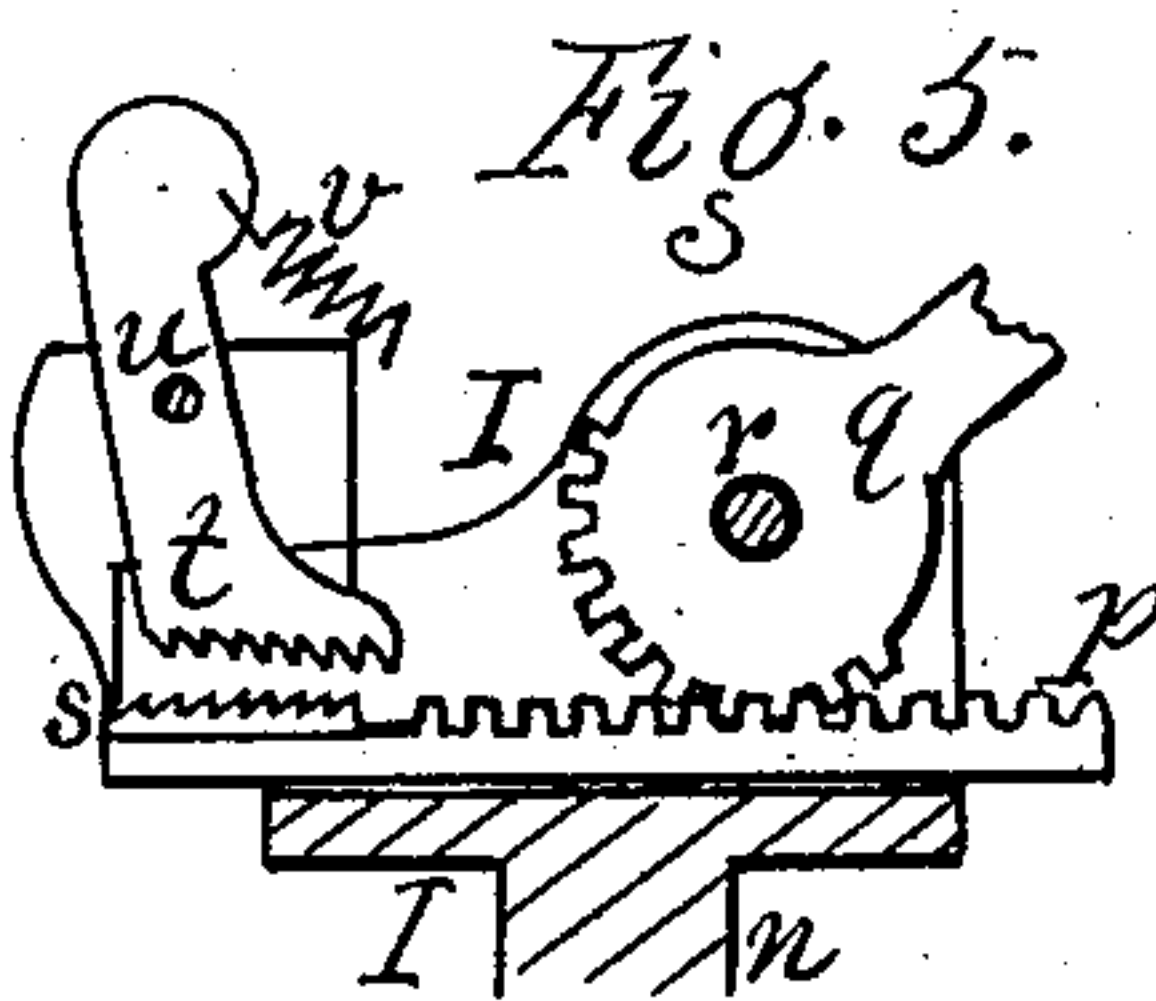
