

(No Model.)

2 Sheets—Sheet 1.

S. N. POND.
ADJUSTABLE CRANK.

No. 421,969.

Patented Feb. 25, 1890.

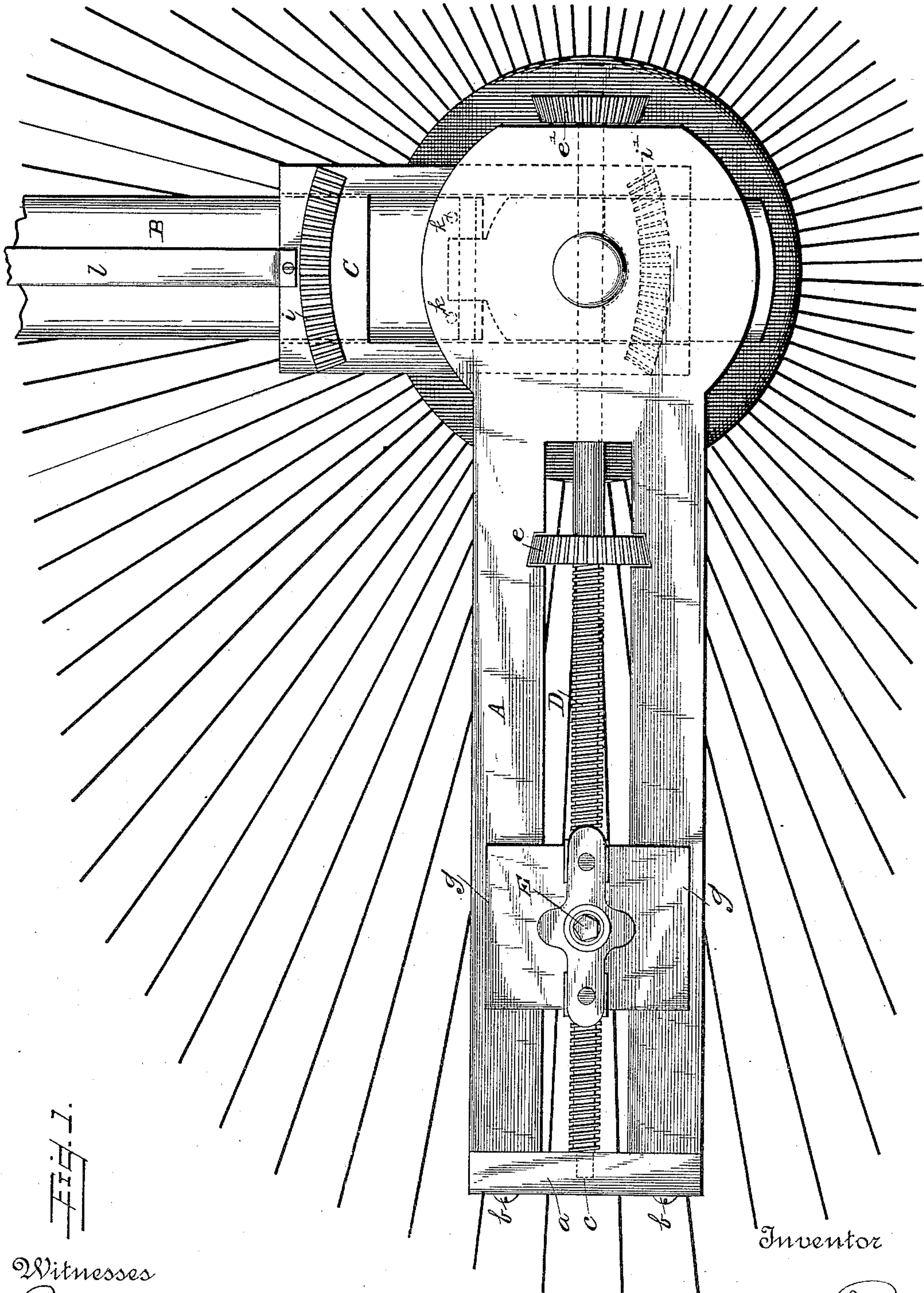


Fig. 1.

Witnesses

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Albert B. Blackwood

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Fig. 1.

