F. RITCHIE.

PANTOGRAPH APPARATUS.

APPLICATION FILED JAN. 24, 1916.

1,393,572. Patented Oct. 11, 1921.

Fig. 2.

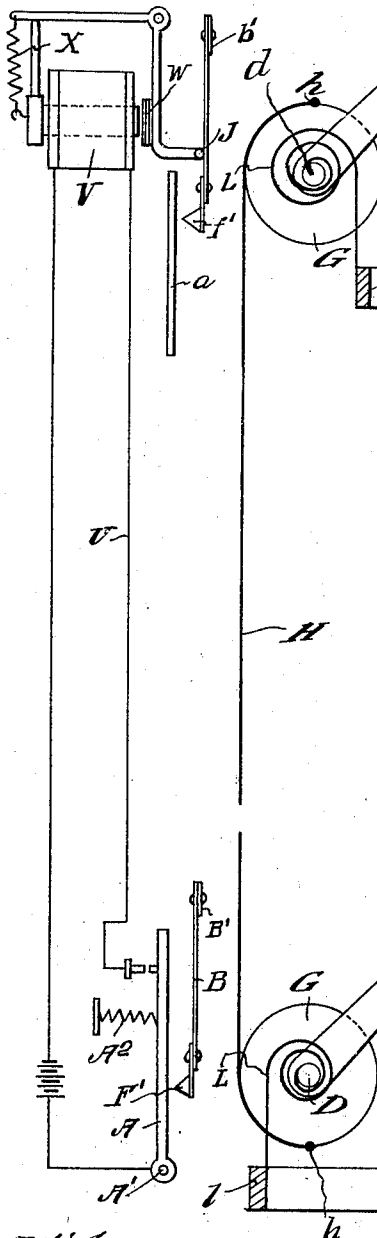
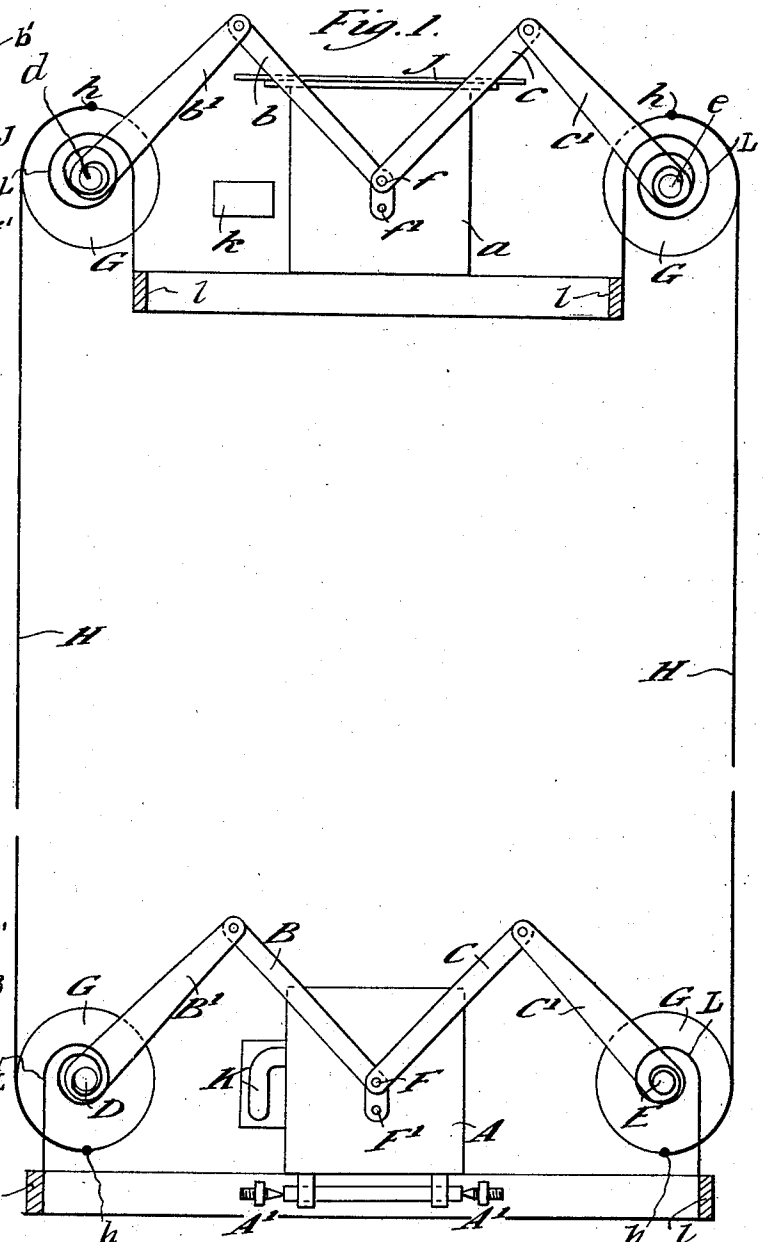


Fig. 1.