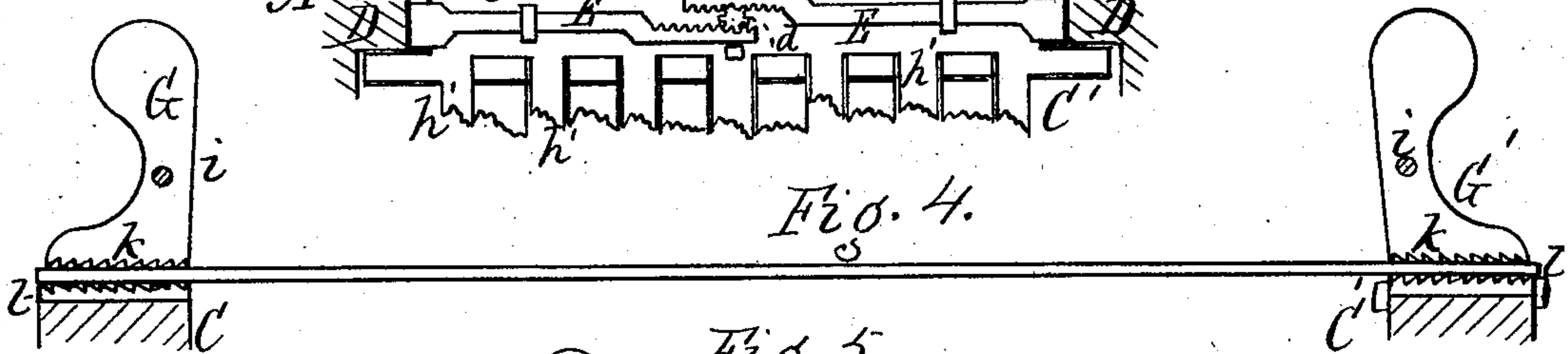
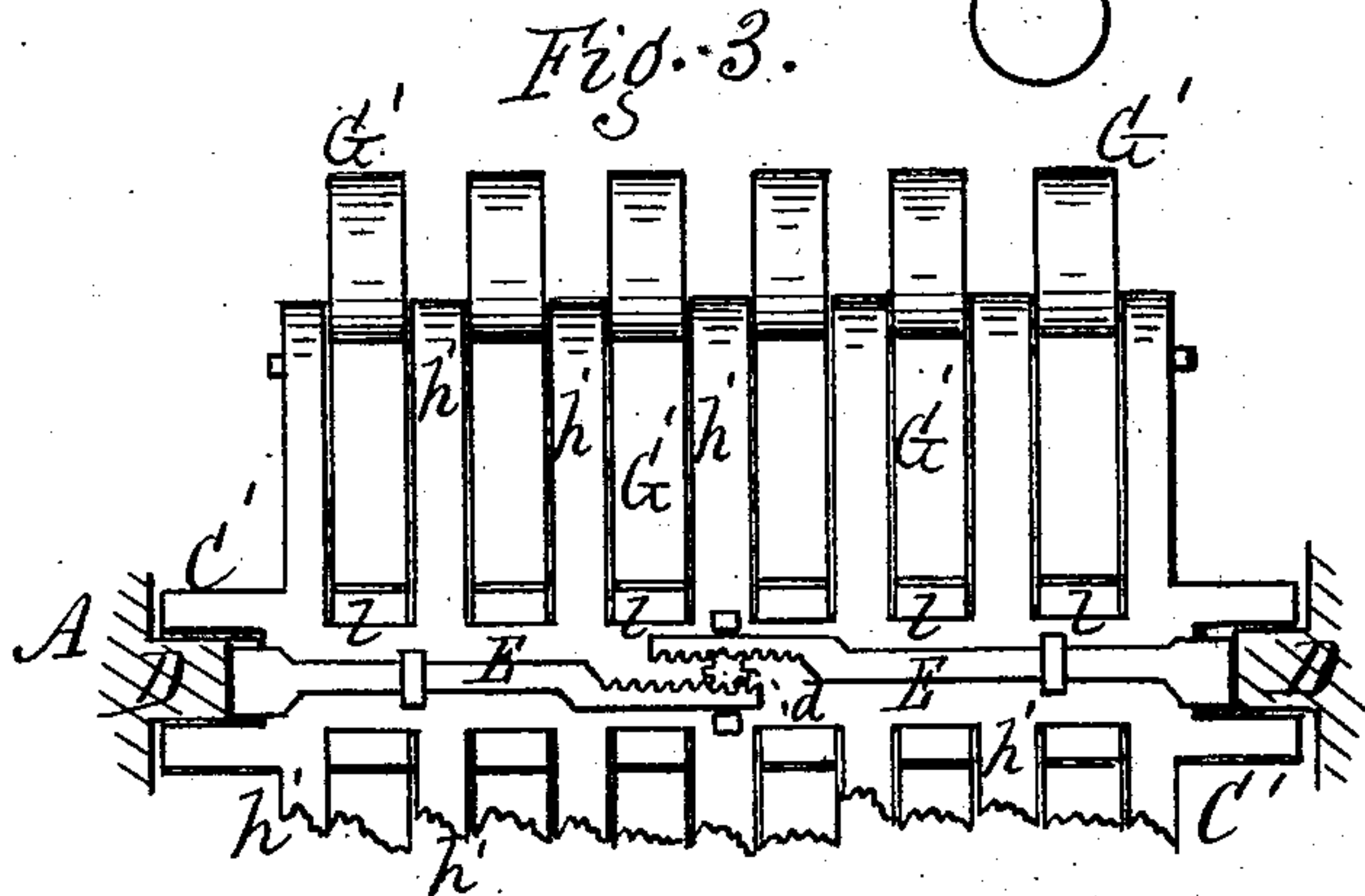
