(No Model.) 3 Sheets—Sheet 1.

L. KLERITJ.

POLYPANTOGRAPH.

No. 512,718. Patented Jan. 16, 1894.

Fig. 1.

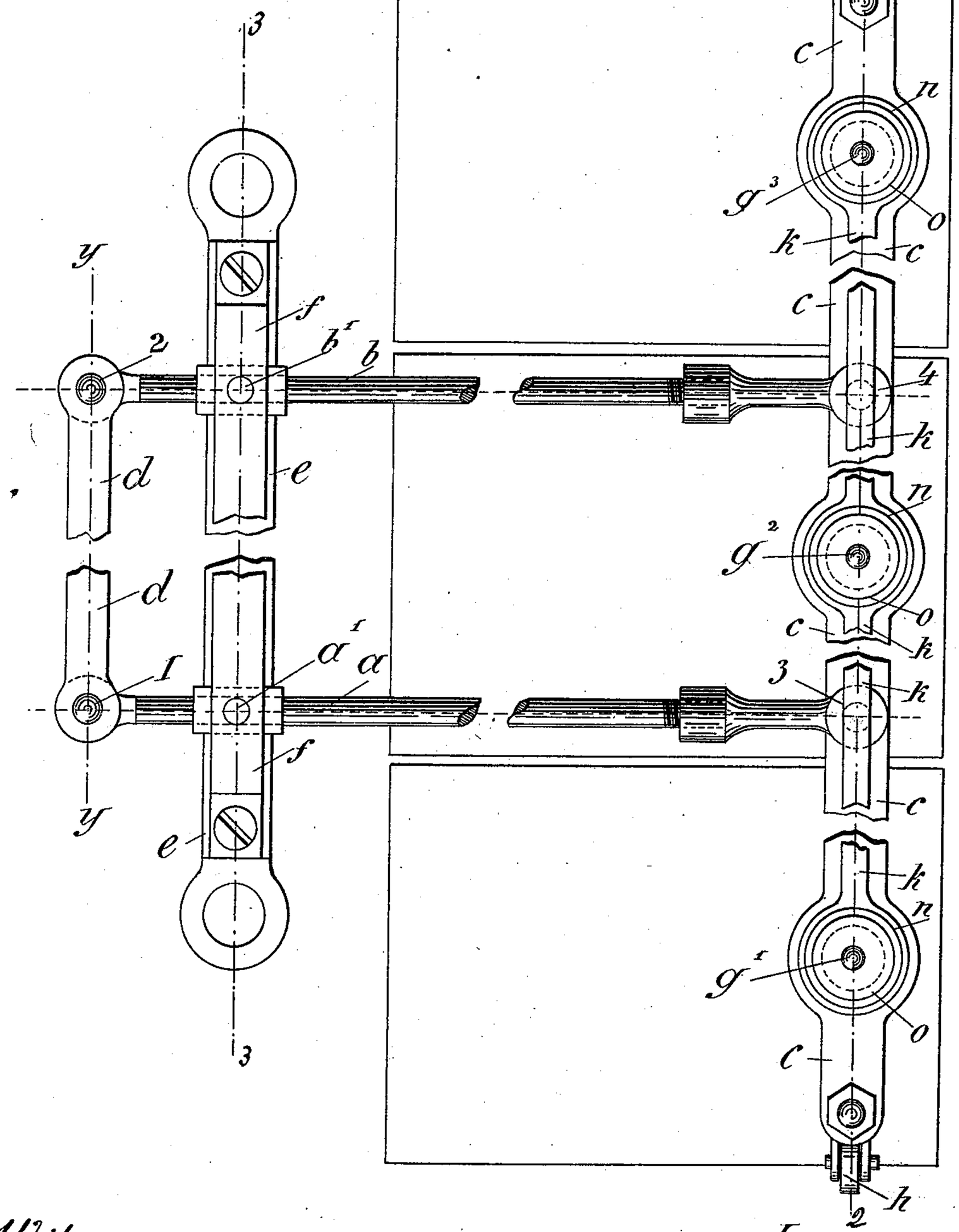

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Fig. 7.

