

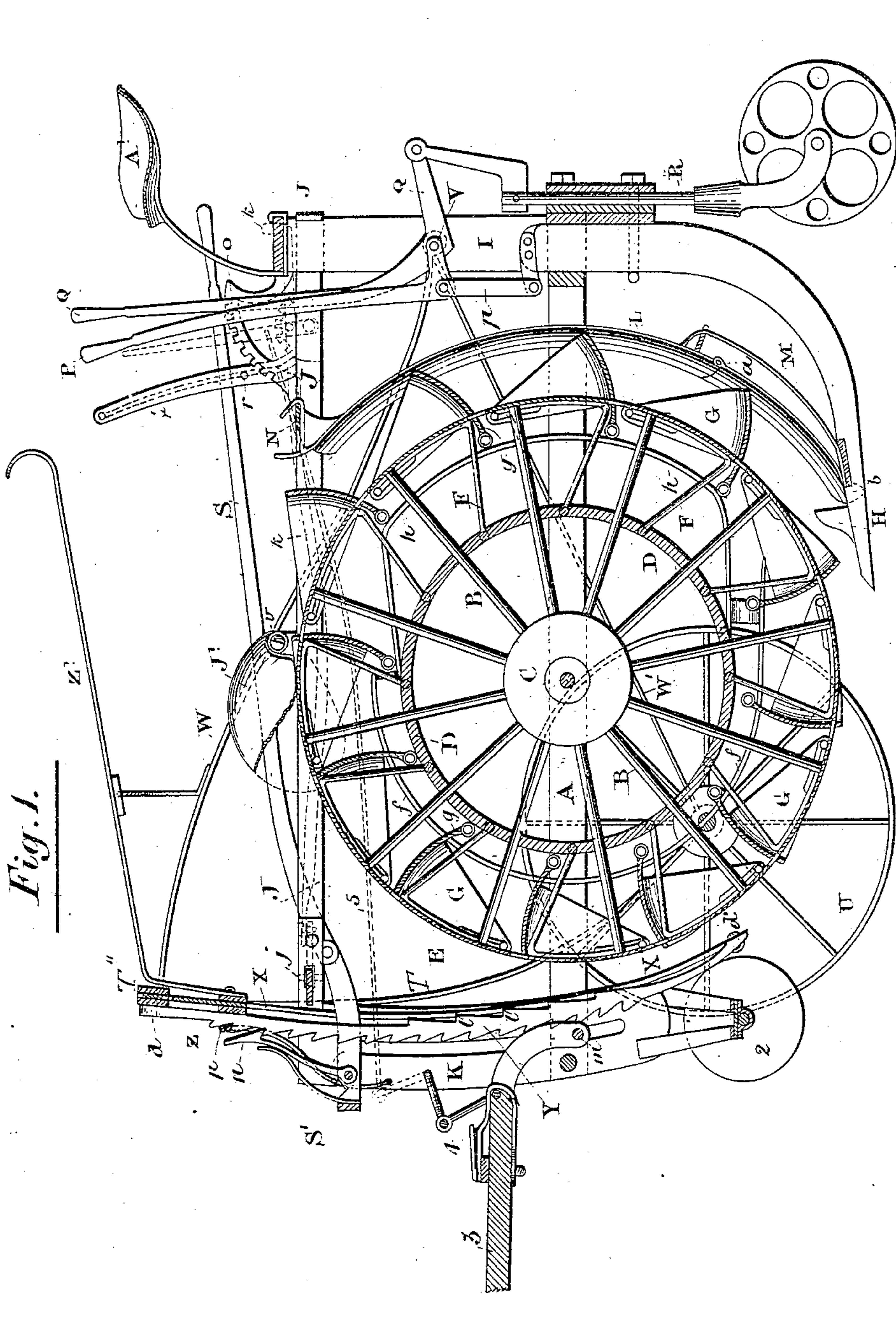
(Model.)

4 Sheets—Sheet 1.

H. CARTER & W. RENNIE.
Ditching Machine.

No. 238,647.

Patented March 8, 1881.



Witnesses.

H. H. Warren.

Chas W. Baldwin.

Inventor.

Henry Carter.

Wm Rennie
Richard Bird & Co. Atty.

(Model.)