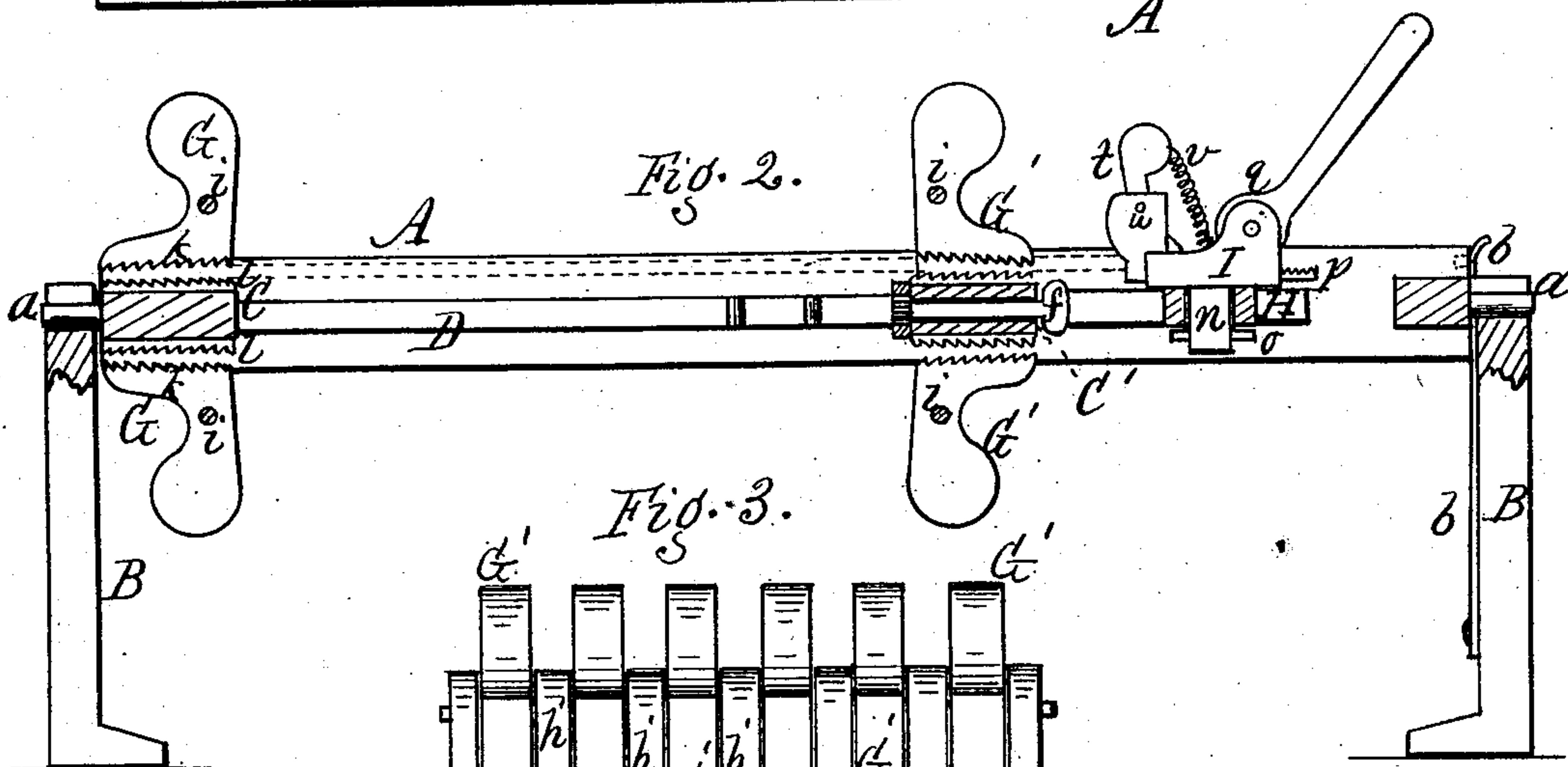
