

(No Model.)

M. REISCH.  
RATCHET DEVICE.

No. 463,778.

Patented Nov. 24, 1891.

Fig. 1.

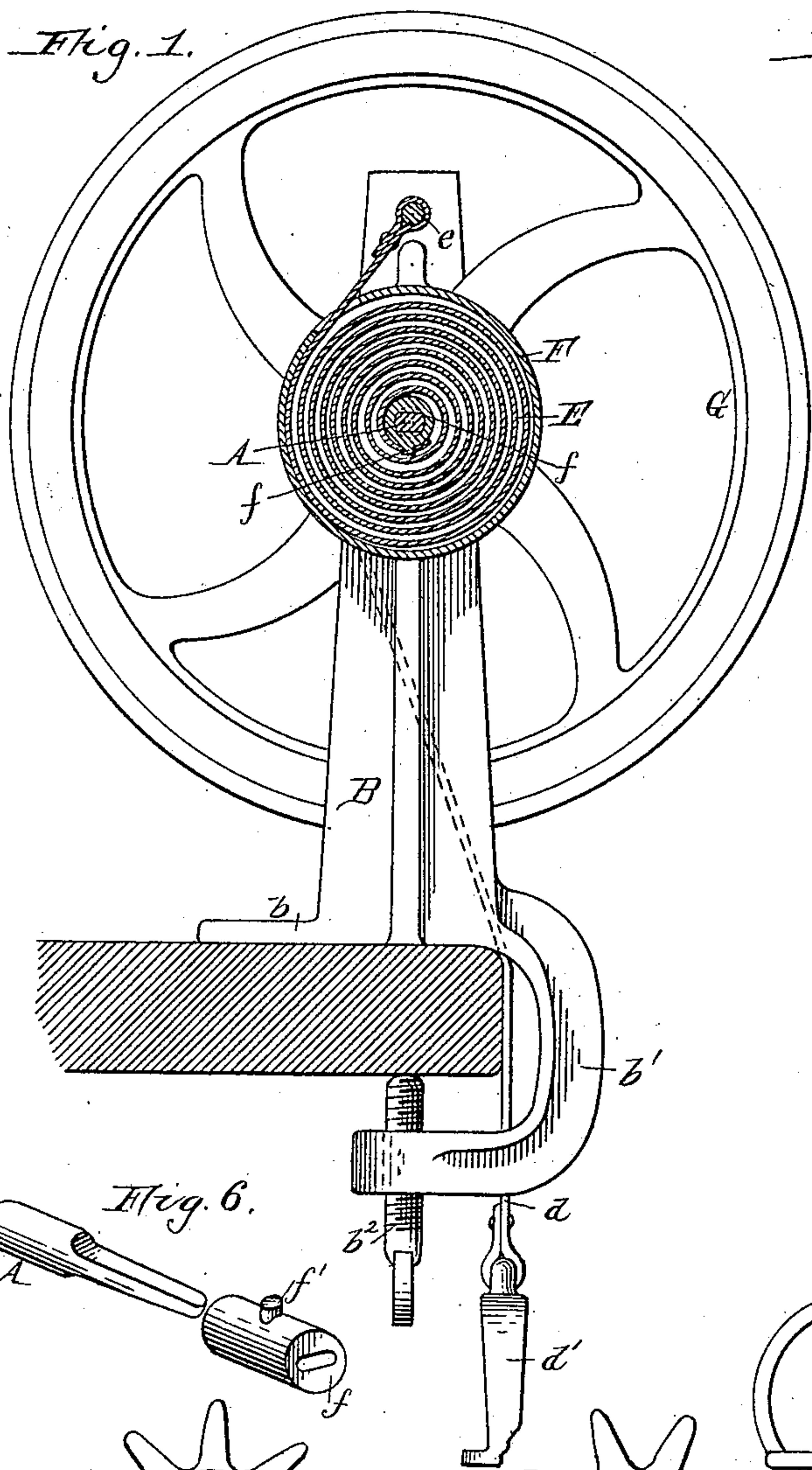


Fig. 2.