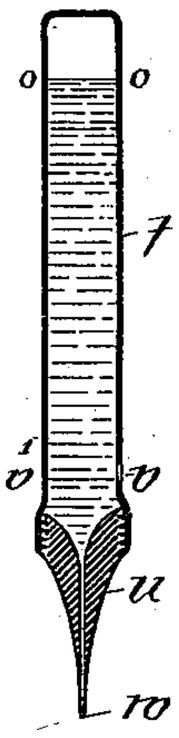

Fig. 4.

Fig. 3.

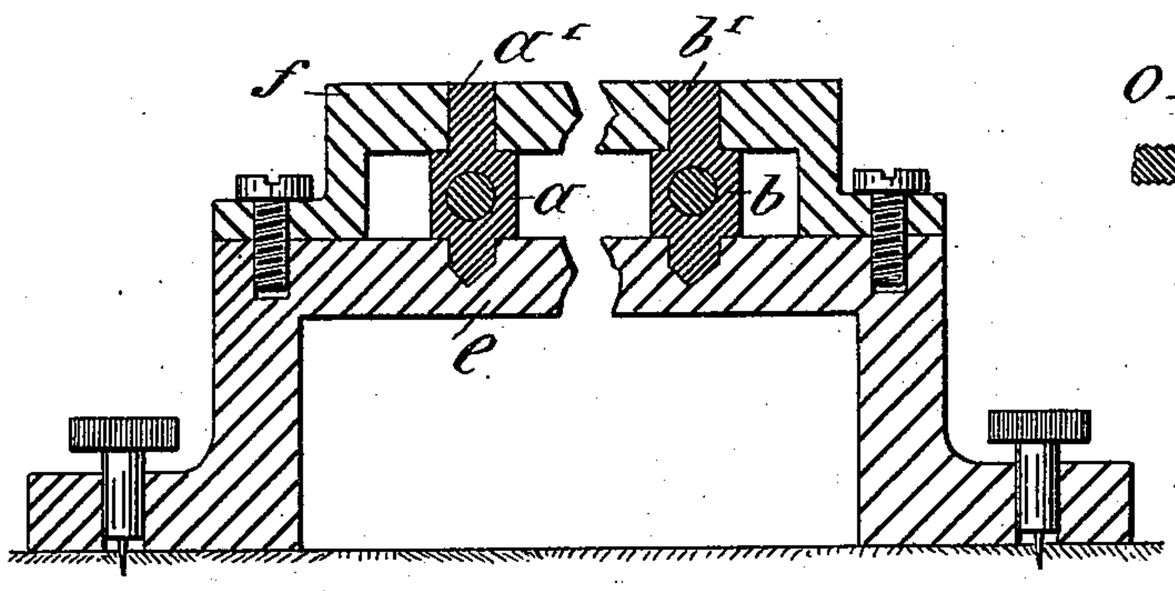

Fig. 2.