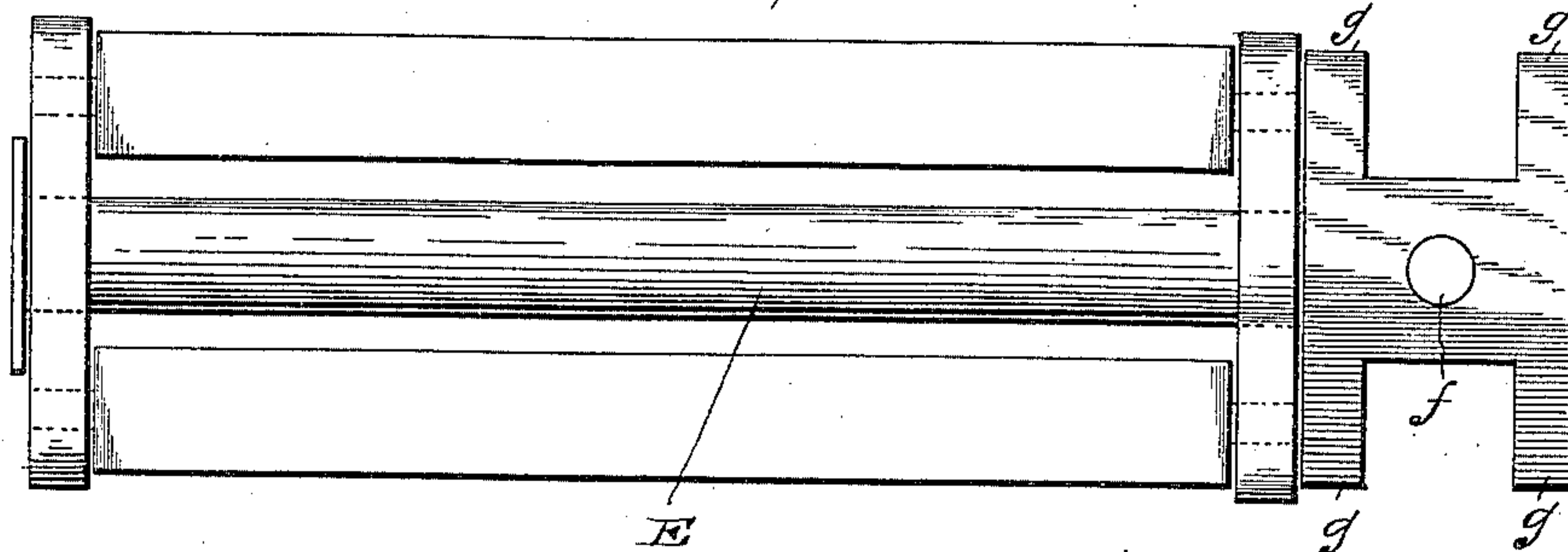


Fig. 2.