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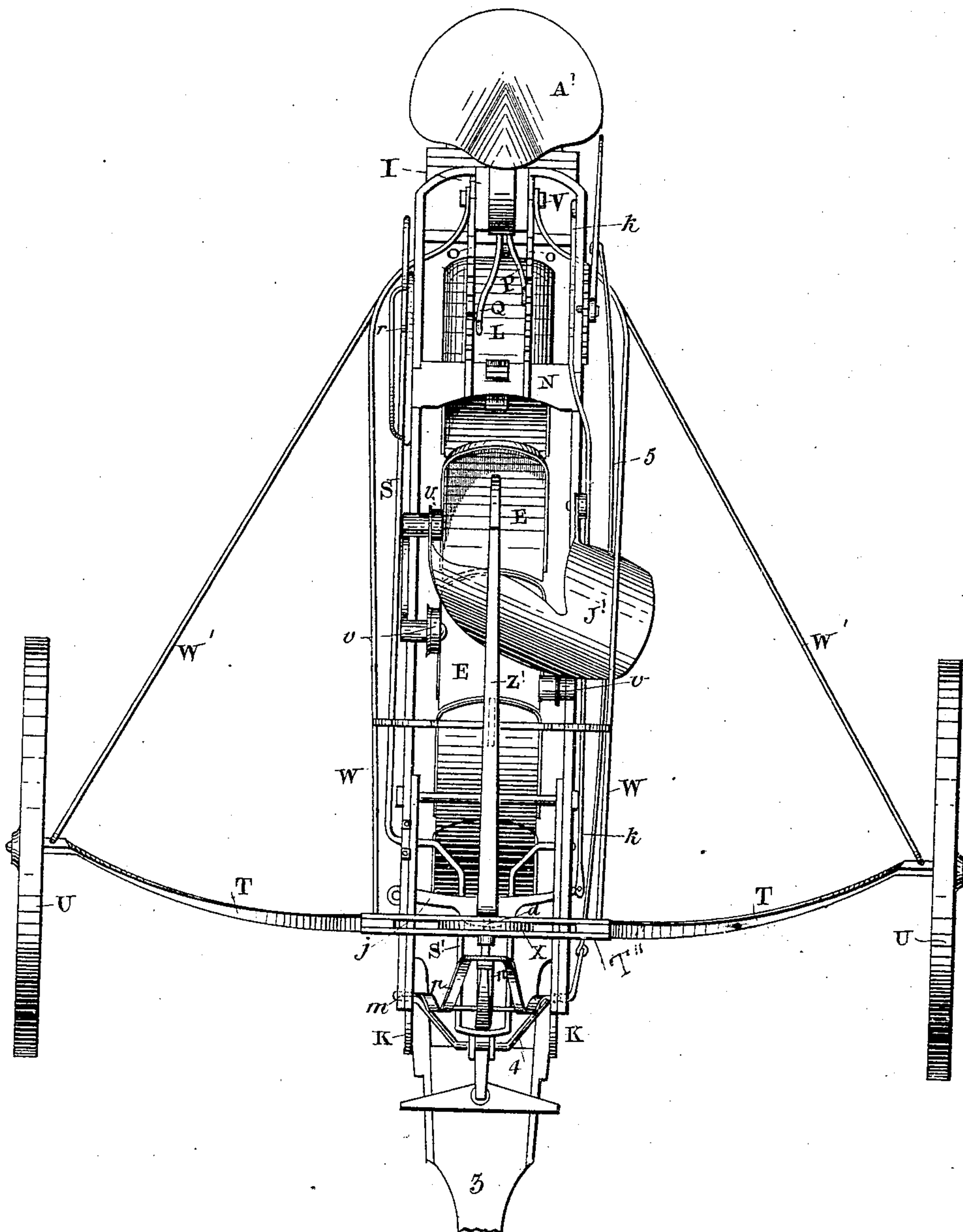


Fig. 2.

Witnesses.

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(Model.)

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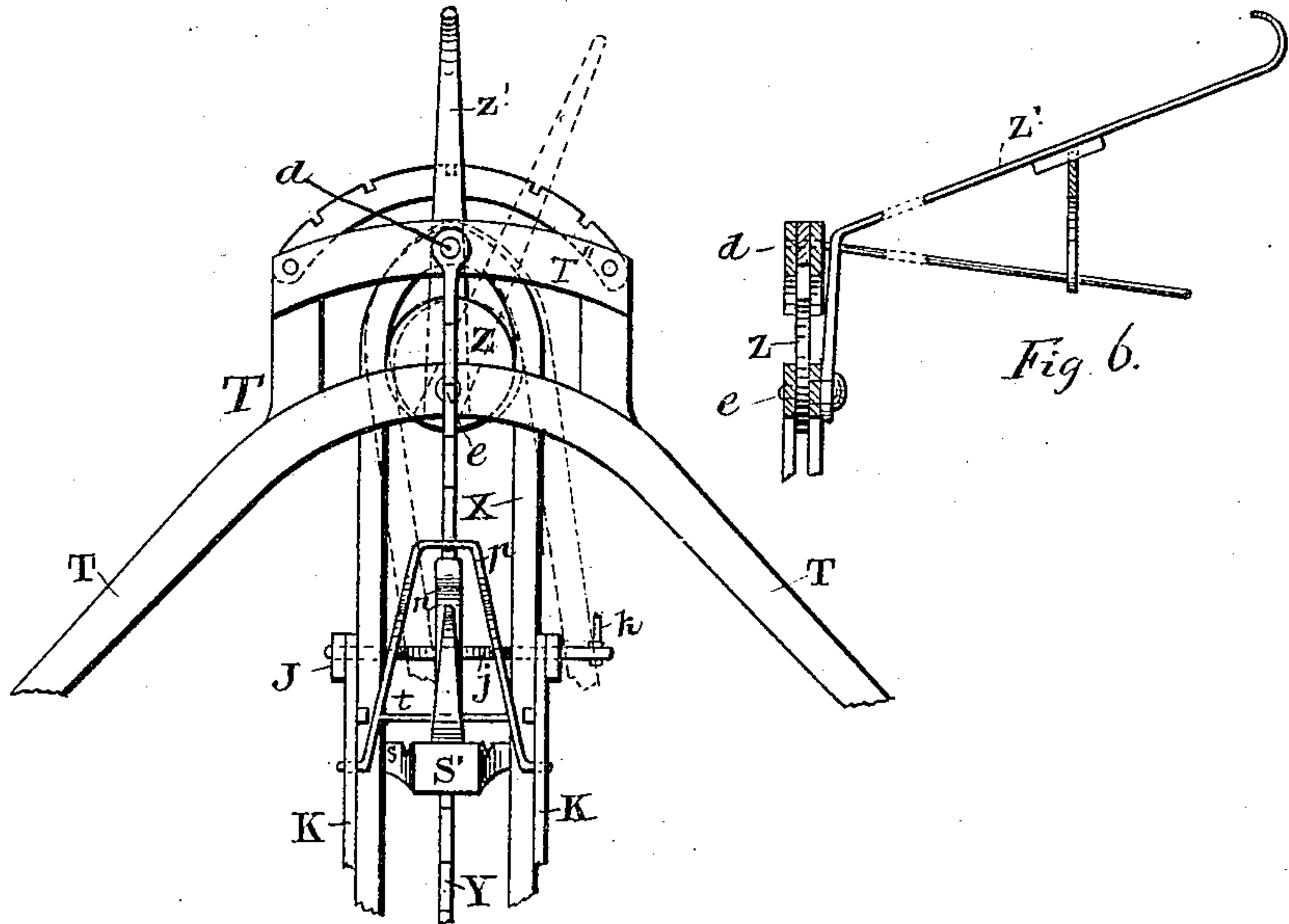


