

(No Model.)

5 Sheets—Sheet 1.

A. KELLER-DORIAN.

PANTOGRAPH ENGRAVING MACHINE.

No. 302,567.

Patented July 29, 1884.

Fig. 5.

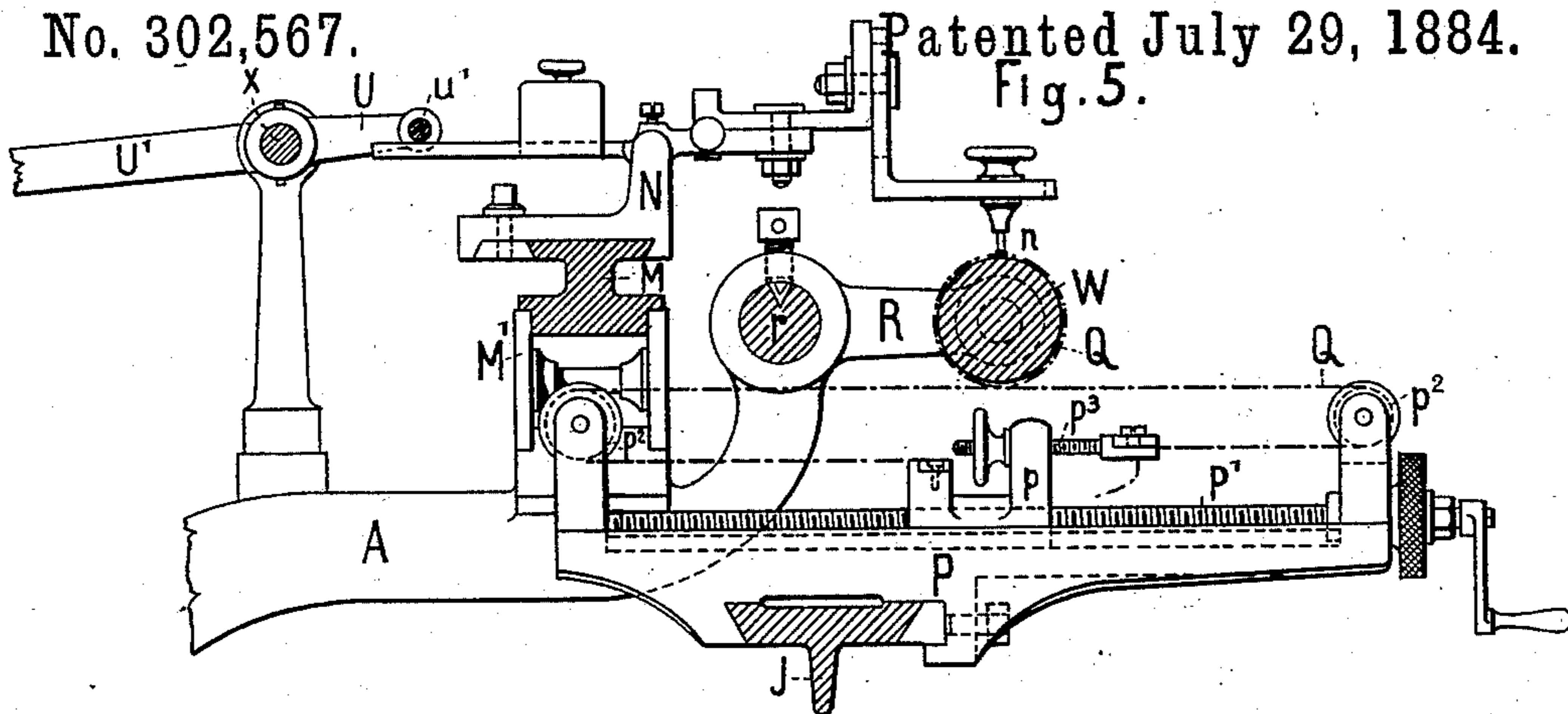
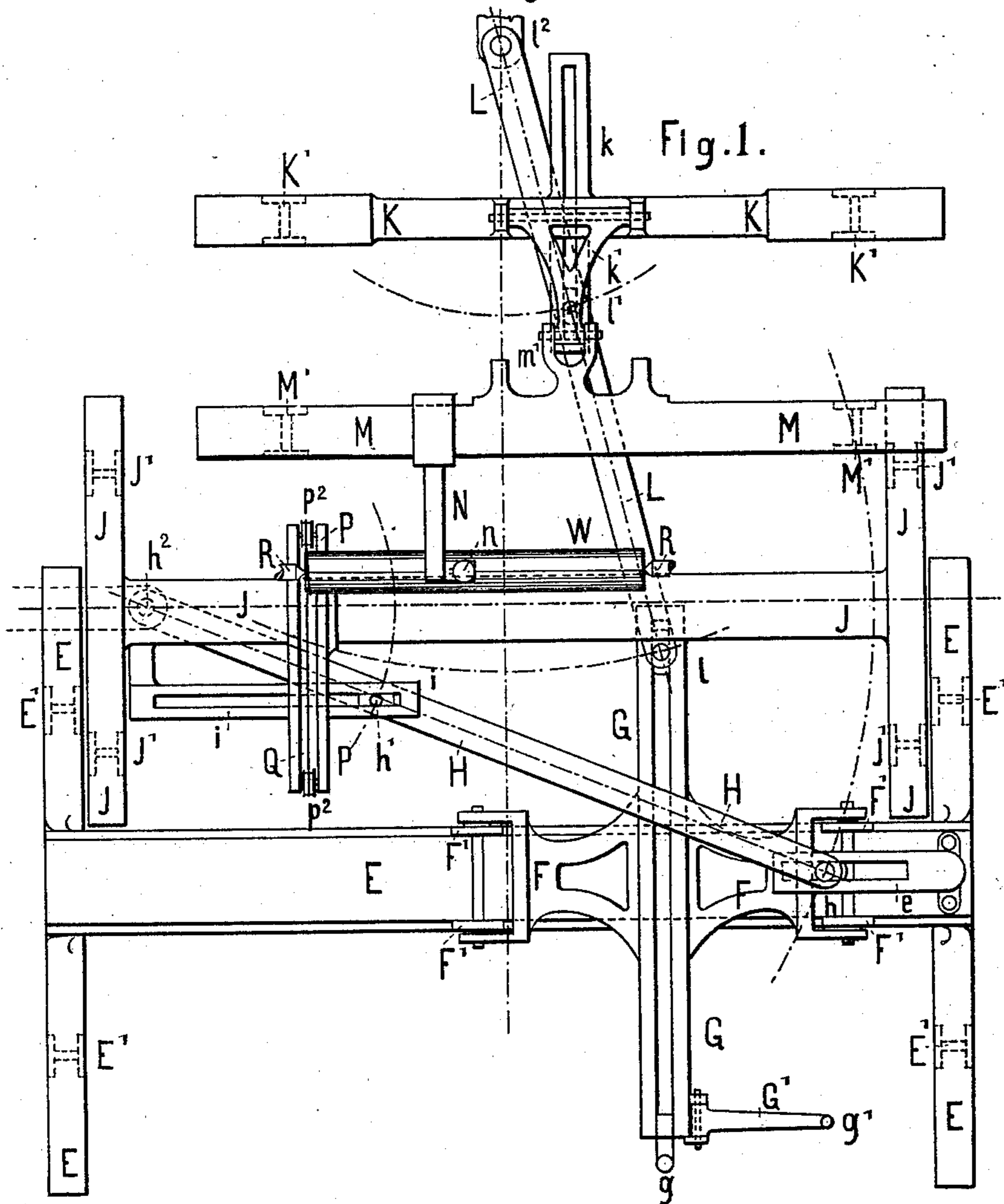