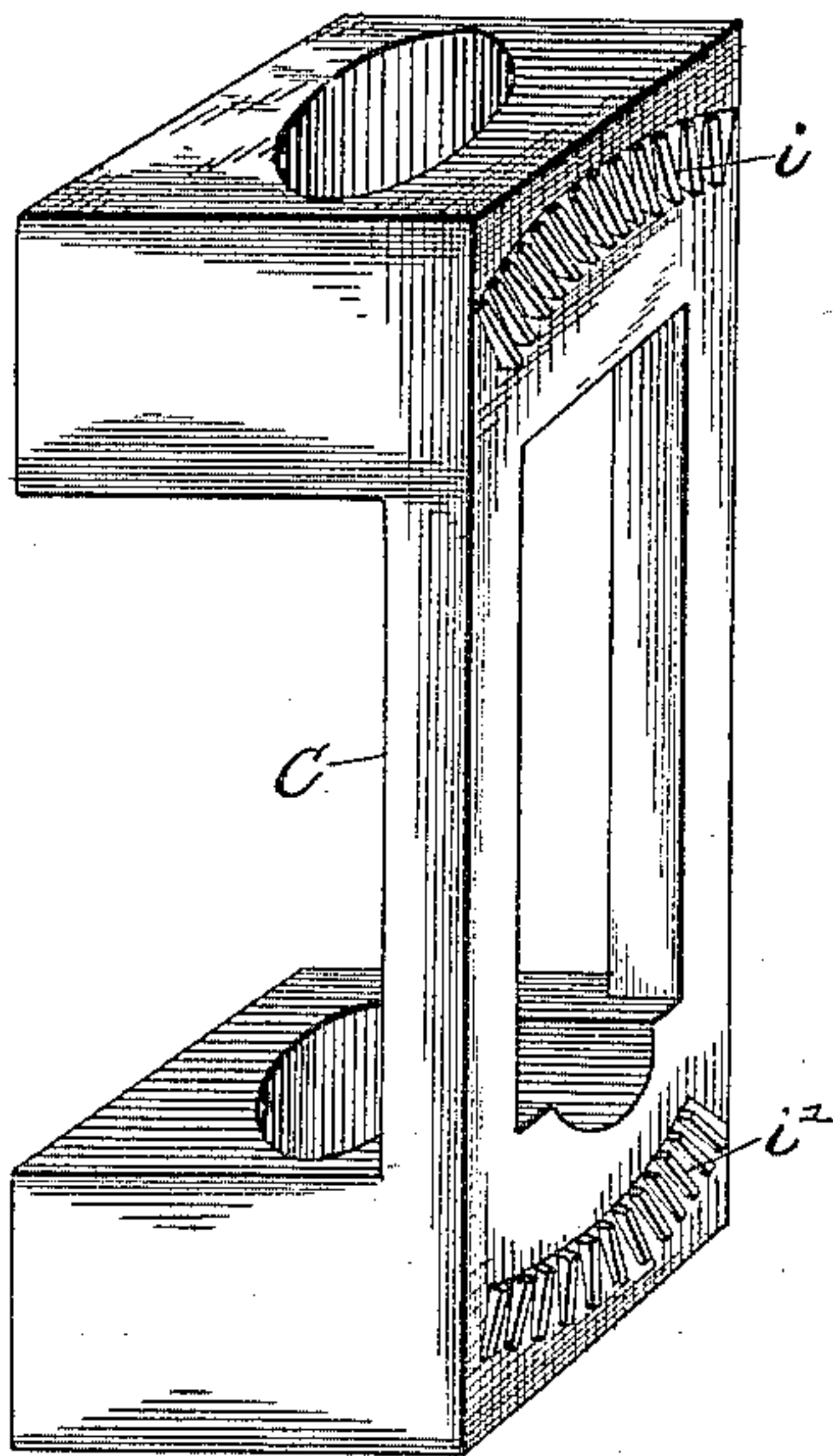


Fig. 4.