Fig. 3.

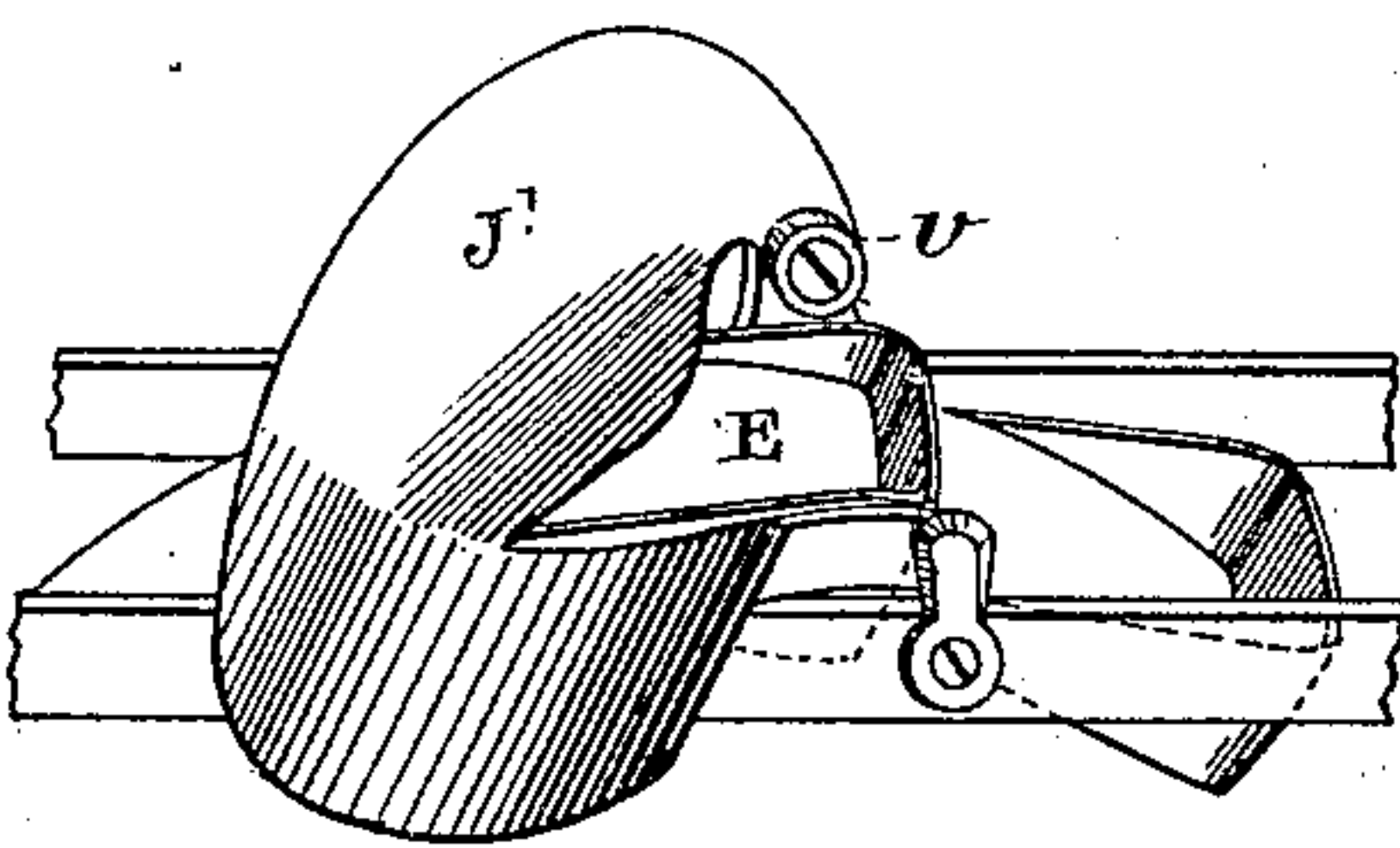


Fig. 5.