Fig. 1.



Witnesses:
Ed. A. D. R. K.
J. Walter Blandford

Inventor:
Albert Keller-Dorian
by Marshall D. D. R. K.

(No Model.)

5 Sheets—Sheet 2.

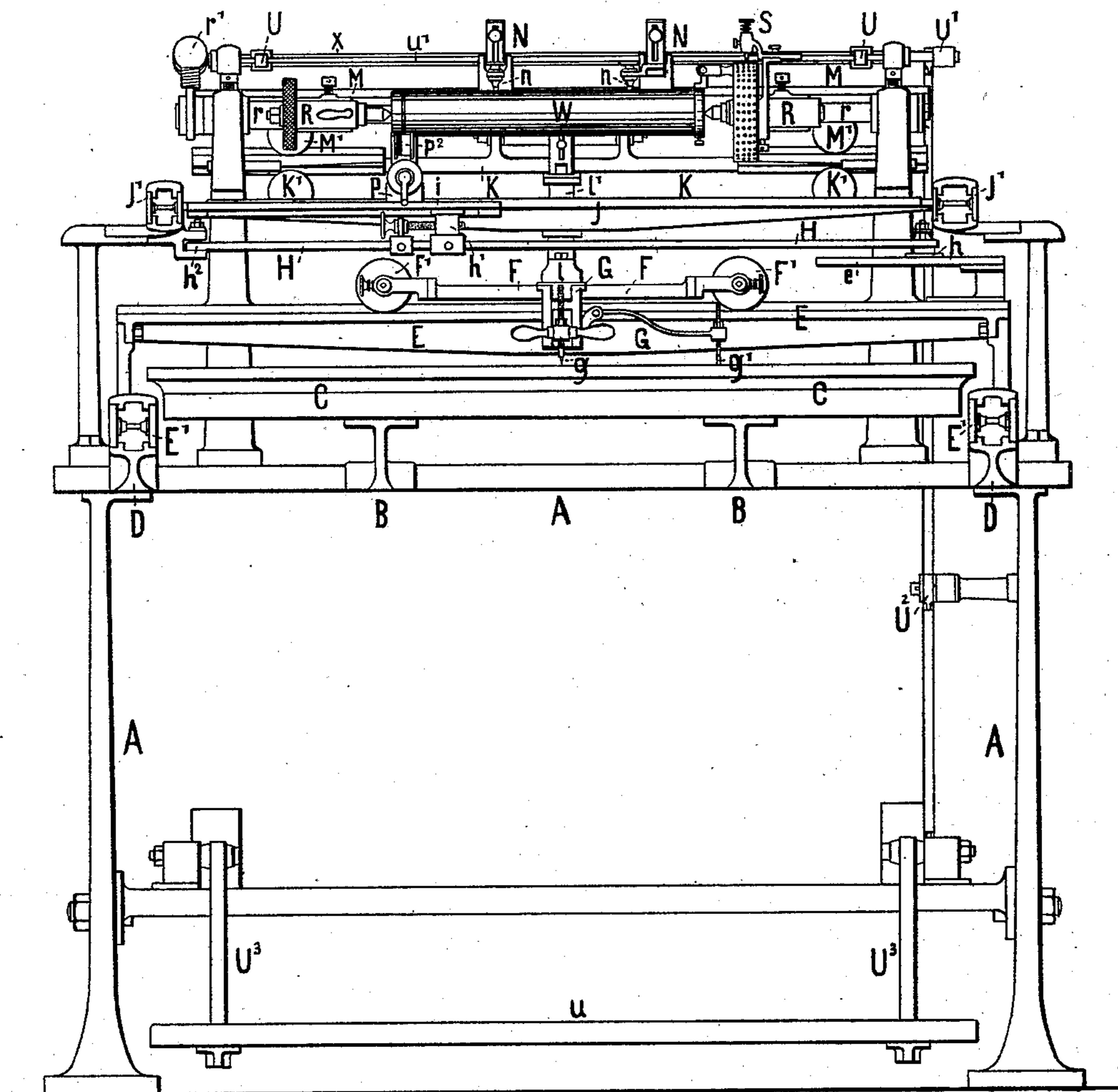
A. KELLER-DORIAN.

PANTOGRAPH ENGRAVING MACHINE.

No. 302,567.

Patented July 29, 1884.

Fig. 2.



Witnesses:

E. A. Dick
J. Walter Blandford

Inventor:

Albert Keller-Dorian
by Marcellus Bailey
Att'y.

(No Model.)