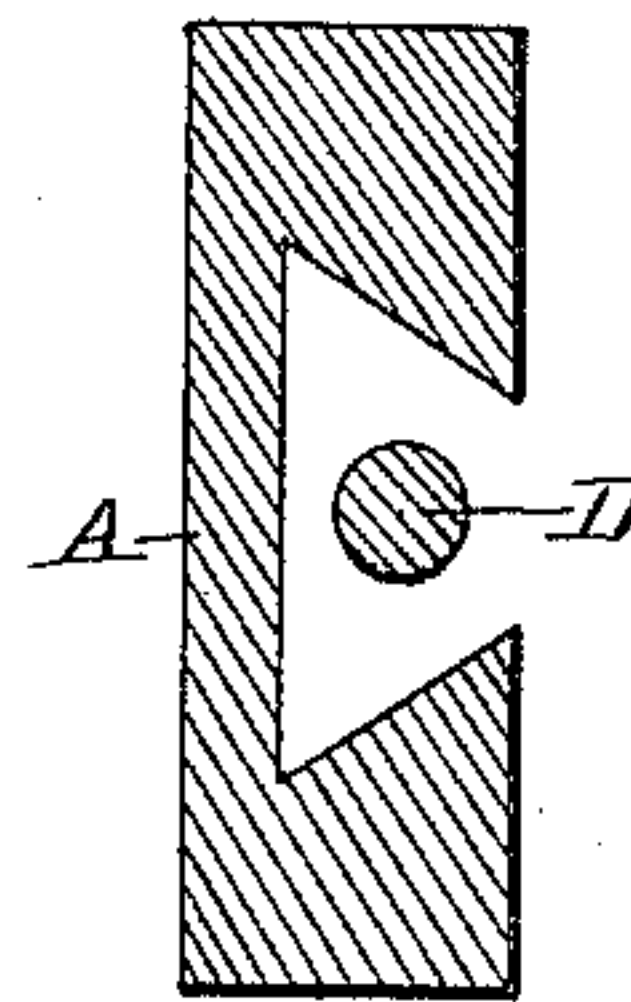
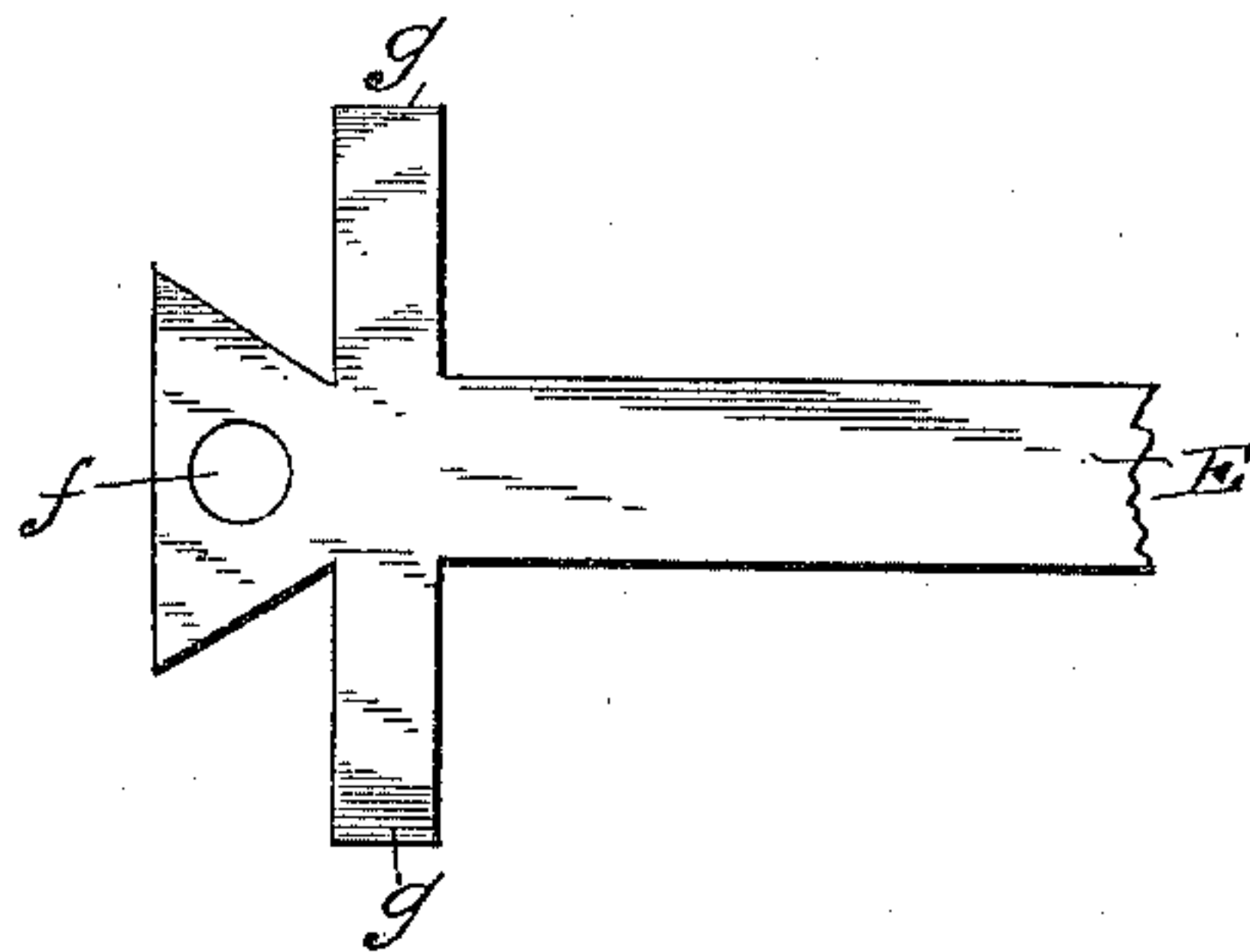


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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ADJUSTABLE CRANK.

SPECIFICATION forming part of Letters Patent No. 421,969, dated February 25, 1890.