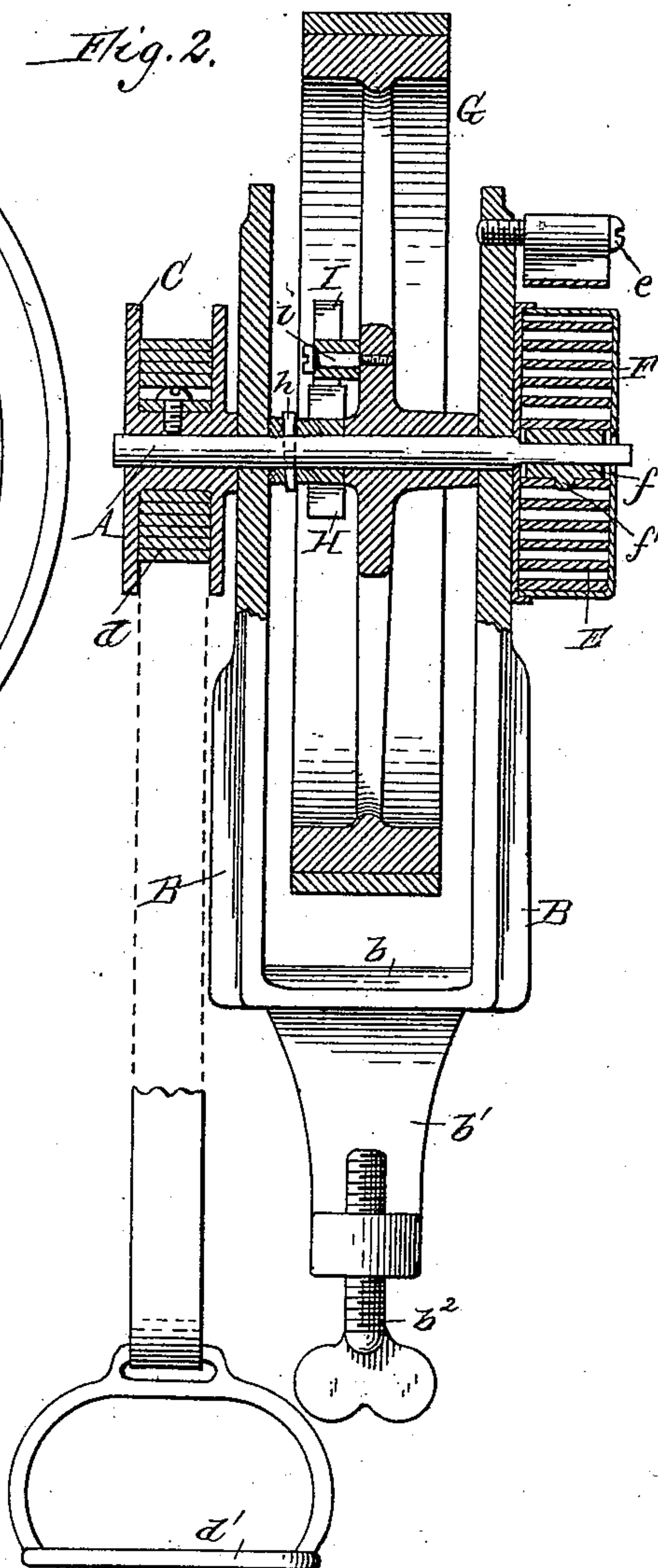
