinder, and means for simultaneously sharpening the color knife during its oscillation. 75

2. An improved intaglio printing machine consisting of a rotating printing cylinder, an oscillating flexible color band knife pressing thereon, means for adjusting the tension of said color knife, an adjustable knife
80 guide, means for moving said color knife more than a quarter of the width of the printing surface of the printing cylinder, and means for simultaneously sharpening the color knife during its oscillation. 85

In testimony whereof I affix my signature in presence of two witnesses.

EDUARD MERTENS.

Witnesses:

OTTO MERTENS,
JEAN GRUND.