Application filed December 20, 1889. Serial No. 334,372. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL N. POND, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Adjustable Cranks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to adjustable cranks for engines or other machines, being more particularly designed for application to velocipedes, and has for its object to effect the easy throw of the wrist-pin up and down the throw-arm without stopping the machine, and in the latter application to effect the easy throw of the pedal up and down the crank-arm without the necessity of dismounting. A bicyclist in coming to a long rising grade would find it a great advantage if, without being obliged to stop and dismount, he could effect the throw of his pedal an inch or so out on the crank-arm, whereby less exertion would be required to overcome the grade; and, conversely, on a level or downgrade, where increased speed is the desideratum, a corresponding shortening of the crank-arm would be advantageous. I accomplish these objects in a simple and effective manner by the device illustrated in the accompanying drawings, in which—

Figure 1 is a view of my device applied to the driving-wheel of a bicycle of the well-known "vertical-fork" type. Fig. 2 is a detail of the pedal attachment. Fig. 3 is a detail of the sliding collar or plate which operates on the vertical fork. Figs. 4 and 5 are modifications of my crank-arm and pedal.

A represents the crank-arm of a bicycle.

B is a section of the vertical fork, and C is a plate or collar designed to slide vertically on the said fork.

The crank-arm A is slotted, as shown, and at one end thereof is provided with a cap-piece *a*, secured to the two forks of the crank-arm by screws *b b*, as shown, or by any other suitable means. The object of this cap-piece

a is to brace and strengthen the slotted crank-arm and to provide a bearing *c* for the screw rod or bar D. This rod or bar D is passed longitudinally through the longitudinal center of the crank-arm and extends its entire length. It is threaded part of its length from one end to the gear-wheel *e*, as shown, and has a bearing at *c* and a long bearing through the diametrical center of the solid head of the crank-arm, as shown by dotted lines in Fig. 1. At one end and at a suitable intermediate point are gear-wheels *e* and *e'* on said rod D as their axis, not rotating thereon, but having a fixed bearing, so that they cannot be rotated without rotating the rod D.

The pedal which operates on the slotted throw-arm A is of the form shown in detail in Fig. 2. Through the end which is designed to slide on the slotted crank-arm is made a hole *f*, internally threaded to engage with the threaded portion of rod D. Above and below said hole are formed grooves to engage with the two forks of the crank-arm, the bottom of the grooves bearing on the interior faces of the forks and the shoulders *g g* hugging the sides of the forks, but not so tightly as not to slide easily thereon when well lubricated. It is thus obvious that, while the screw-rod prevents a straining or loosening of the pedal lengthwise of the crank-arm, the bearing of the forks in the grooves on the pedal, as above described, prevents a similar defect crosswise of the arm, and the pedal is as firmly and securely fixed on the crank-arm as if held by clamps and bolts and nuts.

In Figs. 4 and 5 I have shown a modified form of my device. The crank or throw arm, instead of being slotted, is channeled, as shown in Fig. 4, and a correspondingly-shaped pedal or wrist-pin (shown in Fig. 5) operates thereupon by engagement with a longitudinal screw rod or bar in the same manner as hereinbefore described.

The crank or throw arm A, constructed and provided as hereinabove described, is shown fixed in the shaft of the driving-wheel in the usual manner, it of course being necessary to form a small hole in the said shaft to permit the passage through the same of the rod or bar D.

C, as aforesaid, is a collar designed to slide

on some suitable part of the stationary framework of the machine, and in the case of a bicycle on the vertical fork, being operated by a lever *l*, passing from said collar up the fork to the handle of the machine. It is shown in detail in Fig. 3.

I have shown no particular form of lever attachment, as any well-known form will answer that will serve the simple function of raising and depressing the collar C, and its particular mode of attachment would be only a matter of mechanical shop-craft. On this collar C are formed two racks *i* and *i'*, designed to engage with the wheels *e* and *e'*, respectively, and formed at such position thereon that when the collar is at its highest position, as shown in Fig. 1, wheel *e* will engage with rack *i*. When the collar is at an intermediate position, neither of the wheels will be in engagement, and when the collar is at its lowest position wheel *e'* will engage with rack *i'*. The upward travel of the collar is limited by the shaft of the driving-wheel and the downward travel is limited by two stops *k k* on the frame.