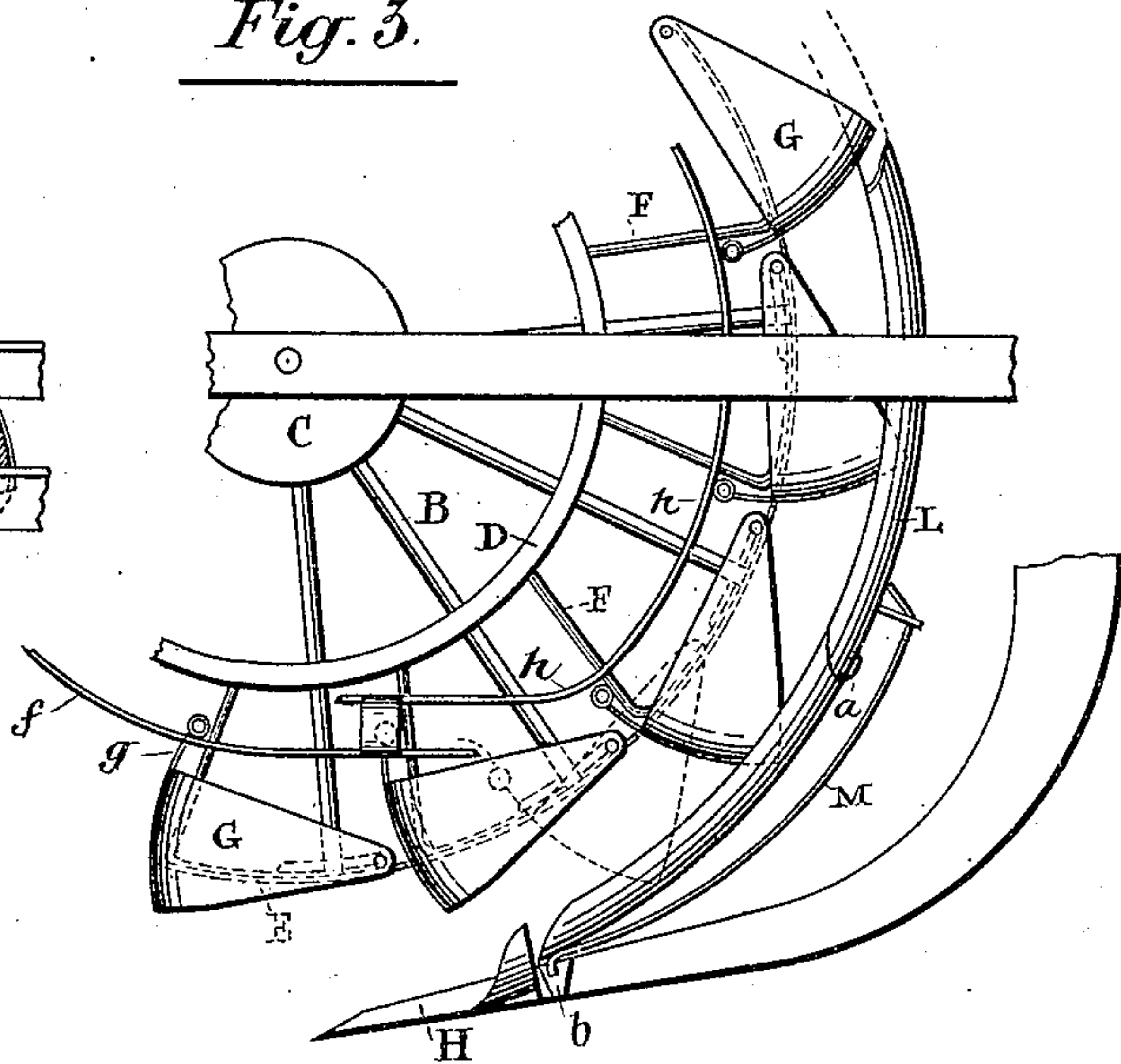


Fig. 4.

Witnesses.

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(Model.)