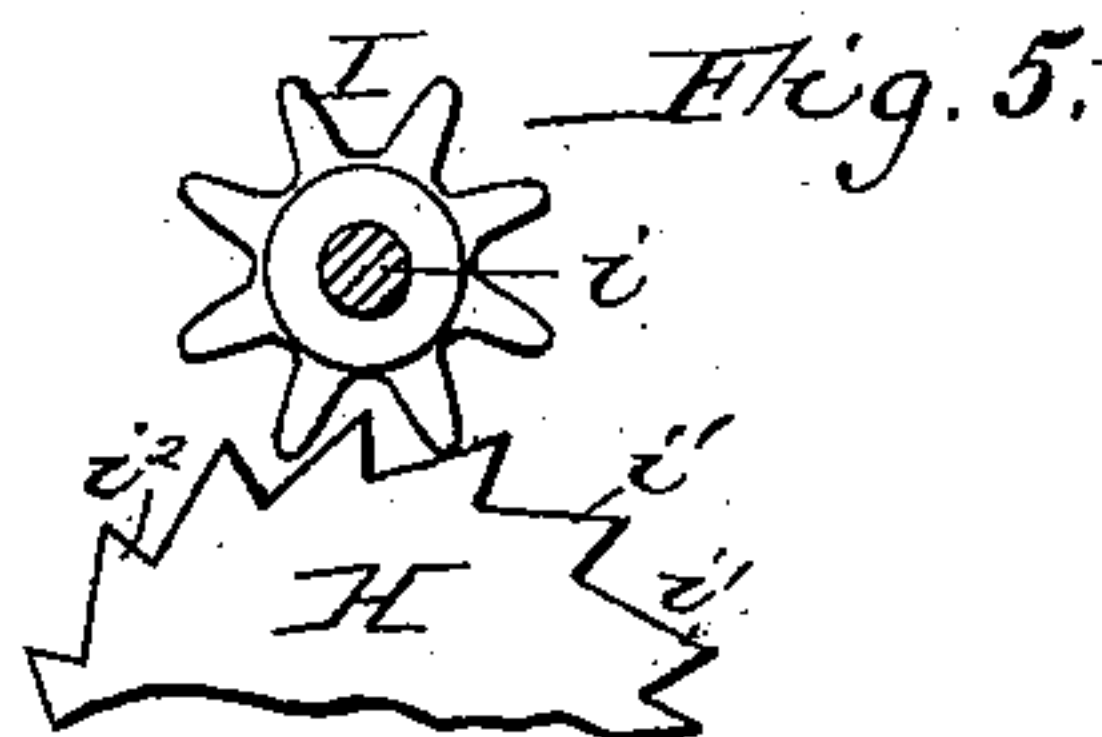
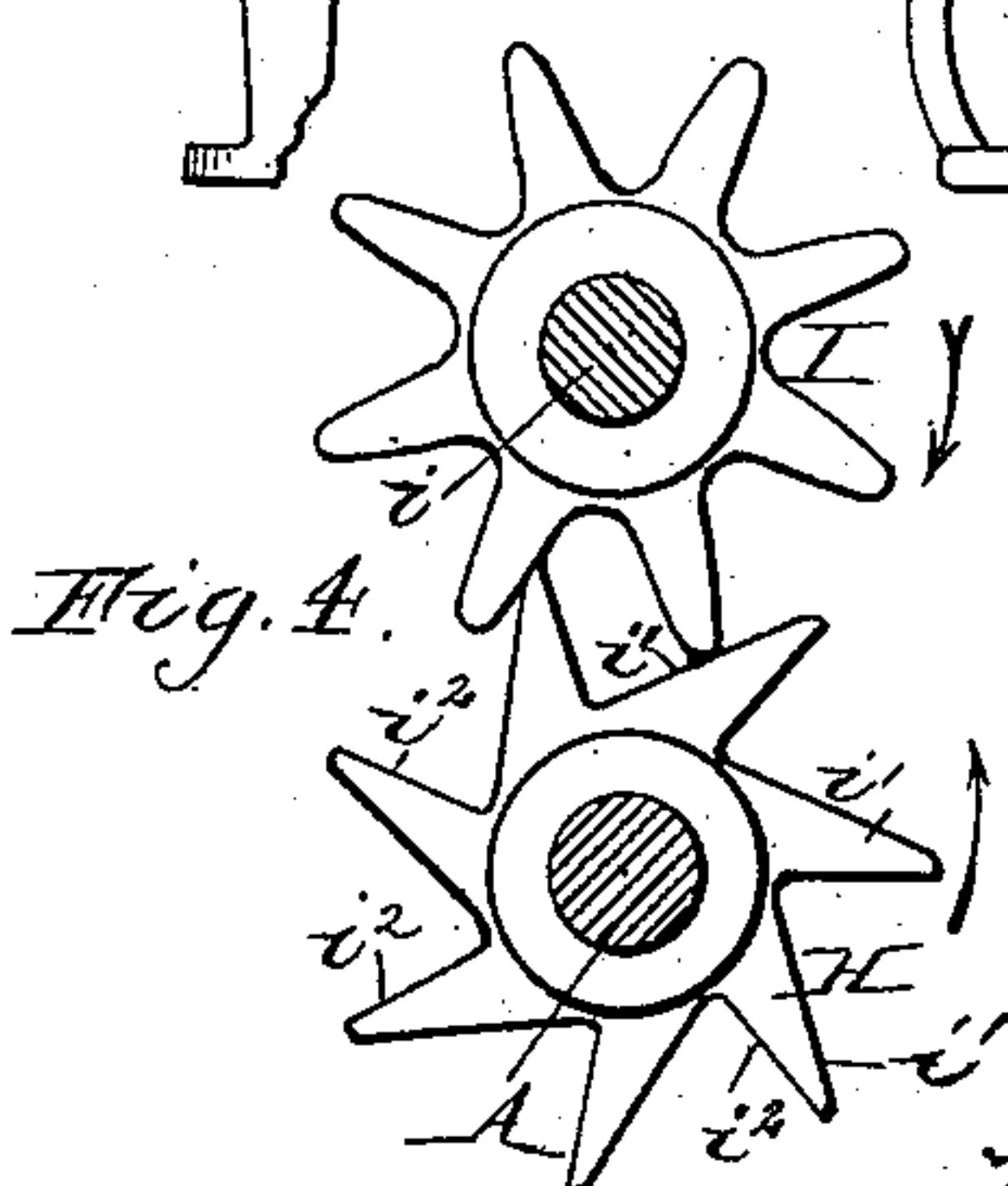