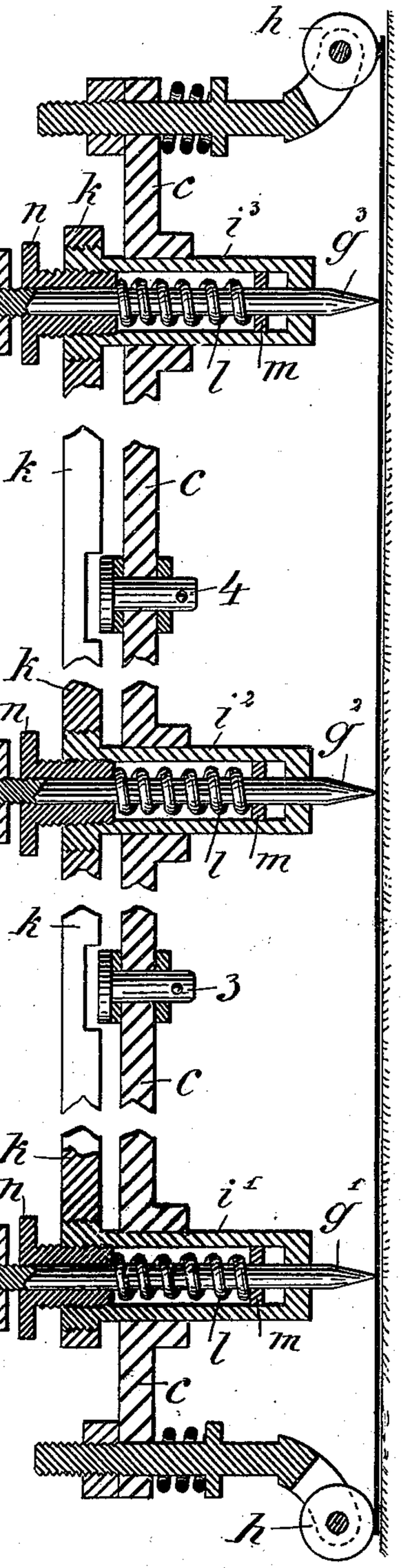

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Fig. 5.