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Fig. 7

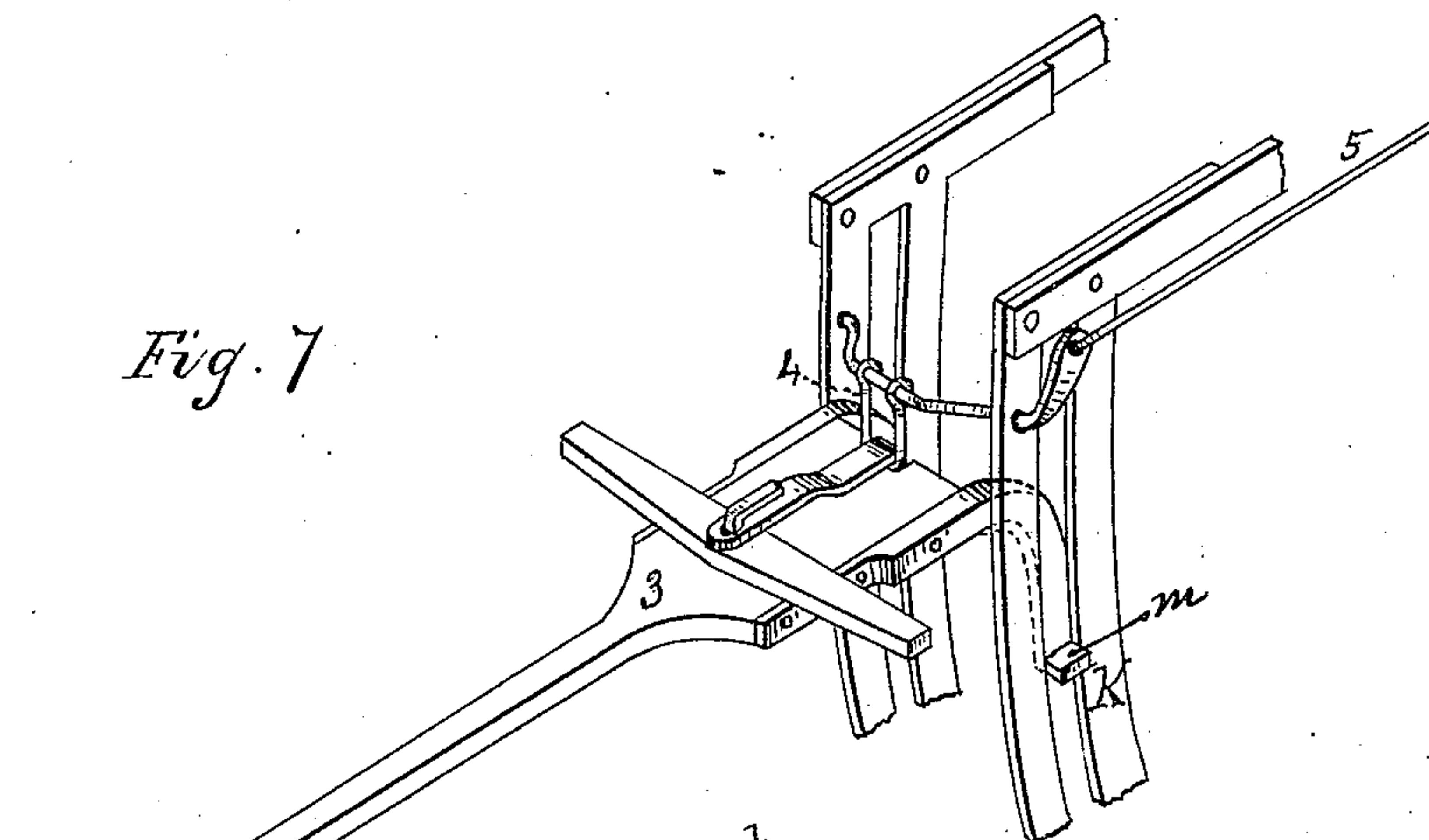
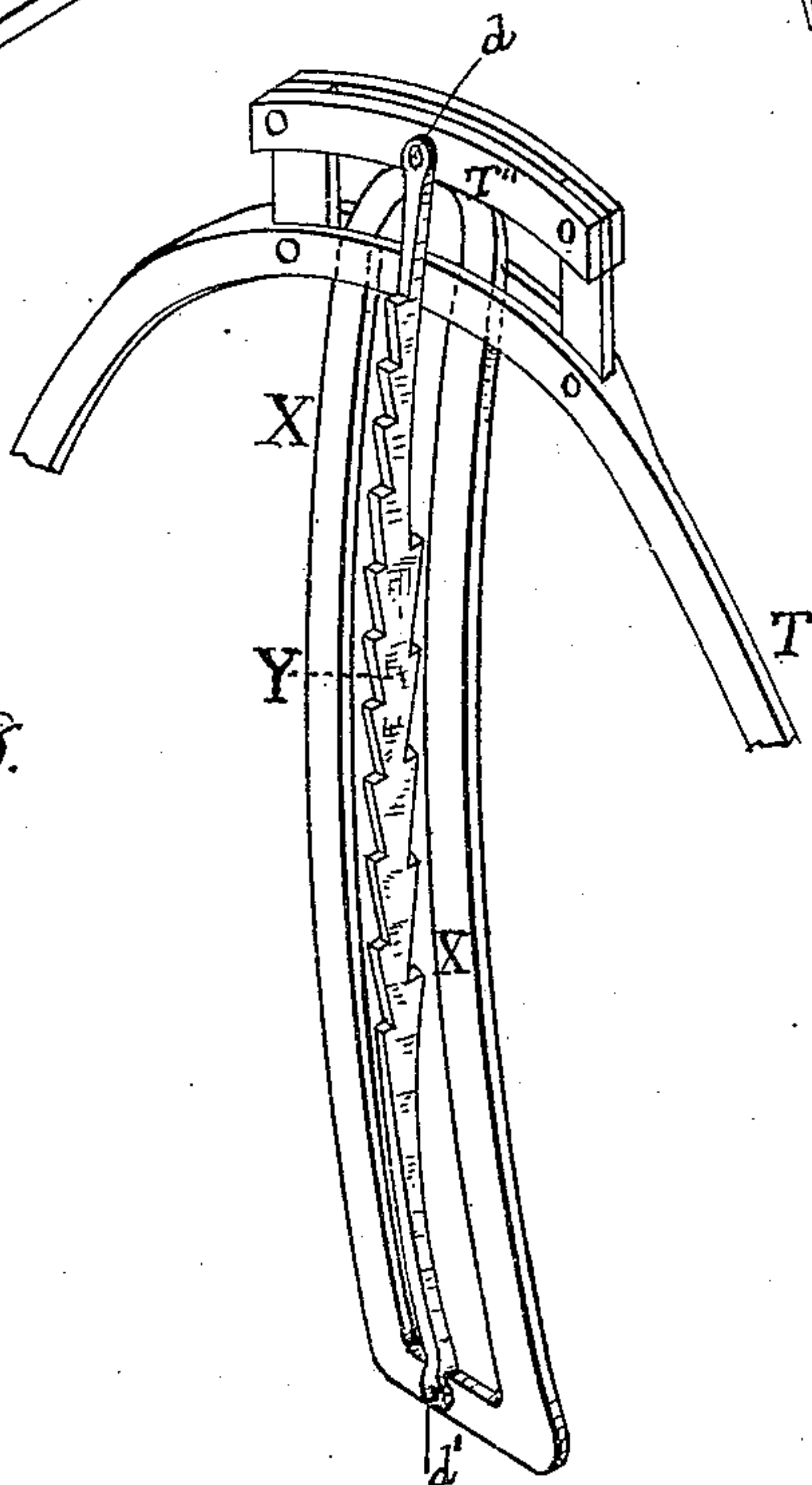