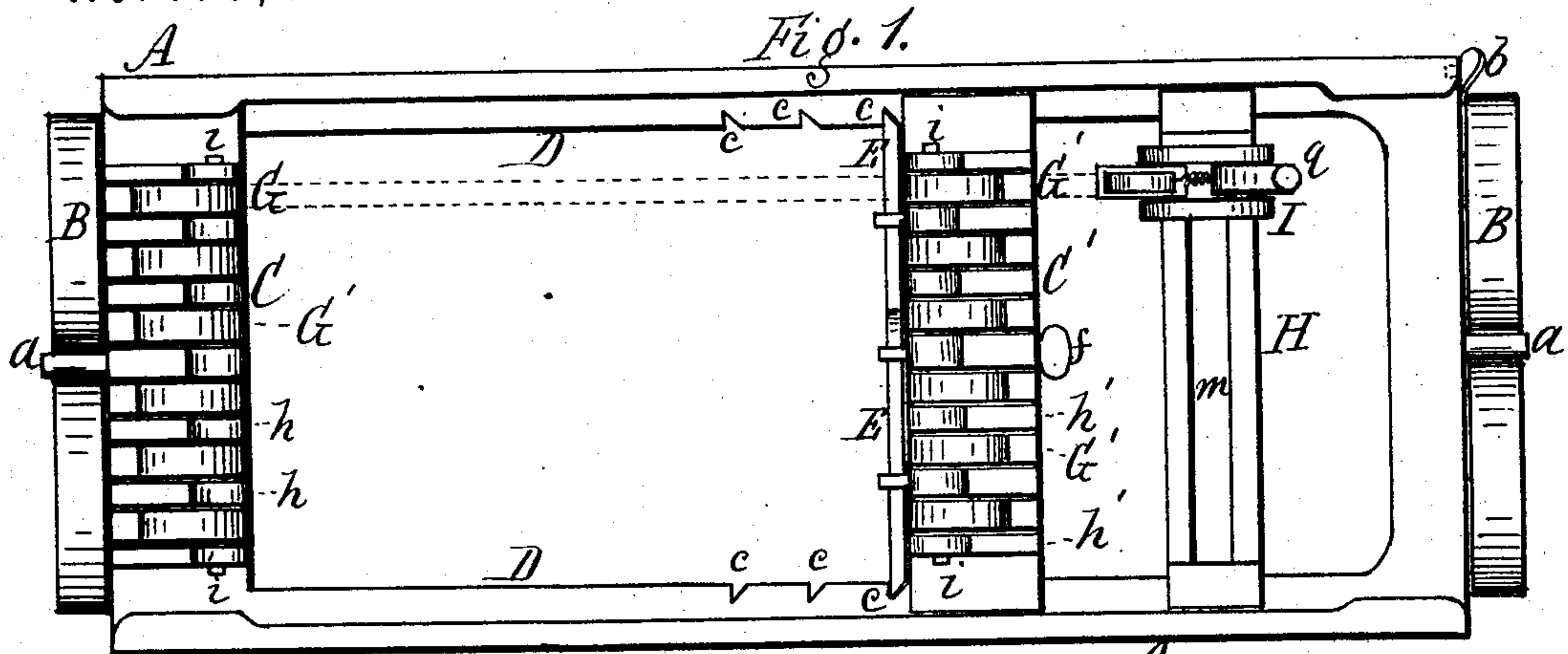