Witnesses:

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PANTOGRAPH APPARATUS.

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To all whom it may concern:

Be it known that I, FOSTER RITCHIE, a subject of the King of Great Britain, residing in Ealing, England, have invented certain new and useful Improvements in Pantograph Apparatus, of which the following is a specification.

This invention relates to an improvement in pantograph apparatus and is designed to provide an apparatus in which the design may be produced or traced in one situation and reproduced at another independent situation at any reasonable distance from the first and thus be employed for transmitting written messages from one place to another.

The invention consists essentially in a pantograph having reversible tracing and reproducing parts entirely separate and distinct from one another and positive or mechanical means whereby they can be connected to operate together at any reasonable distance and at any relative angles.

The invention will be fully described with reference to the accompanying drawings. Figure 1 is a diagrammatic view of one form of the invention; and Fig. 2 is a diagrammatic view showing a means for holding the reproducing pen away from its table when not in use as well as an electrical connection between the tracer and the reproducing pen for releasing said means and permitting the reproducer to rest upon its table when the tracer is operated.

As shown in Fig. 1, the apparatus comprises a tracing or producing end and a reproducing end of generally similar construction connected together by flexible bands by means of which the movements are transmitted from the tracer to the reproducer.

The tracing end comprises a platen or table A of suitable construction and two pairs of articulated links B, B′ and C, C′. The links B′ and C′ are secured, respectively, to axially stationary rotary spindles D, E mounted on either side of the table or in other suitable position. The free extremities of the links B and C are pivoted together at F and provided with any suitable means F′ to receive or carry a pencil or tracer in known manner. It will be seen that as the pencil or tracer is moved about over the table or platen A movement will be given to the levers B, B′, C, C′ which produce varying rotation of the spindles D, E.

The reproducing end of the apparatus is similar in construction to the tracing end, the table *a*, the toggle links *b*, *b′*, *c*, *c′*, the axially fixed rotary spindles *d*, *e*, and the connecting pivot *f*, being exactly as above described. The pivot *f* also is provided with means *f′* for carrying a pen or other suitable reproducing device.

Upon each of the spindles D, E, *d*, *e* and adapted to rotate with them, are mounted wheels or disks G respectively, and the corresponding wheels or disks in the two parts of the apparatus are connected together by a band or cord H secured to their peripheries and adapted to transmit motion from one to the other. In this way it will be seen that any rotation given to the spindles D, E is transmitted to the spindles *d*, *e* which again cause movements of the links *b*, *b′*, *c*, *c′* and the reproducing point *f′* exactly similar to the movements of the links B, B′, C, C′ and the tracer F′ which generated the movement.

The wheels G may be of any suitable construction and the band or cord H may be of any suitable material. As the force to be transmitted is a very small one, this may be of very light material such, for instance, as piano wire, but it should be of material with as little stretch as possible. It is not, of course, necessary that the tables A and *a* should be in the same plane, as the bands H may be passed over intermediate pulleys if desired. The bands H are securely attached to the wheels as at *h*, to prevent them slipping thereon and volute springs L are provided to maintain the bands under tension. The springs are connected to the spindles D, *d* at one end and to the table supports at *l*.

The pen *f′* is preferably normally held away from the platen *a* by a bar J which pushes the links *b c* which carry the pen away from the platen. The bar J is shown in Fig. 2 of the drawings as carried by one arm of a bell-crank lever and a spring X is shown as acting upon the other arm of said bell-crank lever for normally maintaining the bar J in engagement with the links *b c*. The platen A is preferably mounted on pivots A′ and is normally pushed upward by a spring A^2. When the platen A is depressed, as when tracing a design, it closes an electric circuit U to an electro-magnet V, thus energizing said magnet to act upon an arm of the bell-crank lever so as to rock the latter and move the bar J out of engagement with the links *b c*.

When the reproduction is to be made in

an optical lantern, the links *b e* carrying the pen *f'* may be made of very small rods or of transparent material such as glass. It will be obvious that the proportionate sizes of the original design and its reproduction can be varied by varying the sizes of the wheels or disks G or by varying the proportionate lengths of the operating articulated links at the tracing and reproducing ends of the apparatus.

To ink the reproducing pen an inkpot *k* may be provided beside the platen *a* and for the purpose of correctly guiding the pen into the ink-pot a slot, groove or the like K may be provided beside the platen A into which the tracer F' may periodically be guided.

Having thus described the said invention and the best means I know of carrying the same into practical effect, I claim:—

A pantograph comprising entirely separate and distinct tracing and reproducing ends; said pantograph having at each of said ends two pairs of articulated links, a pair of axially fixed spindles to which corresponding links of the two pairs are connected, and a pen or tracer connected to the junction of the other links of the two pairs; pulleys upon said spindles, flexible driving means connecting the corresponding pulleys at the two ends, and volute springs acting on the corresponding spindles at the two ends for maintaining tension on said flexible driving means.

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

FOSTER RITCHIE.

Witnesses:
JOSEPH MILLARD,
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