The manner in which my device may be operated when applied to a velocipede is as follows: When the rider comes to a hill and desires to lengthen the crank-arm of his machine, he simply raises the collar C by means of the lever extending to his handle-bar, which places rack *i* in a position to engage wheel *e* at each revolution of the crank, thus rotating screw-rod D, and thereby throwing pedal E farther out on the arm. When the crank-arm has thus been lengthened sufficiently, the collar is permitted to drop to its intermediate position and the pedal remains in its new position. Similarly when a level or downgrade confronts the rider and speed is his object, by depressing the collar by means of the same lever, wheel *e'* is thrown into engagement with rack *i'*, the screw-rod is rotated in the opposite direction from formerly, and the pedal is thus thrown nearer the center of revolution and the crank-arm is shortened, thus permitting more rapid revolution of the same, and consequently increased speed.

In the construction of my device I do not limit myself to the exact forms shown in the drawings or hereinabove described. Any engagement of parts whereby the pedal or wrist-pin is thrown back and forth on the throw-arm by means of a screw rod or bar passing through or parallel to said throw-arm and rotated by gearing fixed on said screw-rod will be within my invention. The gearing may be toothed, frictional, or of any suitable form. Neither do I limit the application of my device to velocipedes alone; but it may be applied to any machine wherein a quick easy adjustment of the length of the lever-arm is desired. In such application wherein power is applied to a crank or throw arm attached to the shaft of a driving-wheel I construct the throw-arm on the same principle and the

same general plan as that shown in Fig. 1, and operate the wrist-pin on said throw-arm by a longitudinal threaded rod or bar passing through said throw-arm, said rod or bar being operated by engagement with a rack attached to some stationary part of the frame-work of the machine.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A crank for velocipedes and other purposes, comprising a head rigidly connected to the shaft to be turned, a throw-arm projecting from and rigidly fast upon said head and having a bearing adapted for adjustment of a crank-pin thereupon, a crank-pin formed to have adjustment upon said bearing, and a holding rod or bar in engagement with the crank-pin and throw-arm, whereby the radial distance of said crank-pin from the center may be varied, substantially as described.

2. A crank for velocipedes and other purposes, comprising a head rigidly connected to the shaft to be turned, a throw-arm projecting from and rigidly fast upon said head and having a longitudinal bearing adapted for adjustment of the crank-pin thereon, a crank-pin formed to have adjustment in said bearing, and a holding-rod arranged longitudinally upon the throw-arm and engaging with the crank-pin, whereby the radial distance of said crank-pin from the center may be varied, substantially as described.

3. A crank for velocipedes and other purposes, comprising a head rigidly connected to the shaft to be turned, a slotted or channeled throw-arm projecting from and rigidly fast upon said head, and a cap on the end of said throw-arm, a screw-threaded holding rod or bar having one bearing in said cap and another in the head of said throw-arm, and an internally-threaded crank-pin engaging with said throw-arm and screw-threaded rod, substantially as described.

4. In a crank for velocipedes and other purposes, the combination, with a throw-arm, of a crank-pin held in a variable relation to said throw-arm, a holding rod or bar engaging with said arm and crank-pin, a movable plate upon the frame-work engaging faces upon said holding-rod and said movable plate, and a rod extending toward the hand of the operator, whereby the latter is enabled to vary the radial distance of the crank-pin from the center without stopping the machine, substantially as described.

5. The combination, with a throw-arm having a slot, channel, or bearing therein, of a crank-pin formed to engage said slot, channel, or bearing, and a holding rod or bar arranged in a parallel relation to said throw-arm and in changeable engagement with said pin, substantially as described.

6. The combination, with the frame, of a plate movable by the hand of the operator, said plate having an engaging-face for engagement with adjusting devices upon the

throw-arm for changing the radial distance of the crank-pin, substantially as described.

7. In a crank for velocipedes and other purposes, the combination, with a longitudinal
5 screw-threaded rod having bearings within the throw-arm, of gearing fixed on and adapted to rotate said rod, adjustable gearing on the stationary frame-work of the machine adapted to engage the gearing upon the
10 rod, and a wrist-pin adapted to be thrown

back and forth on said throw-arm by the rotation of said screw-rod, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL N. POND.

Witnesses:

HENRY E. COOPER,

ALBERT B. BLACKWOOD.