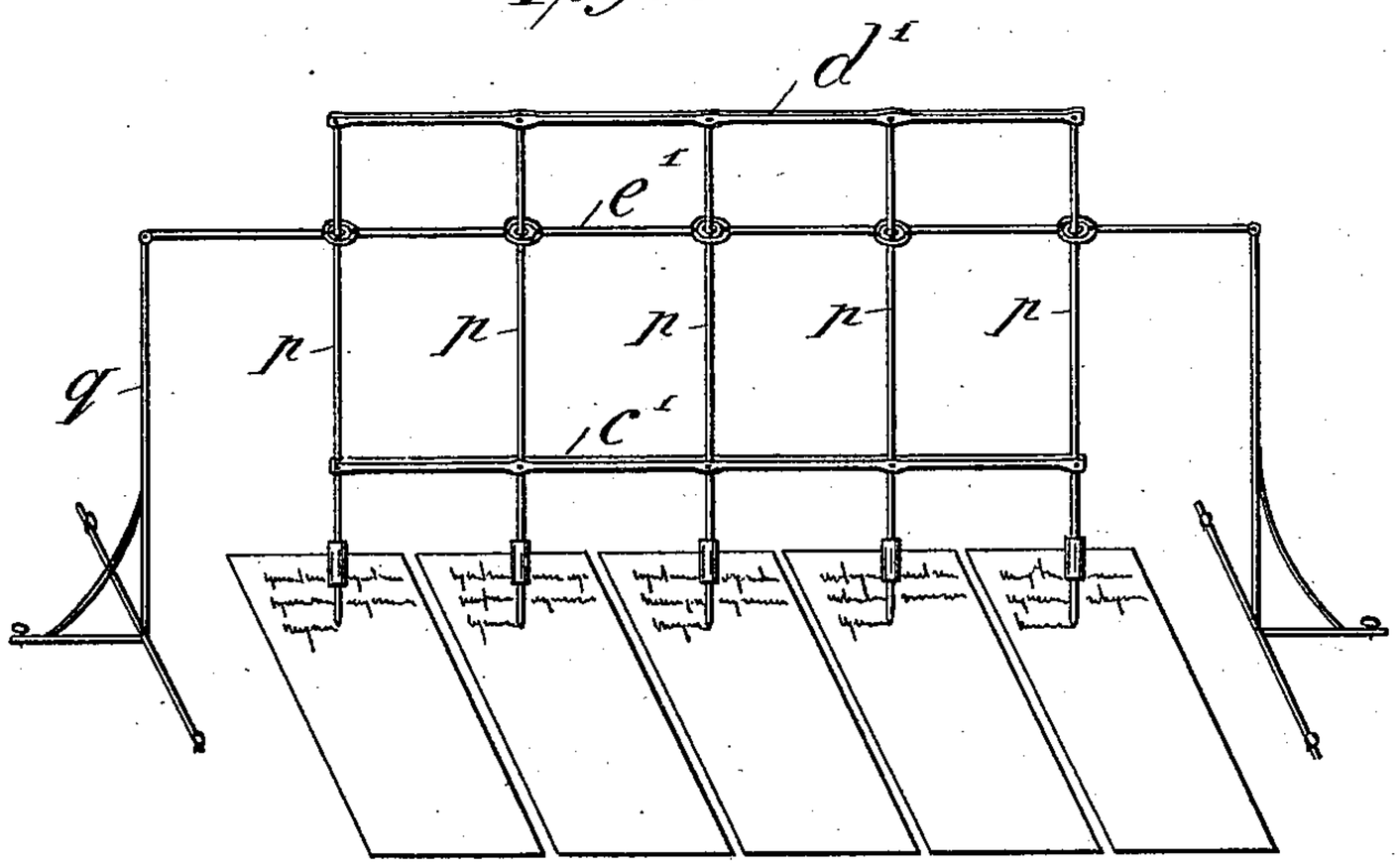
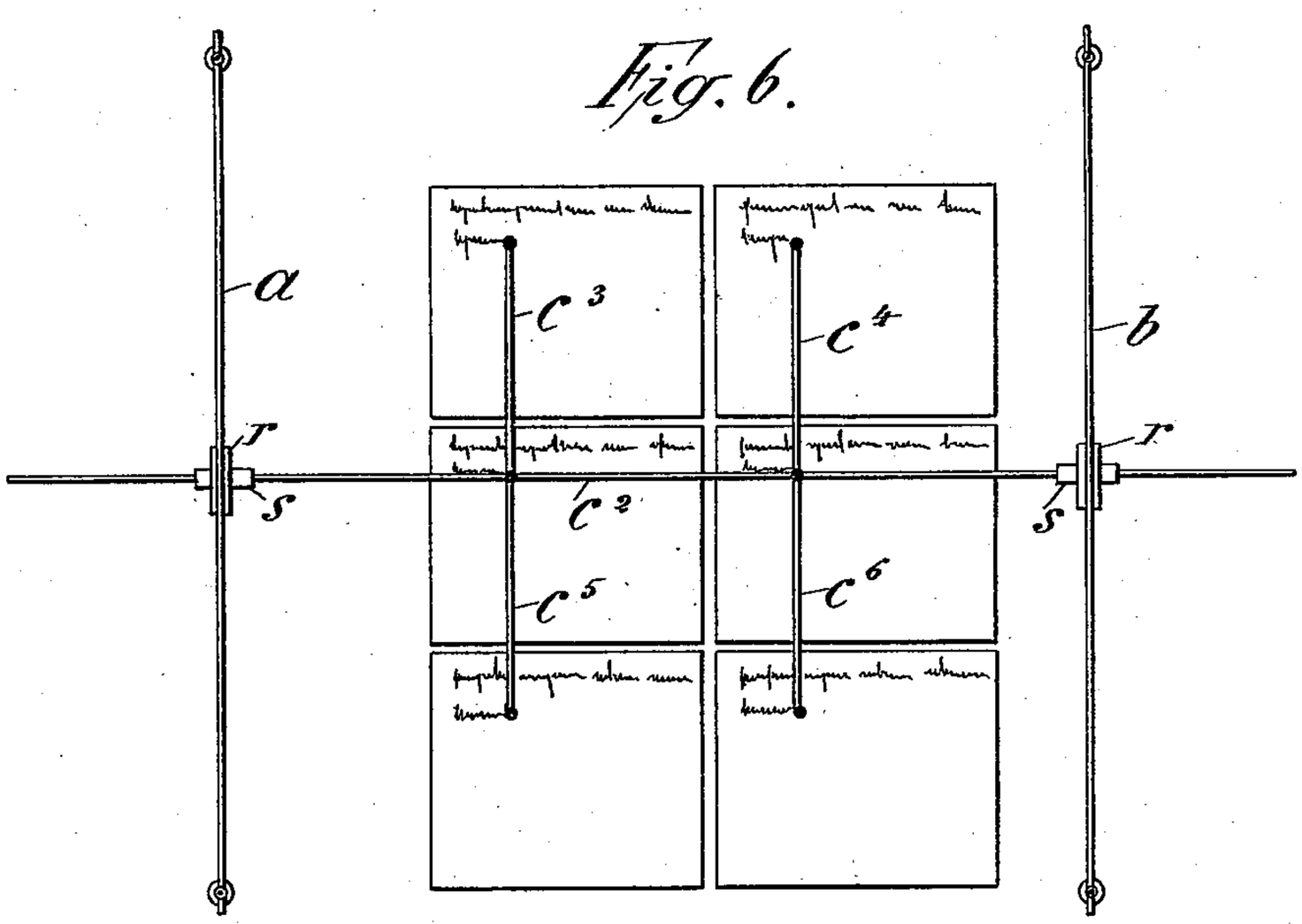


Fig. 6.