5 Sheets—Sheet 3.

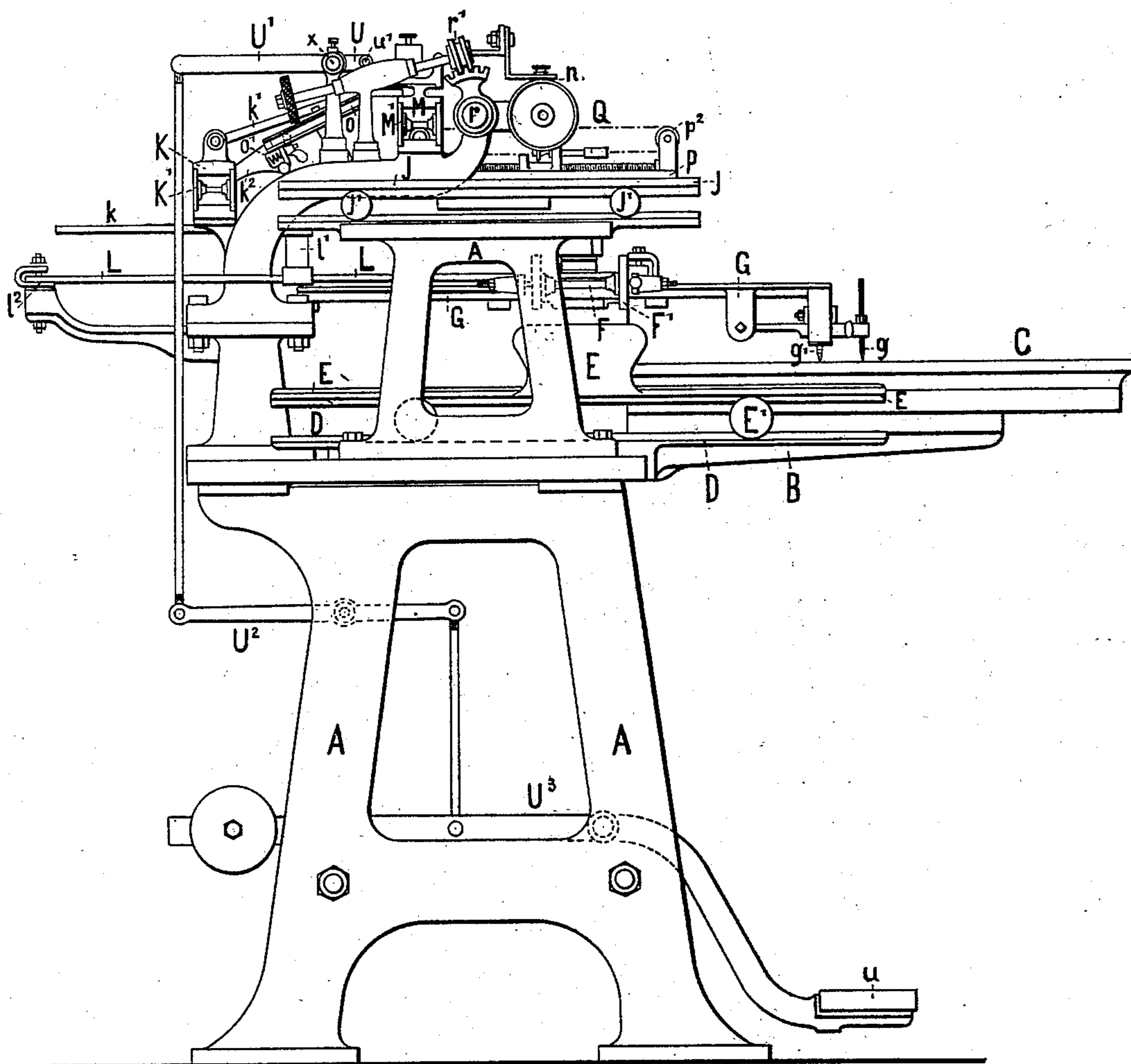
A. KELLER-DORIAN.

PANTOGRAPH ENGRAVING MACHINE.

No. 302,567.

Patented July 29, 1884.

Fig. 3.



Witnesses:
E. A. Dick
J. Keller Blandford

Inventor:
Albert Keller-Dorian
by Marcelus Bailey
Atty

(No Model.)