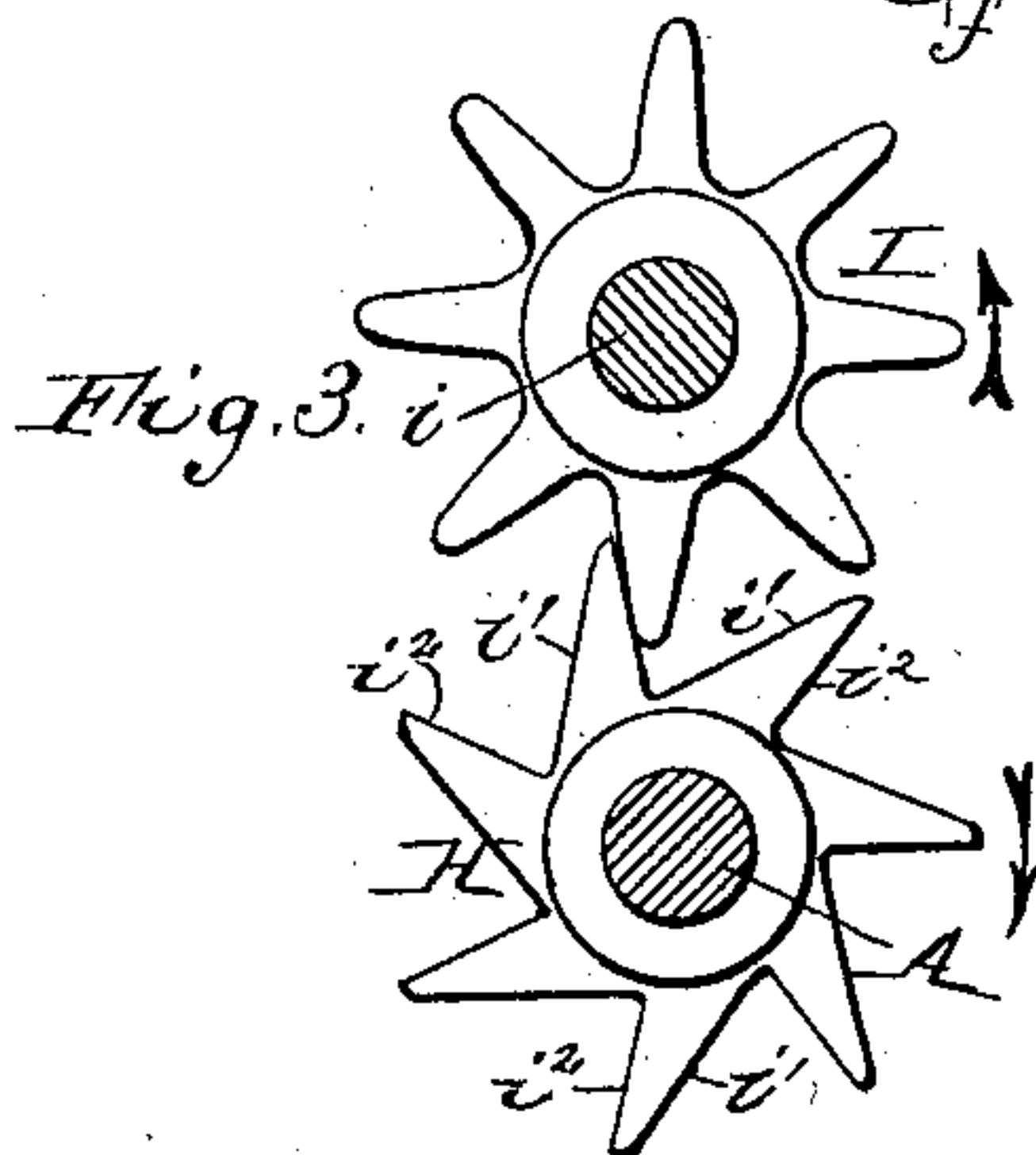