Fig. 8



WITNESSES:

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BY *Richard Bird & Co.*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

HENRY CARTER AND WILLIAM RENNIE, OF TORONTO, ONTARIO, CANADA,
ASSIGNORS TO SAID RENNIE.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 238,647, dated March 8, 1881.

Application filed October 11, 1880. (Model.)

To all whom it may concern:

Be it known that we, HENRY CARTER, mechanic, and WILLIAM RENNIE, merchant, both of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Ditching-Machines, of which the following is a specification.

The object of the invention is to make a ditching-machine capable of doing the work for which it is designed, and which can be managed by one person, substantially in the manner hereinafter explained.

Figure 1 is a sectional elevation of the machine. Fig. 2 is a plan. Fig. 3 is a detail of front of machine. Fig. 4 is a detail of buckets, guard-plate, and plow. Fig. 5 is a detail of discharge-spout. Fig. 6 is a sectional detail of part of the frame T and an adjusting-lever; Fig. 7, a perspective detail of the pole and its connections; and Fig. 8 is a perspective view of the rack-bar Y and bars X detached from the machine.

In the drawings, like letters indicate corresponding parts in each figure.

A is the main frame of the machine, composed of two parallel bars, one on each side of the elevating-wheel, and welded or otherwise suitably joined together at either end. The spokes B radiate from a hub, C, which is provided with an axle resting in suitable bearings on the frame A. The spokes B of the elevating-wheel project beyond the rim D, and at the end of each is rigidly fastened a plate, E, which forms the bottom of the elevating-bucket. A stay-rod, F, extends from the rim D to each plate E. Besides the plate E, which forms its bottom, the elevating-bucket is composed of a body-piece, G, pivoted to the said plate E, for the purpose hereinafter explained.

H is the plow, shovel-shaped, substantially in the manner shown, its standard being fitted and held between the vertical guard or guide bars I. The back end of the upper frame, J, is supported by the bars I, which are fastened to and extend from the back of the frame A, as shown. The front vertical bars, K, bind together the forward ends of these two frames, as shown.

L is a semicircular guard or back, extending from or near the nose of the plow to the up-

per frame and fitting on the circle described by the elevating-buckets. The plate L is held to the plow H by the clips b, and is hinged at a. The spring M, which is secured to the plow H, presses against the plate near the hinge, for the purpose hereinafter explained. The top end of the plate L passes through a notch or slot in the cross-piece N, which also supports the notched quadrants O.

The plow or shovel lever P is pivoted upon a bolt passing through the bars I, and is connected to the shovel by a link, p. The caster-wheel lever Q is similarly pivoted, and is connected direct to an arm attached to the caster-wheel standard R, as shown.

S is the raising-lever, pivoted to the frame J and operating the crank S', which is provided with attachment, hereinafter explained, for the purpose of raising the machine upon the wheels U of the steadying-frame T. The steadying-frame T consists of a curved bar, upon the top of which (see Fig. 3) is a yoke, T'', carrying the bars X and the stays W, which latter extend backward to the bolt V, which acts as a pivot. (See Fig. 2.) At W' are other stays, also pivoted on the bolt V and extending forward to the lower end of the curved bars T, where they are united to said bars, thus forming on each side, with said bar T and stay W, an irregular triangular frame, the lower corners of which carry the wheels U. The upper corners of the two triangles carry the yoke T''.