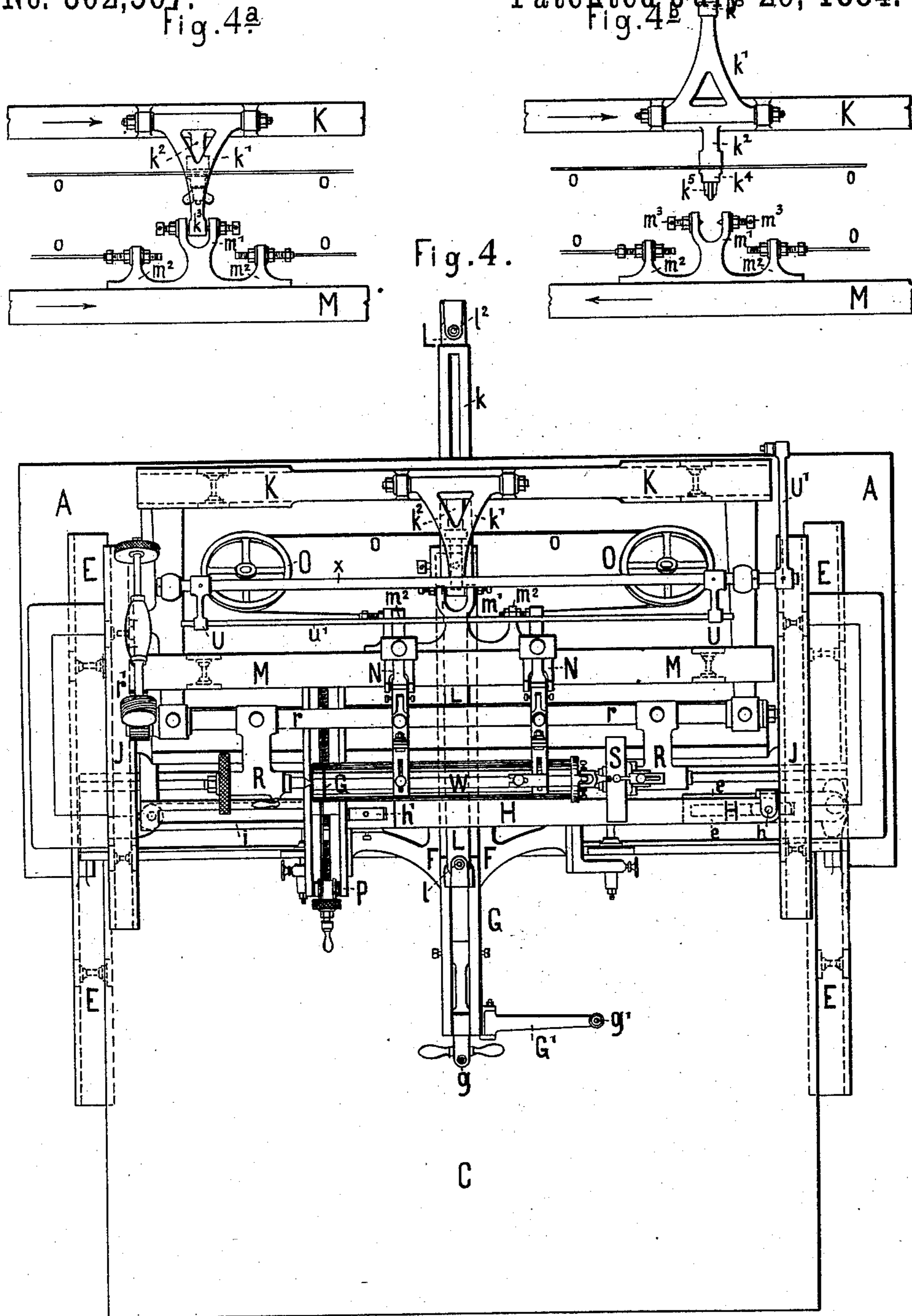
5 Sheets—Sheet 4.

A. KELLER-DORIAN.

PANTOGRAPH ENGRAVING MACHINE.

No. 302,567.

Patented July 29, 1884.



Witnesses:
Ed. Dick
J. Walter Blandford

Inventor:
Albert Keller-Dorian
by Marceline Baile,
att'y

(No Model.)