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LJUBOMIR KLERITJ, OF BELGRADE, SERVIA.

POLYPANTOGRAPH.

SPECIFICATION forming part of Letters Patent No. 512,718, dated January 16, 1894.

Application filed May 10, 1892. Serial No. 432,517. (No model.)

To all whom it may concern:

Be it known that I, LJUBOMIR KLERITJ, a subject of the King of Servia, residing in the city of Belgrade, in the Province of Belgrade, in the Kingdom of Servia, have invented certain new and useful Improvements in Polypantographs, of which the following is a specification.

If a straight or curved line is moved parallel to its original position in any direction in the plane or in the room, every point of this line performs quite a similar movement in the same direction. If I provide a rod with several pens, pencils or other similar writing appliances and move this rod in parallel directions, all pens, &c., will draw the same figures, letters, &c., and thus furnish as many copies of a drawing for instance as there are writing appliances used. My apparatus, forming the object of this invention is based upon that principle. It consists of a rod (which may be also provided with branches) carrying at various intervals a drawing pen, pencil or other similar writing appliance, which, when this rod is moved in parallel directions will all draw the same figures, letters, &c. It is obvious that I may furnish thus as many copies of a drawing as there are writing appliances used. The rod mentioned above is guided by means of an articulated parallelogram capable of sliding to and fro and a side of which is formed by the rod carrying the writing appliances aforesaid. If I employ the polar co-ordinate system the two parallel sides are arranged to slide in a support, being situated parallel to the rod. If I employ the parallel co-ordinate system the two parallel sides mentioned above are stationary and the rod carrying the writing appliances is capable to slide through the same in a longitudinal direction and parallel to the same.

Figures 1 to 4 and Fig. 6 in the accompanying drawings represent the apparatus with a horizontal and Fig. 5 with a standing or vertical parallelogram.

In the accompanying drawings Fig. 1 represents a plan view of the apparatus. Fig. 2 is a vertical section taken on line 2—2, Fig. 1, through the rod carrying the writing appliances (pen, pencils, &c.) Fig. 3 is a vertical section taken on line 3—3, Fig. 1, through the stationary support with (support) pivots and guiding pins or bolts. Fig. 4 represents a diagram showing the position of the sides of the parallelogram in respect to each other, when the apparatus is used. In Figs. 1 to 3 the several parts of the apparatus are shown in natural size, the longitudinal dimensions being however shortened to save room. Fig. 5 is a perspective view of a modification in which the parallelograms are shown standing or vertically. Fig. 6 is a plan view of a second modification, in which the two parallel sides are shown stationary and serve as guides for the side or rod carrying the writing appliances (pen, pencils, &c.) Fig. 7 is a sectional view of a fountain pen that can be used.

In the construction illustrated in Figs. 1 to 4 are arranged two cylindrical or prismatic bars a, and b, forming the sides of the parallelogram sliding in vertical sockets a' b' in the longitudinal direction. The sockets or pivots a' b' are capable of being turned in a support e and yoke f about their vertical axes, so that the side-rods a b may be turned laterally about these axes in a horizontal plane about the same angle in the same direction. The third side c, a more or less flattened rod, serves to carry several writing appliances g' g^2 g^3 (three in Figs. 1 and 2, five in Fig. 4). The rod may be prolonged in both directions and provided with branches. The spring supported rollers h h on both extremities serve for better guiding the rod c. The rod d connecting the pivots 1, 2 is parallel to the axis 3—3, passing through the pivots a' b' and to the axis 2—2 passing through the pivots 3 and 4. It is obvious that during all movements of the parallelogram the sides c d in respect to a b will be parallel to each other.

The writing or drawing appliances g' g^2 g^3, which may be pens, pencils, drawing-pens or so-called fountain-pens, are guided in sockets or collars i' i^2 i^3 passing loosely through rod c and secured to a support k and are pressed down by springs l, bearing against a ring m secured to the writing-appliance on the inner side and against a screw-socket n secured into the socket i', &c., so that the pens or pencils touch always the paper, even when the surface is uneven or if the papers are of different thickness.

