

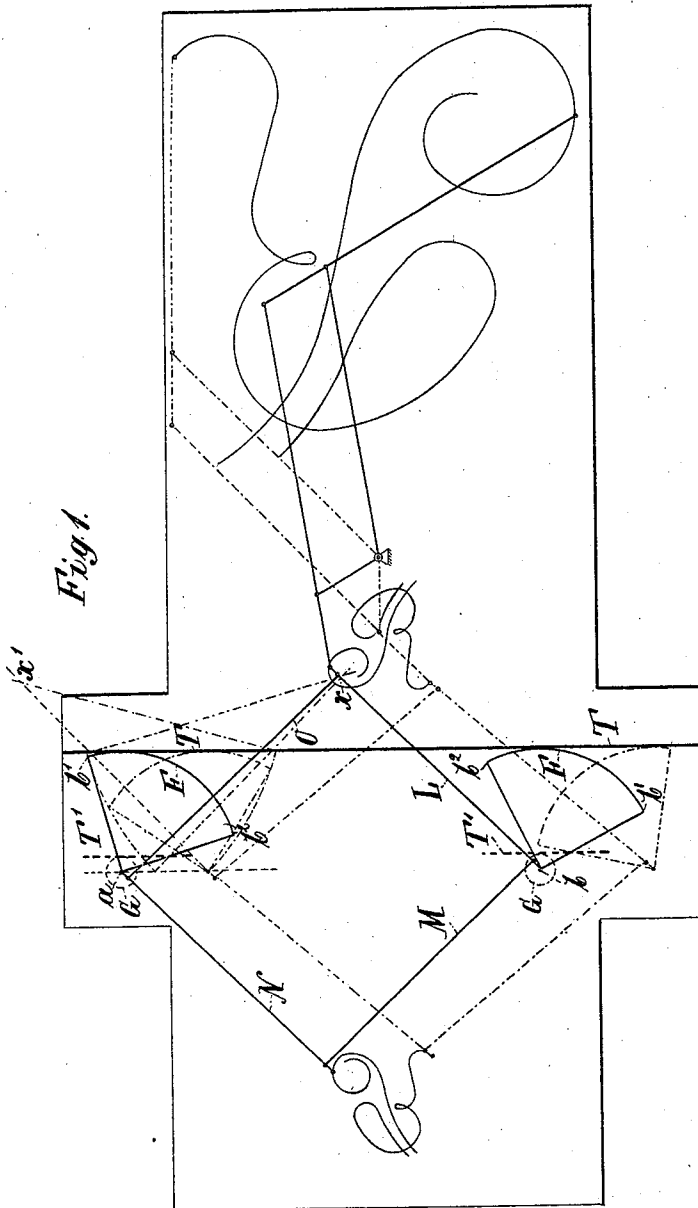
(No Model.)

3 Sheets—Sheet 1.

F. W. SABEL.
ENGRAVING MACHINE.

No. 587,332.

Patented Aug. 3, 1897.



Witnesses.
C. Severance.
Harry E. Hay.