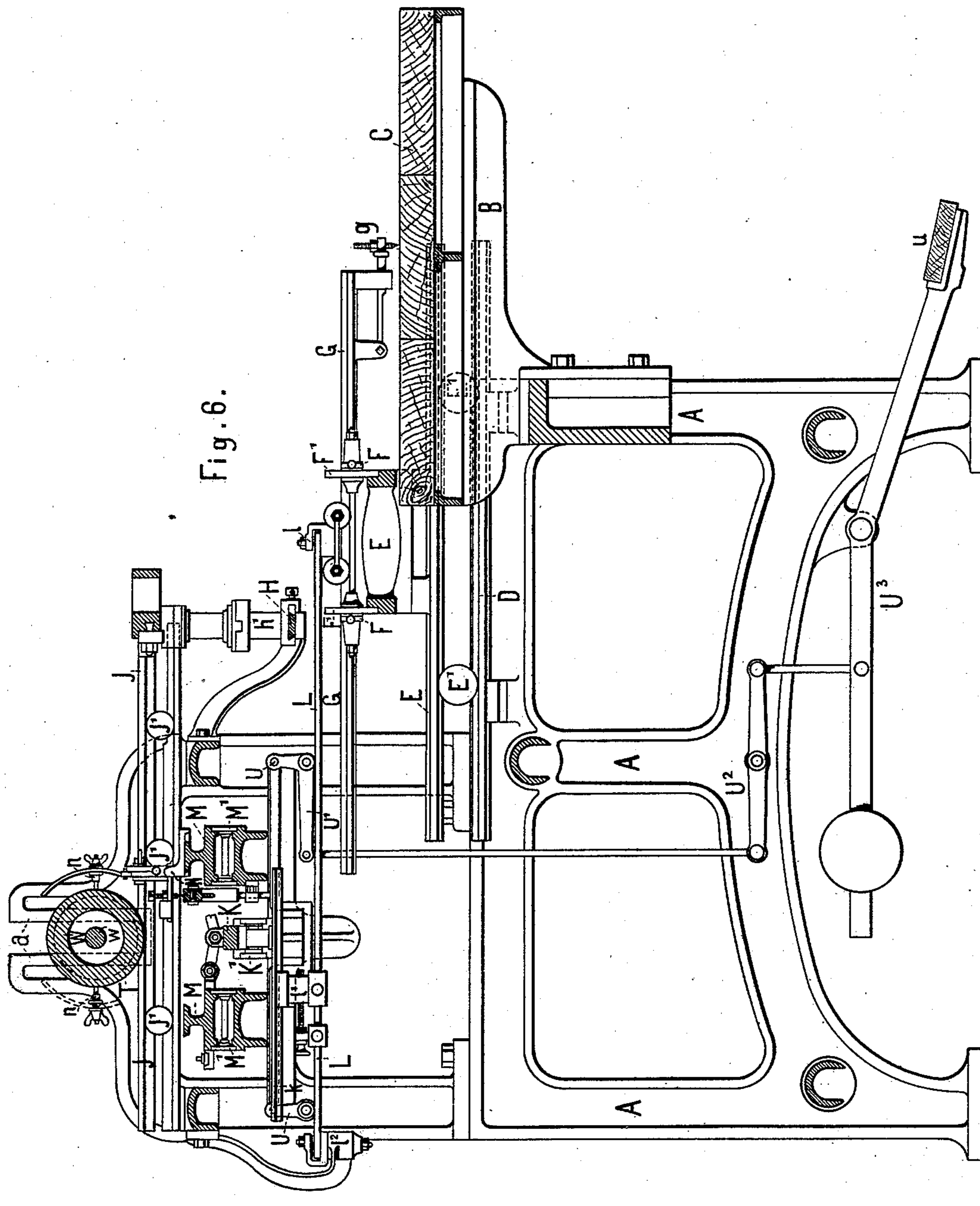
5 Sheets—Sheet 5.

A. KELLER-DORIAN.

PANTOGRAPH ENGRAVING MACHINE.

No. 302,567.

Patented July 29, 1884.



Witnesses:
E. A. Dick
J. Walter Blandford

Inventor:
Albert Keller-Dorian
by Marceline Bailey
Attorney

UNITED STATES PATENT OFFICE.

ALBERT KELLER-DORIAN, OF MÜLHAUSEN, ALSACE, GERMANY.

PANTOGRAPH ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 302,567, dated July 29, 1884.

Application filed April 22, 1884. (No model.) Patented in Germany August 19, 1883, No. 26,291.

To all whom it may concern:

Be it known that I, ALBERT KELLER-DORIAN, engraver, residing in Mülhausen, Alsace, German Empire, have invented new and
5 useful Improvements in Pantograph Engraving-Machines, (for which I have obtained a patent in Germany, August 19, 1883, No. 26,291,) of which the following is a specification.

10 My invention relates to pantographs for engraving printing rollers or plates—i. e., to apparatus serving to transfer a drawing, in reduced size, to a metal roller or plate to be used in printing on cloth or other material. More
15 especially, it has reference to such apparatus of this kind in which carriages traveling at a right angle to each other are used; and the improvements consist in the means employed for conveying motion, reduced in a certain ratio,
20 from one pair of carriages to the other, and for reversing the direction of motion of the engraving-point.

The invention is represented on the annexed five sheets of drawings.

