(No Model.)

R. B. COCHRANE.

DRAWING BOARD.

No. 565,433. Patented Aug. 11, 1896.

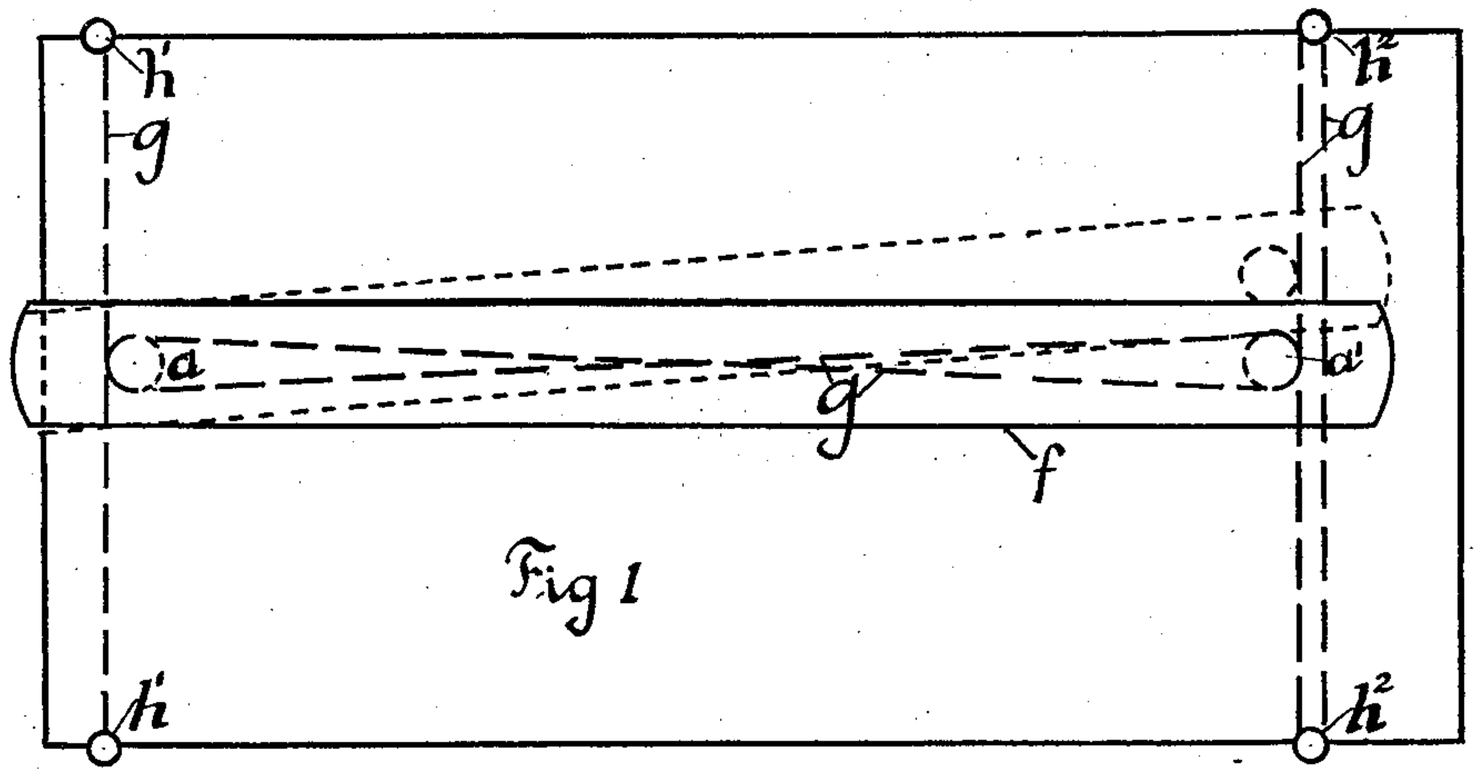

Fig 1

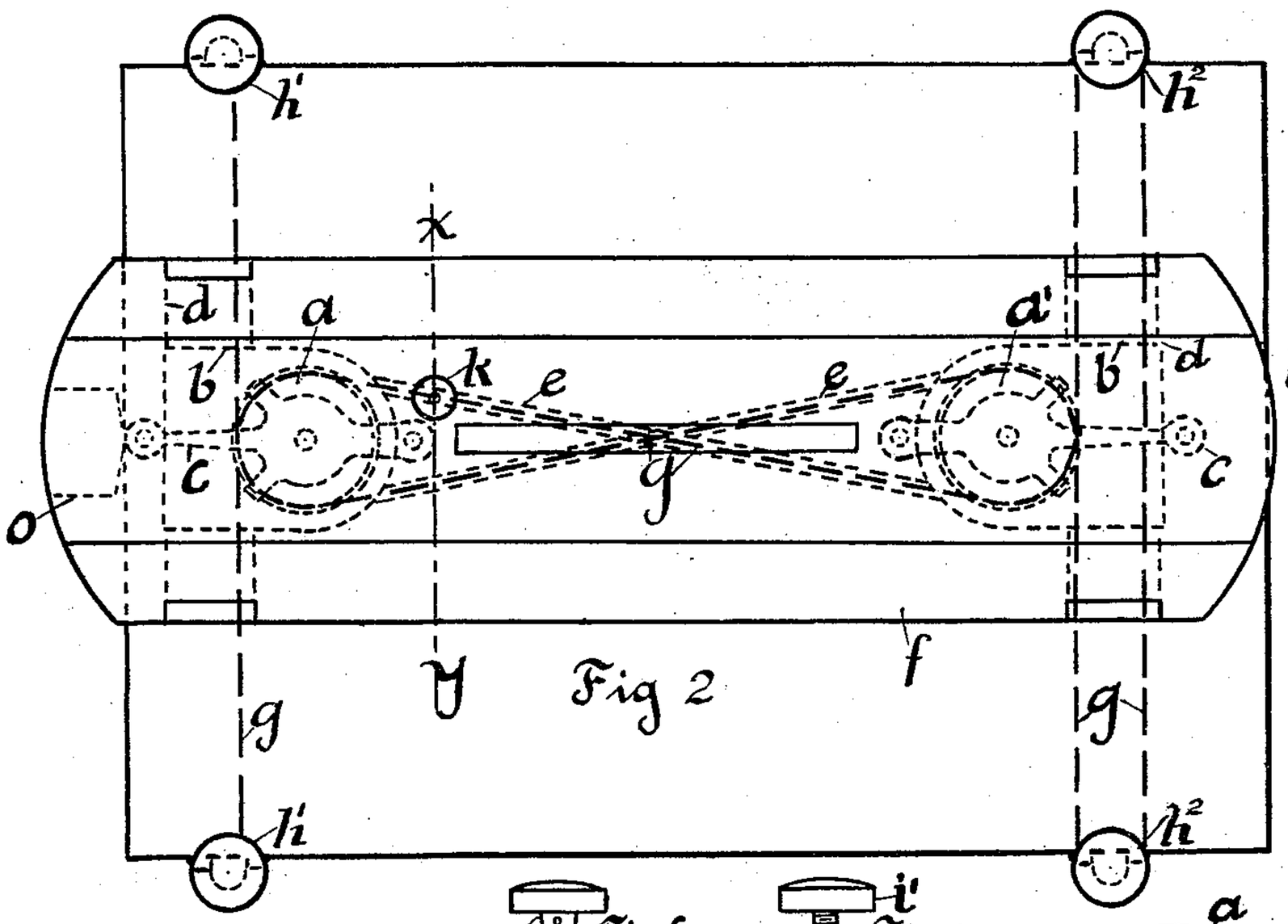

Fig 2

Fig 3

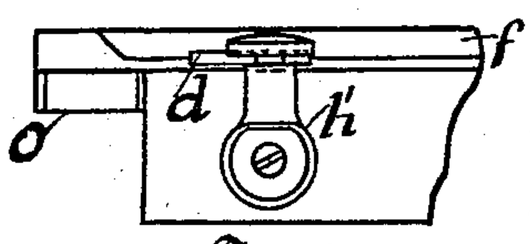

Fig 4

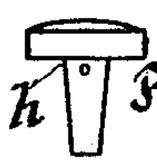

Fig 6

Fig 8

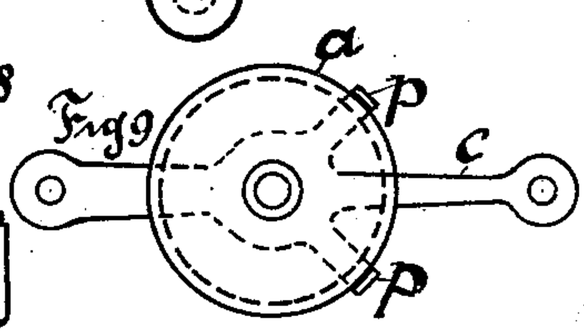

Fig 9

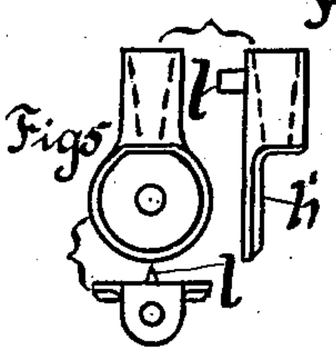

Fig 5

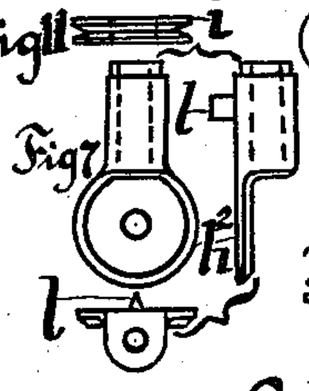

Fig 7

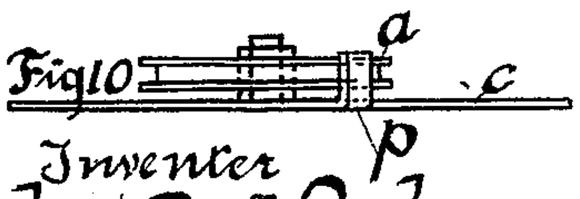

Fig 10

Witnesses,
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UNITED STATES PATENT OFFICE.

ROBERT BOYD COCHRANE, OF MADISON, WISCONSIN.

DRAWING-BOARD.

SPECIFICATION forming part of Letters Patent No. 565,433, dated August 11, 1896.

Application filed December 18, 1894. Serial No. 532,274. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BOYD COCHRANE, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Parallel-Rulers, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part hereof, in which—