W. H. FERGUSON.

Method of Straightening Whalebone.

No. 160,411.

Patented March 2, 1875.



Witnesses.
E. B. Scott.
Jacob Spalding

Inventor.
Wm. H. Ferguson,
per R. F. Osgood,
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM H. FERGUSON, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN METHODS OF STRAIGHTENING WHALEBONE.

Specification forming part of Letters Patent No. **160,411**, dated March 2, 1875; application filed May 15, 1874.

To all whom it may concern:

Be it known that I, WILLIAM H. FERGUSON, of the city of Rochester, in the county of Monroe and State of New York, have invented a certain new and Improved Method of Straightening Whalebone for Whips and other uses; and I do hereby declare that the following is a full, clear, and exact description of the same.

In its natural state, after being rived or split, whalebone is filled with short bends, which require to be straightened before it can be used for whips or other purposes where straight lengths are required. The method heretofore in use has been to hold the bend of the whalebone in the flame of a lamp, for the purpose of heating the same, and then straightening it by the pressure of the thumb and fingers, sighting down as the work is done. As there are many bends it is a difficult and tedious operation, and when complete it is impossible to get the bone quite straight. In the manufacture of whips much difficulty occurs, as the bone is covered with strips of rattan, which must be fitted nicely in place to make good work, and any bends or irregularities in the bone makes an enlargement or turn in the body, which cannot be avoided. A still more serious difficulty is that, in heating the bone in the flame of a lamp sufficiently to make it pliable, it becomes burned, and so brittle in many places that it is frequently useless for whips, breaking in the first use. This difficulty occurs in whips of all qualities, as the utmost care cannot prevent the burning of the material. To obviate this difficulty is the object of my invention, which consists in a novel process whereby all bends and irregularities are removed from the strips, leaving them in a straight condition, and preventing any burning or injury to the fiber of the material. The invention also consists in a novel apparatus for carrying my process into effect.

In the drawings, Figure 1 is a plan. Fig. 2 is a longitudinal section. Figs. 3, 4, and 5 are detail views.

In carrying out my invention, I first place the strips of whalebone in a steam-vat, and subject the same to the action of steam till they become thoroughly heated. The object is to attain the action of the heat rather than

the soaking action of the water; but when heated by steam they retain the heat longer than when heated dry, which gives time for the subsequent manipulation. From the tank the strips are taken and placed in the straining apparatus, of which one form is shown in the drawings.