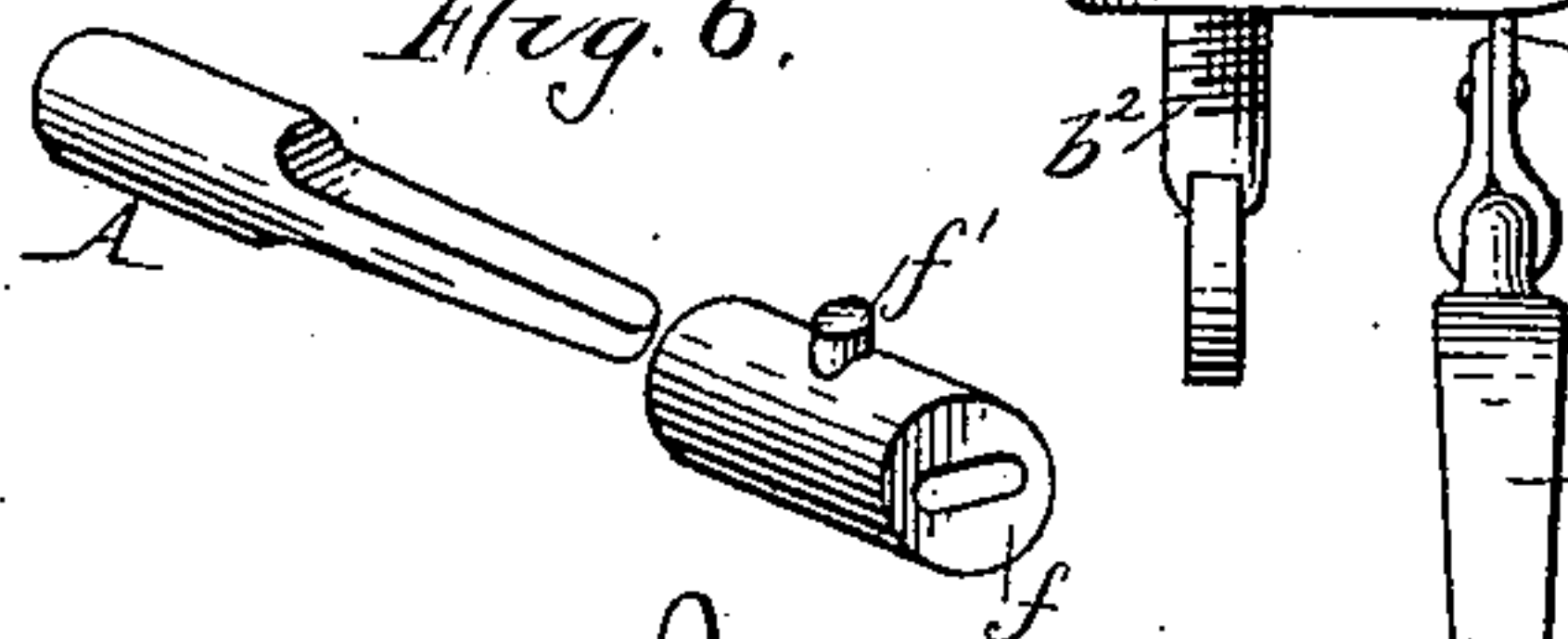