Figure 1 shows my said improved parallel-ruler attached to a drawing-board in plan view. Fig. 2 shows said ruler in plan view on an enlarged scale with details in plan view. Fig. 3 shows a transverse sectional view of the ruler, taken through the clamping-screw, on the plane *x y*. Fig. 4 shows one end of the ruler and corner of the drawing-board with a stud on an enlarged scale. Fig. 5 shows a tension-stud in front, side, and top view. Fig. 6 shows a tension-pin for the said stud shown in Fig. 5. Fig. 7 shows a wheel-stud in front, side, and top view. Fig. 8 shows a screw-pin for said stud shown in Fig. 7. Fig. 9 shows one of the sheaves attached to the ruler in plan view. Fig. 10 shows Fig. 9 in elevation. The holding-frame is also shown in each figure. Fig. 11 shows the sheave *i* in elevation.

Like letters of reference denote like parts throughout.

The object of my invention is to produce a parallel-ruler for drawing-boards which shall supplant the T-square or T-rule and other parallel-rulers, and which may be attached to any drawing-board and work perfectly, irrespective of the condition of the edges of such board; and to such ruler there shall be but one sheave at each end and either two wires, or, preferably, a single-looped wire, adjustable at one or more places for both tension of wire and direction of ruler. When said sheaves are clamped, they hold the ruler rigidly parallel to any given direction. It will be observed that by using only a single sheave at each end of the ruler the pressure on the bearings and consequent wear is greatly reduced, as the wires from the opposite directions press upon the sheaves only and not on its bearings, and that one part of the wire runs on as another part runs off the sheave, thus greatly simplifying construction, also reducing cost and enhancing convenience over rulers which use more than one end sheave. To attain said desirable end, I construct my said new device in substantially the following manner, namely:

I make a ruler of about the usual form and proportions for such purpose. At or near each end of said ruler I attach a sheave, as *a a'*. Said sheaves may be on the top or bottom and at or near the ends of the ruler. In the drawings said sheaves are shown set into a cavity *b* from below and held by a suitable frame *c*, provided with wire holding-lugs *p*. A transverse mortise-slot *d* extends slightly into and beyond each sheave. Between said sheaves and tangent to them are crossed channels *e e* in the ruler. To the edge of the drawing-board are attached a set of four studs. Said studs are placed at the opposite directions of said slots *d*, and hold a wire *g*, used either in one or two parts, which passes over said ruler-sheaves. Two of said studs *h'* have conical pins or key-pins *h*, like those used to strain piano or like strings, and the two remaining studs h^2 have sharp-grooved sheaves *i*, which run on a shoulder on each of said studs and touch the hub of the sheaves with their heads, and thus hold the sheaves from turning when the head is screwed down upon said hub. The ruler and said studs may be connected either by two separate pieces or by a single piece of wire. When two pieces of wire are used, the studs *h'* alone are used, one end of the wire is fastened to such key-pin, as *h*, and the other end thereof passed into the slot *d*, thence onto the ruler-sheave, thence through the tangent diagonal channel *e*, to and over the other ruler-sheave, and out of its slot *d* to the opposite stud, where it is then fastened. A second wire is then fastened to the stud opposite to the one first used for the first wire and passed over the same first sheave, thence through the other diagonal channel *e*, and out at the opposite end of the other slot *d*, and fastened to the last of the said studs. Said wires are then tightened equally to the proper degree of tension, after which the ruler is ready for work.

When only one piece of wire is used, one end of it is fastened at the same key-pin that the first of the former wires was fastened at, and the opposite end of the wire is passed

on to the same diagonally opposite stud, thence around it, but preferably over the grooved sheave *i* on said stud, the wire end passing outward around said sheave, thence around the sheave on the transversely-opposite stud, thence on reëntering the slot *d* it passes over the sheave and on through the diagonal slot *e*, yet open, and out through the first slot *d* to the last remaining stud, where its end is fastened with a key-pin. When this single-piece wire is used, the parallel direction of the ruler may be changed to either the upper or lower side of the normal position at the loop end of the ruler. One of said positions is indicated by the broken outlines, which indicate the ruler in Fig. 1. The ruler is secured in any such position by bringing the screw-pins *i'* down on the sheave-hubs. The sheave *i* is shown thicker than the height of the stud h^2, which forms the turning-pin for such sheave, which is from the shoulder up to the top of the stud. Said looped or single wire is strained by means of the key-pins at either one or both ends of said wire. There is also a clamping-stud *k* in one of the channels *e*, which may hold or release the wire and thereby fix or release the ruler in its position. The studs are held by screws and spurs *l*, which enter the edge of the drawing-board.

As the slots *d* and lugs *p* of the frame *c* hold the wire *g* on the ruler-sheaves, the ruler may be removed to attach or remove paper from the board, and readily replaced by removing the top parts of the studs. A block *o*, attached to the overhanging end of the ruler, plays against the end of the drawing-board and tends to prevent longitudinal motion of the ruler.

In the preferable construction there is but a single looped wire whereof the tension can be made at either or both ends and it will always be substantially alike throughout, especially after the ruler has been moved a few times in both directions.

What I claim is—

1. The combination with a ruler provided with single sheaves at its ends, of wires crossed between and carried on said sheaves and fixed opposed studs therefor transversely opposite to said ruler at its sheaves, substantially as specified.

2. The combination with a ruler provided with single sheaves at its ends, of a wire crossed between and carried on said sheaves, and fixed opposed adjusting-studs therefor transversely opposite to said ruler at said sheaves, substantially as specified.

3. The combination with a ruler provided with single sheaves at its ends, of a wire crossed between and carried on said sheaves and removably-fixed opposed studs therefor transversely opposite to said ruler at said sheaves, substantially as specified.

4. The combination with a ruler provided with single sheaves at its ends, of two wires crossed between said sheaves and opposed studs transversely opposite to said ruler at said sheaves and means with said studs to hold the ends of said wires, substantially as specified.

5. The combination with a ruler provided with single sheaves at its ends and a set of studs, of a looped wire crossed between and run over said sheaves and on studs transversely opposite and at one end of the ruler and the ends of the wire secured at the studs transversely opposite the other end of the ruler, substantially as specified.

6. The combination with a ruler with changeable adjustment of direction and single sheaves at its ends, of wire looped transversely at one end of ruler and held on studs, substantially as specified.

7. The combination with a ruler with single sheaves at its ends, of a looped wire, crossed between said sheaves, key-pinned studs for ends and clampable sheaves for loop wire, substantially as specified.

8. The combination with a ruler with single-end sheaves, of wires crossed between and running from opposite sides over said sheaves, holders for the wire and clamping mechanism on said ruler to said wire, substantially as specified.

ROBERT BOYD COCHRANE.

Witnesses:
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JOHN F. MATHIE.