25 Figure 1 is a plan showing the main features of the invention, the levers H and L being placed at an angle to the carriages. Fig. 2 is a front view of a complete apparatus carried out according to the invention. Fig. 3 is a
30 side view thereof, and Fig. 4 a plan. Figs. 4^a and 4^b are detail views of the device for reversing the motion of the engraving-point. Fig. 5 is a sectional view of a part of the apparatus drawn to a larger scale. Fig. 6 is a
35 sectional view showing a modified arrangement of the apparatus.

To the brackets B of the frame A of the apparatus is fixed a table, C, on which the drawing to be copied is placed.

40 W is a roller covered with a coat of etching-varnish, which is to receive the engraving.

g is the tracing-pencil, and n, Fig. 1, the engraving-point. Of the latter there may be two, as shown by Figs. 2 and 4, or even more. The
45 arrangement of the apparatus is such that all movements of the pencil g from the right to the left, or vice versa, which I shall call the "transverse movements," are transferred in the same or in opposite direction to the point
50 or points n, while the movements toward and

away from the operator, or the longitudinal movements, cause a rotation of the roller W, which is carried by centers R. The pencil g is fixed to a slotted guide-bar, G, constituting a part of a carriage, F, mounted on wheels or
55 rollers F', running in or upon ways on the carriage E, the said ways being formed by rabbets or grooves, or in other suitable manner. The carriage E in its turn runs on wheels or rollers E' in or upon stationary ways D, Figs. 60 2 and 3, arranged at a right angle to the ways of the carriage F. In the slotted guide-bar G is a movable slide-block, pivoted at l to a lever, L, having its fulcrum at l², and engaging at l', by means of a pivot, with a slide-block
65 working in the slotted bar k. This bar forms part of a carriage, K, connected by its arm k' (see also Fig. 4^a) to the arm m' of a carriage, M, having adjustably secured to it one or more saddles, N, each of which carries an arm with
70 an engraving-point, n. Both carriages, K and M, which, when connected together as described, may be considered as a single carriage, run by means of their respective wheels or rollers K' and M' in or upon stationary ways
75 parallel to the ways of the carriage F. The carriage E is provided with a slotted bar, e, in which slides a block, pivoted at h to the lever H, turning on its fulcrum h², and engaging at h' by a pivot with a slide-block movable in
80 the slotted bar i. This bar is fixed to a carriage, J, running upon the wheels or rollers J', which are guided by stationary ways arranged above the carriage E and parallel to the ways of this carriage. On the carriage
85 J there is a saddle, P, adapted to be slid lengthwise on the same, and to be secured thereto in the required position. To the said saddle are attached the ends of a band of metal, Q, which is slung with its middle part
90 around one end of the roller W, and which is stretched sufficiently tight to act on the roller by means of friction. When the pencil g is moved, the transverse component of its motion will be transferred by the carriage F and
95 the lever L to the carriages K and M and the engraving point or points n, the motion of n bearing to the transverse motion of g the proportion of the length of the lever-arm l' l to that of the entire lever extending from l² l. 100

The longitudinal component of the motion of g is transferred by the carriage E and the lever H to the carriage J and the metal band Q, which latter consequently imparts to the roller W a rotative motion, the extent whereof, measured on the surface of the roller, is in proportion to the longitudinal motion of g as the length of the lever-arm $h^2 h'$ is to the whole length of the lever extending from $h^2 h$. The pivots at h' and l' , by which the levers H and L engage with the slide-blocks in the slotted bars i and k , respectively, are arranged to be shifted on the said levers in the manner shown in Figs. 2 and 6. The lengths of the lever-arms $h^2 h'$ and $l^2 l'$ may thus be varied, and the proportion in which the design is reduced in size altered accordingly.

The band Q is conducted over sheaves p^2 and fixed with its ends to a slide, p , Fig. 5, guided between ways on the saddle P, and adjustable by a screw, p' . This arrangement allows the roller to be turned by the requisite angle when a strip thereof has been finished and the design is to be repeated. For the purpose of accurately determining the said angle, a divided disk, S, Figs. 2 and 4, is placed loose on one of the centers R, and connected with the roller, while an indicator is fixed to the same center. The screw p^3 serves to stretch the band Q to the necessary degree. The centers R are carried by puppets arranged to be slid on and fixed to an axle, r , Figs. 2 to 5, which is mounted in fixed bearings, and adapted to be turned by a screw, r' , gearing with a sector on the said axle. By means of this mechanism the centers may be raised and lowered simultaneously and uniformly, and the roller thereby adjusted at the proper height relatively to the band Q.