Fig. 6.



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# UNITED STATES PATENT OFFICE.

MICHAEL REISCH, OF BUFFALO, NEW YORK.

## RATCHET DEVICE.

SPECIFICATION forming part of Letters Patent No. 463,778, dated November 24, 1891.

Application filed December 17, 1890. Serial No. 374,975. (No model.)

*To all whom it may concern:*

Be it known that I, MICHAEL REISCH, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Ratchet Devices, of which the following is a specification.

This invention relates to a ratchet mechanism which is particularly desirable for imparting a continuous rotary motion to an emery-wheel or grinding-machine by the intermittent motion of the hand or foot, but which may be used for other purposes.

The object of my invention is to provide a simple ratchet mechanism which is comparatively noiseless in operation, and to improve the construction of the parts with which the ratchet mechanism is combined in a grinding or similar machine, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of an emery grinding-wheel provided with my improvements. Fig. 2 is a vertical cross-section thereof at right angles to Fig. 1. Fig. 3 is a detached view of the ratchet mechanism, showing the position of the parts when the driving-shaft is rotated backwardly by the spring for winding the strap on the drum. Fig. 4 is a similar view showing the position of the ratchets when locked and the wheel is rotated forwardly by a pull on the strap. Fig. 5 is a fragmentary view illustrating the action of a ratchet-wheel having short teeth. Fig. 6 is a perspective view of one end of the driving-shaft and the connecting sleeve.

Like letters of reference refer to like parts in the several figures.

A represents a horizontal driving-shaft journaled near its opposite ends in bearings formed near the upper ends of two standards B B. The latter are connected at their lower ends by a base-plate *b*, provided with a depending curved yoke *b'*, having a vertical thumb-screw *b<sup>2</sup>*, whereby the supporting-standards are secured to the edge of a bench or table.

C represents the drum or reel secured to one end of the shaft on the outer side of one of the standards B, and *d* is a strap wound around said drum, its inner end being secured to the drum and its outer end provided with

a stirrup or handle *d'*. By pulling on the strap *d* the drum and the shaft are caused to rotate by the unwinding of the strap from the drum.

E is a coil-spring surrounding the opposite end of the shaft A, with its inner end secured to said shaft and its outer end to a screw or bolt *e*, projecting from the adjacent standard B. The inner end of the spring is fastened to the shaft by means of a removable sleeve or collar *f*, which is provided with a pin or stud *f'*, which engages in a hole formed on the inner end of the spring. The end of the shaft A which receives the sleeve is flattened, and the bore of the sleeve is shaped to correspond with the flattened portion of the shaft so that the sleeve is caused to revolve with the shaft. When pressure is applied to the stirrup *d'* by the hand or foot, the shaft is rotated in one direction and the strap unwound from the drum. This causes the spring to be coiled around the shaft, and upon releasing the pressure from the strap the tension of the spring causes the shaft to be rotated in a reverse direction. During this reverse rotary motion of the shaft the strap is wound upon the drum, so that by a succession of pulls imparted to the strap or cord the shaft is rotated alternately in opposite directions. The spring E is preferably inclosed by a cylindrical casing F, having central openings for the end of the driving-shaft to pass through and a peripheral opening or slot for the passage of the spring.

G represents an emery or other wheel, which is mounted loosely on the shaft A between the standards B, and H is a ratchet-wheel secured to said shaft close to the hub of the emery-wheel by a transverse pin *h*. The hubs of the emery-wheel and ratchet-wheel occupy the entire space between the inner sides of the standards, whereby lengthwise movement of the shaft on said wheels is avoided.