At X is shown guide-bars pivoted, by a bolt, d, to the top of the yoke T'', which bolt also passes through the top of a rack-bar, Y, which is secured also to the lower part of bars X by a bolt, d'. The bars X slide in bearings made between the bars K, connecting the main frame A and upper frame, J. The eccentric Z is pivoted upon the stud or rivet e, which passes through the steadying-frame T and handle or lever Z', which handle extends back to within reach of the driver when sitting on the seat A'.

Having now described the general construction of the machine as exhibited by the accompanying drawings, we shall proceed to explain briefly its operation, adding such further description of the mechanism connected therewith as may be found necessary.

In operating our ditcher the driver sits on

the seat A', and from this position not only has complete control of the horses hitched to the machine, but also, by means of the levers hereinbefore referred to, can regulate the depth of the ditch, raise the machine clear of the ground, and otherwise operate it without descending from the seat. As represented in Fig. 1, the machine is carried on the caster-wheel and the two side or steadying wheels, U. When so carried it can be moved about without bringing the ditching mechanism into operation. When the driver has driven the machine to the point where he proposes to commence the ditch he drops the back end of the machine by raising the caster-wheel by its lever Q; he then depresses the lever S, and, in a manner hereinafter described, frees the steadying-frame, dropping the front of the machine, and thereby bringing the ditching mechanism into play. The depth of the cut is next regulated by lowering the plow H through its lever P, by which the cut can be regulated to suit the description of the soil, the plow H being made to take a heavier or lighter cut, as may be found necessary.

In the first part of the specification we mention that the plates E are rigidly attached to the ends of the spokes B. We now wish to draw attention to the fact that these plates form a complete but sectional tire around the elevating-wheel, and that by hinging the body-piece G in the manner before explained the said plates E not only form a tire to the said wheel, but act as bottoms to the buckets. As the weight of the machine is carried by these plates E the elevating-wheel revolves as the machine moves forward, each body-piece G being supported by the arm *g*, which has friction-rollers at either end resting on the inside of the bars *f*, which are situated one on each side of the elevating-wheel, and are supported by the frame A. The body-piece G of each bucket is thus kept clear of its respective plate E while the latter is descending toward and resting on the ground; but so soon as the nose of the plow has been passed the body-piece G begins to drop past the plate E, and when the rollers on the arm *g* have reached the ends of the bars *f* the body-piece G swings outward to its full extent. As the wheel continues to revolve the rollers referred to come in contact with the outside edge of the bars *h*, which are shaped as shown, and are fastened to the frame A and bars *f* near their ends. On dropping past the plate E, as described, the body-piece G forms the elevating-bucket, which gathers the loose earth thrown up by the plow H and carries it to the discharge-spout J'. The guard-plate L, situated as described, holds the earth in the buckets while ascending, the hinge *a* permitting this plate to give sufficiently in the event of the buckets raising a large boulder or anything else which would otherwise obstruct the free movement of the elevating-wheel.

It will be noticed that the shape of the bars *h* are such that as each bucket reaches the

spout J' the body-piece G gradually falls back as the discharge-spout J', which extends over the bucket, as shown, removes the earth from the bucket, discharging it on the side of the ditch. The body-piece G is forced back by rollers *v v*, arranged on suitable standards at the sides of the frame, (see Fig. 2,) one of which standards also serves to secure the spout J' in place. On passing the discharge-spout the rollers on the arms *g* pass below the bars *f*, and the operation is repeated as the wheel revolves, each bucket acting independently of the others, while the plates E form a complete though sectional tire.

As will be understood from the description already given of the steadying-frame T, it is so arranged that while preventing the machine tipping over it allows the ditching apparatus to act freely. It, moreover, can be set so that the machine shall be kept perpendicular while ditching on the side of a hill. This adjustment can be effected by the driver from his seat by simply moving the lever Z', which, owing to its connection with the eccentric Z and frame T, (see Fig. 3,) as before described, produces the desired adjustment.

While it is desirable that the ditching-frame shall have a free vertical movement on the guide-bars connecting it to the steadying-frame, it is, of course, necessary that this movement should be limited to a certain extent. With that view we provide what we term a "stopping-block," *j*, which is pivoted at one side of the frame J, its other end projecting through a slot in the opposite side of the frame. The rod *k* brings the block *j* within reach of the driver, who can thus draw it from or push it toward the rack Y, upon the back of which are cut the notches *l*. When the machine is taking the first cut the stopping-block *j* is set so as to come in contact with the first notch. For the next cut the block is drawn back so that the first notch will clear it, but will come in contact with the second, and so on, the notches being made the proper distance apart corresponding with the depth of the ditch.

The leading-wheel 2 is placed at the end of the bars K. It is not intended to carry any part of the machine, but merely to act as a guide-wheel when the buckets are in the ditch, and to prevent the machine tipping forward, as it might otherwise do.

It will be noticed that a slot is made in the bars, into which the pin *m* on the end of the tongue 3 fits. This slot allows the tongue 3 to have a vertical movement, which is, however, regulated by the crank 4, connected to it, as shown, and brought under the command of the driver by the rod 5, which extends back to his seat. This adjustment of the tongue will be found of great service, as it enables the driver to throw more or less weight on the main or elevating wheel, as circumstances require.