When the two carriages K and M are rigidly connected together, as shown in Figs. 1 and 4, they will both move in conformity with each other and in the same direction as the carriage F. They may, however, also be brought in such relation to each other as to move in opposite directions by means of the metal band o , Fig. 4. This band runs over guiding-sheaves O, and is attached at either end to an arm, m^2 , on the carriage M, while in the middle it may be fixed to the arm k^2 of the carriage K. In order to allow either connection between K and M to be established and broken with facility, the arm k' , with which the carriage K is provided, is pivoted thereto, so that it may be turned over from the position of Figs. 4 and 4^a into the position shown by Fig. 4^b, and its end k^3 fits between the two branches of the forked arm m' on the carriage M. By means of regulating-screws m^3 the clear space between the said branches of the arm m' may be adjusted to be in conformity with the thickness of the part k^3 , and this part may be made slightly tapering for attaining perfect contact with both screws m^3 . Moreover, for connecting the carriage K to the band o , the arm k^2 is provided with a clamping device consisting of the jaw-piece or

washer k^4 and screw with nut k^5 , by which the band o may be clamped against the end of the arm k^2 . When the arm k' is out of engagement with the arm m' , and the two carriages are connected by the band o , the carriage M will move in a direction contrary to that of the carriages K and F, and the design on the roller will be produced in inverted position, as compared with the pattern. It will be seen herefrom that the carriage M is of importance only for this special purpose, whereas when the design is not to be inverted it may be left away, the engraving-point having then to be attached to the carriage K.

Fig. 6 shows a modified arrangement with two carriages M placed below the carriage J, and each having one or more holders with engraving-points n acting on either side of the roller W. Besides, in this figure, the roller W is supposed to be rotated by a friction-bar attached to the carriage J, and acting with a roughened surface on a disk, T, secured to the roller, or keyed on an axle, w , on which the roller is placed. This arrangement is preferred for large rollers. The axle w may be mounted in bearings adjustable between the upright brackets a . When a plate is to be engraved, the carriage J is provided with a table, to which the plate may be secured, while the parts serving to carry and rotate a roller are put out of operation. All the rest of the mechanism remains the same as before. The arms carrying the engraving-points n are formed by levers pivoted to the saddles N, (see Fig. 5,) and so balanced that the points will act by gravity against the roller W. When the points require to be lifted off the roller, the tail ends of the levers are depressed by a rod, u' , Figs. 2, 3, 4, and 5, carried by the lever-arms U on the shaft x , which is connected by the arm U', the lever U², and suitable rods to the lever U³ of a pedal, u , the parts being so arranged that when the pedal is pressed down the bar u' will be raised, so as to allow the points n to bear on the roller, whereas on releasing the pedal the bar u' will be depressed by a weight fixed on the lever U³, and the points n thereby raised.

For carrying out the shading of the drawing it is of advantage to have a second tracing-pencil, g' , attached by an arm, G', to the bar G. Under this pencil plates are placed, in which are engraved the hatching-lines to be reproduced to a smaller scale, and while the operator follows these lines with the pencil g' he determines their length by the motion of the pencil g on the pattern.

I claim as my invention—

1. In a pantograph comprising the carriages E, F, J, and K, the tracing-pencil g , and engraving point or points n , and means for holding the surface to be engraved, and of imparting motion thereto by the carriage J, the combination, with the said carriages, of the levers H and L, transmitting motion from the carriages E and F to the carriages J and K,

respectively, substantially as and for the purpose described.

2. In a pantograph comprising the carriages E, F, J, and K, levers H and L, and
5 means for rotatively supporting the roller, W, which is to be engraved, the combination, with the carriage J, of the saddle P, carrying the metal band Q, arranged to be slung around the roller W, as and for the purpose described.

10 3. The combination, with the carriages K and M, band o, and sheaves O, of the forked arm m' on carriage M, and the arm k', pivoted

to carriage K, and adapted to engage with arm m', and of the clamping device for connecting carriage K to the band o, substantially
15 as and for the purpose specified.

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

ALBERT KELLER-DORIAN.

Witnesses:

HENRY SPRINGMANN,
B. Roi.