Inventor
Friedrich Wilhelm Sabel
by
Wm H Babcock
Attorney

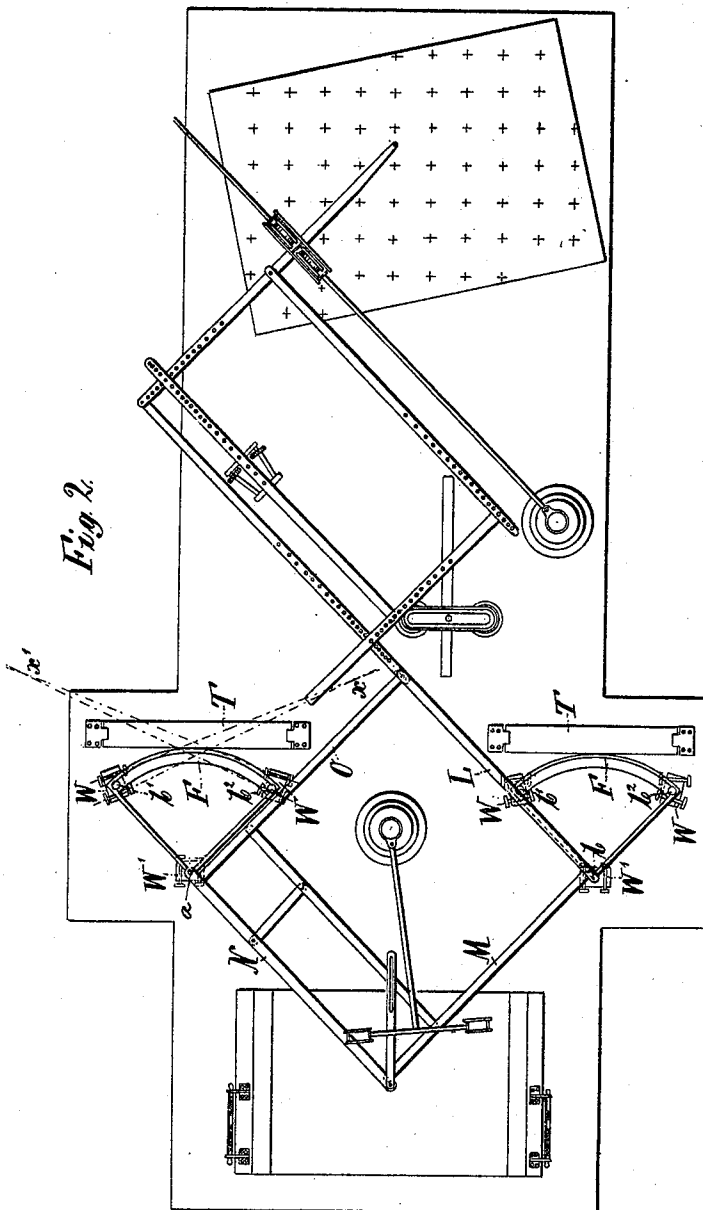
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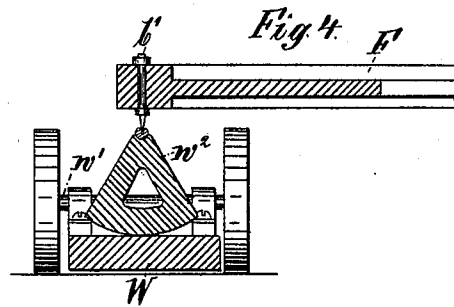
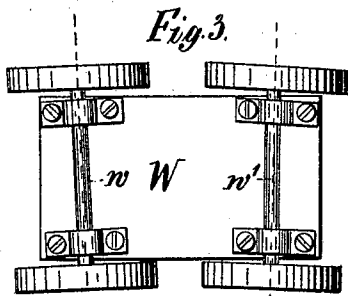


Fig. 5.

Fig. 6.

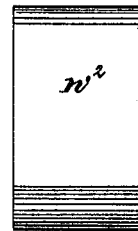
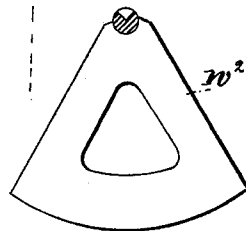


Fig. 7.

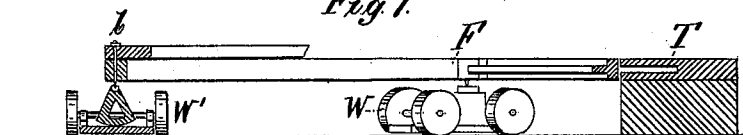


Fig. 8.

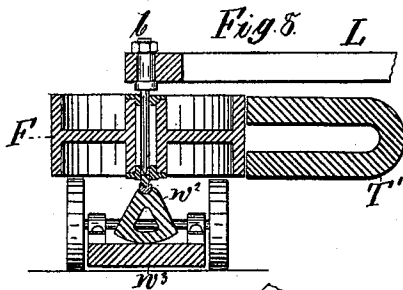


Fig. 10.

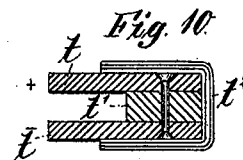


Fig. 9.

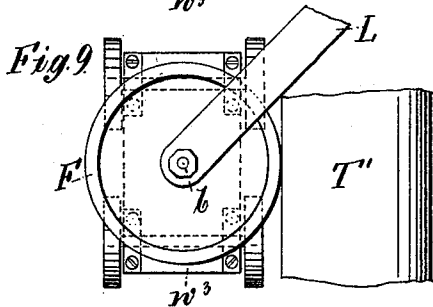
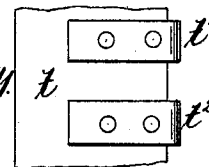


Fig. 11.



Witnesses.

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UNITED STATES PATENT OFFICE.

FRIEDRICH WILHELM SABEL, OF COBLENTZ, GERMANY.

ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 587,332, dated August 3, 1897.

Application filed July 24, 1896. Serial No. 600,348. (No model.) Patented in Germany August 15, 1895, No. 86,384; in France November 23, 1895, No. 251,934; in England March 28, 1896, No. 6,669, and in Belgium May 5, 1896, No. 121,254.