We have already referred to the raising-lever S, and may now state that the attachments then referred to consist of a hook-catch, *n*,

hinged at the end of the crank *S'*, and made to engage with the teeth in the rack *Y* by the action of a suitable spring. A hold-fast catch, *p*, is pivoted between the bars *K*, and is set to engage with the teeth in the rack *Y*, as shown. When the lever *S* is operated it causes the catch *n* to take into the teeth of the rack *Y*, raising the front part of the main frame *A J* and elevating the wheel, the hinder part of the frame being supported on the caster-wheel. As the frame is raised it carries with it the hold-fast catch *p*, which also takes into the teeth of the rack and holds the frame while the lever is being depressed to make the catch *n* take hold of another tooth. It will thus be seen that by alternately raising and depressing the lever *S* the frame and elevating-wheel can be raised to any desired height. When the frame and wheel are to be lowered the lever *S* is pressed down below the pin *r* on the guide *r'*, which will cause an incline, *s*, (see Fig. 3,) on the crank *S'*, to strike a cross-bar, *t*, on the catch *p*, and thus throw said catch away from the teeth *Y*, and as it moves outward the upper part of the catch *p* strikes the point of the catch *n* and forces it away from the teeth of the rack, and there being nothing to hold up the front end of the frame it descends by its own weight until the plates *E* come in contact with the surface of the ground. It will thus be seen that by operating the lever *S* above the pin *r* the frame and wheel can be raised, and that by depressing said lever below the pin *r* the frame, wheel, &c., will descend.

It will thus be seen that by working the lever *S* up and down the front of the machine can be raised and regulated by the driver to suit the work he wishes accomplished.

We are aware that it is not new in ditching-machines to use elevating-wheels with reciprocating blades or buckets passing through apertures in the tire of the wheel; but these differ essentially from our wheel, in which the tire is made up of a series of separate or detached plates, each independent of the rest, which allows of the body-pieces *G* embracing the plates on three sides, which is not done in any other machine with which we are acquainted.

What we claim as our invention is—

1. An elevating-wheel of a ditching-machine having a sectional tire composed of the plates *E*, each plate being separated or detached from the rest, substantially as and for the purpose specified.

2. An elevating-wheel of a ditching-machine having a sectional tire composed of the plates *E*, in combination with the body-piece *G*, hinged to each plate and forming a series of discharging earth-buckets, substantially as and for the purpose specified.

3. The body-piece *G*, hinged to each plate *E*, and provided with an arm, *g*, in combination with the bars *h* and *f*, formed to operate the

body-piece *G*, substantially as and for the purpose specified.

4. An elevating-wheel of a ditching-machine having a sectional tire composed of the plates *E*, with body-pieces *G* hinged thereto, and provided with arms *g*, in combination with the bars *h* and *f*, rollers *v v*, and discharge-spout *J'*, arranged and operating substantially as and for the purpose specified.

5. The spokes *B*, radiating from the hub *C*, pivoted to the main frame *A*, and having the plates *E* attached to their outer ends, in combination with the stay-rods *F*, extending from the rim *D* to the bottom of the plates *E*, substantially as and for the purpose specified.

6. The circular guard-plate *L*, extending from or near the nose of the plow *H* to the frame *J*, and hinged at *a*, in combination with traveling earth-elevating buckets, substantially as and for the purpose specified.

7. The hand-lever *P*, pivoted on the vertical bars *I*, and extending to within reach of the driver on the seat, in combination with the link *p*, plow *H*, and circular hinged guard-plate *L*, arranged and operating substantially as and for the purpose specified.

8. The adjustable steadying-frame *T*, provided with the wheels *U*, in combination with the hand-lever *S*, pivoted on the frame *J*, and extending back to within reach of the driver on the seat, with the crank *S'*, connected by suitable mechanism to the guide-bars *X*, substantially as shown and described.

9. The central guide-bars, *X*, connected to the frame *T* by the bolt *d*, in combination with the eccentric *Z*, pivoted on the stud or rivet *e*, passing through the frame *T* and lever *Z'*, substantially as and for the purpose specified.

10. The steadying-frame *T*, braced from and pivoted to the rear of the machine by the rods or stays *W*, in combination with the guide-bars *X*, eccentric *Z*, and lever *Z'*, substantially as and for the purpose specified.

11. The hold-fast catch *p*, pivoted on the bars *K*, and engaging with the notches in the rack *Y*, as described, in combination with the catch *n*, pivoted on the end of the crank *S'*, the lever *S*, and rack *Y*, substantially as and for the purpose specified.

12. The stubbing-block *j*, pivoted to the frame *J*, and provided with the rod *k*, as described, in combination with the notches *l* on the back of the rack *Y*, substantially as and for the purpose specified.

13. The tongue 3, provided with a pin, *m*, which slides in a groove in the bars *K*, in combination with crank 4 and rod 5, arranged and operating substantially as and for the purpose specified.

HENRY CARTER.
WM. RENNIE.

In presence of—

DONALD L. RIDOUT,
CHAS. W. BALDWIN.