By screwing in and out the sockets n the tension of the springs l may be regulated and a stronger or weaker pressure of the writing appliances be effected, so that more or less fine writings or drawings may be produced.

In order to be enabled to regulate the free springy motion of the writing appliances toward the bottom, the same are provided on the top with rings o, which are distant from the sockets n as far as it is desired to give a vertical downward movement to the writing appliances. That full play which renders possible an elastic motion of the writing appliances toward the bottom of the paper, is made as small as possible, so that the appliances must not be lifted too much, when an interruption in the writing or drawing requires this, but only as much as it is the case with ordinary pens, &c., when a new word or letter is to be begun.

In order to lift uniformly all writing appliances from the paper, the same are secured to a support k by means of sockets i' i^2 i^3 passing freely through the bar c as mentioned above.

When the apparatus is used, any pen or pencil, for instance the middle one (g^2) is taken in the hand like an ordinary pen by the socket (i^2), and the desired letter or word (*f. i.* the letter N in the diagram Fig. 4) is written. The other writing appliances, all being relatively rigidly connected to the one guided by the hand and following all movements of the same, execute the same letter or word or drawing. The parallelogram passes from the position 1, 2, 3, 4 (shown in full lines) to that 1′ 2′ 3′ 4′ indicated in dotted lines and the writing appliances g' g^2 g^3 g^4 g^5 come into the positions g', g^2, g^3, g^4, g^5, whereas the pivots or guide-bolts a' b' maintain their original position.

In the modification illustrated in Fig. 5, with standing or vertical parallelogram the vertical sides or bars of the parallelogram p p, articulated to the horizontal rods c' d' are guided and movable in a horizontal guide-rod e' supported by standards q q (which guide-rod e' corresponds to the stationary support e in Fig. 1), so that, when one of the writing appliances is conducted to and fro or up and down, all the other ones are forced to follow these movements. The guides in the rod e' are constructed like ships' compasses or with ball and socket joints, so that a further explanation is unnecessary.

In the second modification, Fig. 6, the two parallel sides a b of the parallelogram are stationary and carry in longitudinal slots the carriages r r, which are provided under a right angle with horizontal holes or small tubes s s in which can slide longitudinally the rod c^2 carrying the writing or drawing appliances. By rendering capable the rod c^2 to move in the longitudinal direction of the two bars a b by means of the carriages r r as well as under a right angle to the same through the holes or small tubes s s in the latter, the writing appliances which may be secured to the rod c^2 as well as to the branches c^3 c^4 c^5 c^6 may produce any writing or drawings. As a writing or drawing pen I may also employ a fountain pen, as illustrated in Fig. 7 in a longitudinal section and which consists generally of a fountain or a cylindrical vessel t, closed at the top, which vessel is provided on its lower extremity with a screwed in tapering cone u of steel. The cone u is provided with a concentric capillary hole or channel for the outflow of the ink. In the receptacle t above the cone u is a lateral hole or opening v, which serves for the inlet of the air into the receptacle to fill the space above the level o o of the ink, to balance the inner pressure of the air and liquid column upon the level o o' with the external atmospheric pressure upon the same level. Owing to that circumstance, the effective height of liquid upon the point w is proportional to the difference of level between v and w and the pressure upon the point w and also the outflow is kept constant, as long as the upper level o o of the ink is situated above the level of the point v.

Having now explained the nature of my invention, I claim—

1. A pantograph for producing simultaneously two or more copies of handwritings or drawings consisting of a rod forming the side of an articulated parallelogram and carrying several writing or drawing appliances, and two parallel sides turning about fixed pivots and sliding through the same; substantially as described.

2. In a pantograph a device for simultaneously lifting two or more writing or drawing appliances, consisting of a common support k, to which are attached the casings carrying the writing or drawing pens &c., said casings passing freely and loosely through the rod c, so that they may be lifted independently from the rod c; substantially as described and for the purpose specified.

In testimony whereof I have signed this specification in presence of two subscribing witnesses.

LJUBOMIR KLERITJ.

Witnesses:
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JOPF ZEH AUER.