To all whom it may concern:

Be it known that I, FRIEDRICH WILHELM SABEL, a citizen of the Empire of Germany, residing at Coblenz, Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Engraving-Machines, (for which I have obtained patents in Germany, No. 86,384, dated August 15, 1895; in England, No. 6,669, dated March 28, 1896; in Belgium, No. 121,254, dated May 5, 1896, and in France, No. 251,934, dated November 23, 1895;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the accompanying drawings, Figure 1 is a diagram showing operations of machine. Fig. 2 is a plan view of same machine. Figs. 3 to 11 represent detail views.

In the specification of Patent No. 460,762 an engraving-machine is described for producing a reduction and reversed drawing upon a printing-plate, in which the points a and b , Fig. 1, of the parallelogram $L O N M$, which are to be guided straight, are attached to lemniscoidal guides, whose inaccuracies in guiding straight are compensated for by a corrective curve. This guide, although it acts excellently, presents several inconveniences, because it is complicated in construction and occupies much space. To obviate these inconveniences is the object of my present invention.

If a circle is caused to roll without a sliding movement upon a straight line, the center of the circle will move in a straight line, while each point of the circumference of the circle describes a cycloid. Having regard to this fact, I make the points a and b to be guided straight (Fig. 1) by the axes of two segments of circles or quadrants F or circular disks G , which roll upon a straight ruler T or T' . In this case I overcome the difficulty of pressing F or G against T or T' and the rolling of these parts without a sliding movement by making the segments F or circular disks G of iron or steel and causing their periphery to bear against a permanent or electro magnet, which forms the straight ruler.

By the magnetic power the segment F or

the circular disk G is pressed firmly against the ruler T or T' in such a manner that a rolling movement without sliding is obtained, which is absolutely necessary by reason of the great mobility of the entire machine. In order to enable the segments F or the circular disk G , carrying the parallelogram $L M N O$, to move upon the table, they must be supported, for which purpose I make use of small carriages, upon which the center b of the circular disk G or the points $b b'$ of the segment F are supported in the following peculiar manner.

The corner-points $b b'$, Fig. 1, of the segment F describe cycloids, upon whose path the small carriages, on which these points rest, must travel in the rolling movement of F upon T . The two cycloids may be replaced approximately by two arcs of circles, whose most favorable centers $x x'$ can best be determined empirically in order to see the extent of deviation of the circumference from the cycloid, which should not amount to upward of five millimeters on both sides. These centers $x x'$ give the directions of the axles for two small four-wheeled carriages W , Figs. 3 and 4, on which the point b' or b^2 rests. If the axles $w w'$ are directed to the point x or x' , Fig. 2, the position of the axles is such that the carriage will move in a circle whose center is x or x' .

In order to equalize the small difference between the circle and the cycloid, the point b' or b^2 is not firmly connected with the frame of the carriage W , but rests upon a segmental bracket w^2 , Fig. 4, which can roll upon the frame-plate of the carriage. Its apex, forming the center of the rolling circle, Figs. 5 and 6, possesses a point-bearing for the point of the axis b' or b^2 , Fig. 4, which latter can therefore be moved to the right or left as far as the deviation of the circumference of the circle from the cycloid may render necessary. The center b of the segment F rests in like manner upon a four-wheeled carriage W' , Figs. 1 and 7, but with parallel axles, a similar segmental bracket with point-bearings equalizing any small inequalities in the motion of the carriages. If in lieu of the segment use is made of a circular disk F , especially in small machines, their center b , as

shown in Figs. 8 and 9, is likewise supported upon the segmental bracket w^2 , resting on the carriage-plate w^3 of a small four-wheeled carriage with parallel axles. In both instances the axle b is connected to the rod L of the parallelogram $L O N M$.

It is expedient to employ in both cases a permanent magnet in order to dispense with the galvanic battery for an electromagnet. This magnet T or T' , Figs. 7 and 8, is secured upon a suitable support arranged on the table. Such a magnet, serving as a ruler, may be constructed by connecting two steel plates $t t$, Figs. 10 and 11, by an intermediate piece t' , of brass, said plates being embraced by single magnets t^2 , composed of single steel strips, which magnets will then communicate their magnetic power to the plates t .

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an engraving-machine a series of arms forming the parallelogram L, O, N, M , connected to a tracing-point and carrying an en-

graving-point, the axes a and b occupying points on said bars the magnetizable segments or disks mounted on the said axes and magnetic rulers arranged to be in contact with their peripheries as the said disks turn substantially as set forth.

2. In an engraving-machine, a series of arms constituting a parallelogram connected to a tracing-point and carrying an engraving-point in combination with two magnetizable segments or disks having their axes a, b at points on said parallelogram, a magnetic ruler arranged to be in contact with said disks or segments as they turn, the small wheeled supporting-carriages $W W'$ and the segmental brackets W^2 rolling thereon substantially as set forth.

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

FRIEDRICH WILHELM SABEL.

Witnesses:

ADOLF BANGEL,
FRANK H. MASON.