A is a rectangular frame, hung by journals *a a* in end standards B B, so that the frame may be turned over. The frame is retained in place by a spring-catch, *b*. C C' are two head-blocks, the former of which is stationary, while the latter is movable on ways D D at the sides of the frame, in order to accommodate different lengths of whalebone. It is retained in place by rack-bars E E, whose ends strike into notches *c c* of the ways. The rack-bars are operated by a central pinion, *d*, Fig. 3, attached to a shaft, *f*. This shaft rests in a socket of the head-block, and the pinion is made small enough to allow it and the shaft to be withdrawn at any time. *h h h' h'* are bearings attached permanently to the head-blocks. G G' are jaws, pivoted, at *i i*, to the bearings. The inner ends of the jaws are serrated, as shown at *k*, and operate in connection with corresponding serrated bars *l l*, resting on the head-blocks, to catch and retain the whalebone when placed therein. The jaws may have springs of any desired kind, to close them down, and the serrated bars may have heads or offsets, which embrace the edges of the head-blocks, to retain them in place, and enable them to be removed at pleasure. Two sets of these jaws are employed, projecting, respectively, from opposite sides of the frame, as shown. H is a fulcrum-bar resting on the ways in rear of the sliding head-block, being retained in a fixed position by bearings projecting back from the head-block, or projecting from the frame, so that power can be applied from it to strain the whalebone. It is provided with a slot or way, *m*, in which rests and slides a jack composed of the following parts: I is a block or bearing, having a stem, *n*, which rests in the slot *m*, and is secured by pins *o o*, so that it can be removed at any time. *p* is a sliding rack-bar resting in the bearing, and operated by a segment-lever, *q*, pivoted, at *r*, to the bearing. The front end of the rack-bar has a series of ser-

rations, *s*, over which rests a serrated jaw, *t*, pivoted at *u*. The jaw is drawn down by a spring, *v*. As the lever is thrown up the rack-bars and the jaw which is pivoted to it will be drawn back, thereby drawing upon the strip placed in the jack.

The operation of the apparatus is as follows: The strips of whalebone, as they are drawn from the steam-vat, are placed one end beneath the jaws of the stationary head-block *C*, and then carried beneath the jaws of the movable head-block through to the jack, where they are secured beneath the jaw *t*. The lever *q* is then raised, which draws the strip taut, and when released it is stretched firmly between the jaws of the two head-blocks. When one strip has been secured the jack is moved laterally opposite the next pair of jaws, and another strip secured in the same manner, and so on till the whole series on one side of the frame is filled. The jack is then removed, the frame turned over, and the jack replaced on the other side, which is filled in like manner. When this is done the frame is lifted off from its bearings and a new one applied in its place. By this means, with a few frames, large numbers of strips may be straightened very rapidly. In drying the strips contract, and the tension removes the bends much more effectively than can be done by hand. I avoid the burning process, and all the inherent elasticity and toughness of the material are preserved.

What I claim, and desire to secure by Letters Patent, is—

1. The process of straightening whalebone herein described, the same consisting in heating the strips by steam, straining the same in a longitudinal direction, and drying it while under this tension, substantially as set forth.

2. The combination of the stationary and movable head-blocks *C C'*, provided with jaws *G G'*, for clamping and holding strips of whalebone under tension, as and for the purpose specified.

3. The combination, with the movable head-block *C'*, of the pinion *d* and sliding rack-bars *E E*, engaging with notches of the frame, as shown and described, and for the purpose specified.

4. In combination with the head-blocks *C C'*, provided with jaws for holding the tension of the strips, the fulcrum-bar *H*, provided with a jack for drawing the strips through the jaws, as described.

5. The jack consisting of the bearing *I*, rack-bar *p*, lever *q*, and jaw *t*, pivoted to an extension of the rack-bar, so as to move therewith, as shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WM. H. FERGUSON.

Witnesses:

DANIEL GATENS,
R. F. OSGOOD.