I represents a pinion or revoluble pawl mounted loosely upon an arbor *i*, secured to one of the arms of the emery-wheel near the hub of said wheel, so that the teeth of said pinion will engage with the teeth of the ratchet-wheel. The teeth of the ratchet-wheel are provided with inclined front faces *i'* and abrupt or radial rear faces *i<sup>2</sup>*, and the teeth of the pinion or star-wheel are preferably



straight, having both their front and rear faces alike. When the driving-shaft is rotated backwardly by the tension of the spring, the abrupt or radial faces of the ratchet-teeth strike against the rear faces of the pinion-teeth, as indicated in Fig. 3, causing the pinion to turn freely upon its arbor without disturbing or changing the motion of the emery-wheel. When the driving-shaft is rotated forwardly by the pressure on the strap, the inclined front face of one of the ratchet-teeth engages against the rear face of a tooth on the pinion, and the inclined face of the next succeeding ratchet-tooth engages against the outer edge of the following tooth of the pinion, as shown in Fig. 4. The pressure exerted by the inclined faces of the ratchet-teeth against the teeth of the pinion is in a radial direction or in line with the center or axis of the pinion, which causes the latter to bind against its arbor and lock the pinion against turning on its arbor, and as the ratchet-wheel continues its forward movement the emery-wheel is carried with it. The inclined face of each ratchet-tooth should be of the proper angle to engage against the edge of the adjacent pinion-tooth and exert a pressure at right angles, or nearly so, against said tooth, as represented in Fig. 4. This causes the ratchet-wheel and pinion to be locked together and compels the emery-wheel to rotate in the same direction with the driving-shaft. The relative position of the teeth of the ratchet-wheel and pinion directly in advance of the locking-teeth of both the ratchet-wheel and pinion is such that the advancing ratchet-tooth in its forward movement will bear against the rear side of the advancing pinion-tooth, whereby the succeeding pinion-tooth is moved into the proper position to receive the end-thrust of the following ratchet-tooth for the purpose of locking them together. The ratchet-wheel and pinion-teeth are preferably of sufficient length to permit the pair of teeth in advance of the locking-teeth to bear against each other and remain in contact when the ratchet and pinion are locked together; but, if desired, the ratchet-teeth may be made much smaller in proportion to the pinion-teeth, as represented in Fig. 5, and equally as effective. By drawing the strap downwardly by either hand or foot power, the shaft is rotated forwardly, and the ratchet-wheel secured thereto rotates therewith and presents the advancing inclined faces of its teeth to the teeth of the pinion, thereby locking them and causing the emery-wheel to rotate in the same direction and in unison with the shaft. Upon releasing the strap the shaft or ratchet-

wheel will be rotated in the opposite direction by the recoil of the spring, which has been wound up during the forward movement of the shaft, and the pinion being released from the ratchet-wheel, the emery-wheel continues its forward rotary motion by its own momentum. A continuous rotary motion is thus imparted to the emery-wheel in a simple manner by a succession of pulls on the strap. It is obvious that the position of the pinion and the ratchet-wheel may be reversed, the pinion being secured to the shaft and the ratchet-wheel attached to the emery-wheel and the same result be obtained.

My improved ratchet mechanism is very simple in construction, is comparatively noiseless, and is very effective in operation.

It is obvious that the ratchet mechanism herein described may be applied to portable forges and other machines in which a ratchet mechanism is employed.

I claim as my invention—

1. The combination, with a ratchet-wheel provided with teeth having inclined and abrupt faces, of a revoluble pawl engaging with said teeth, whereby the wheel and pawl are permitted to rotate in one direction and are held against rotation in the opposite direction, substantially as set forth.

2. The combination, with a shaft, of a ratchet-wheel secured to said shaft and provided with teeth having inclined and abrupt faces, a wheel loosely mounted on said shaft, and a revoluble pawl pivoted on said latter wheel and engaging with the teeth of the ratchet-wheel, substantially as set forth.

3. The combination, with the revolving driving-shaft having a drum and spring secured thereto, whereby said shaft is alternately revolved in opposite directions, of a ratchet-wheel secured to said shaft, a wheel loosely mounted on said shaft, and a revoluble pawl pivoted to the latter wheel and engaging with said ratchet-wheel, substantially as set forth.

4. The combination, with a coil-spring having its outer end fixed and provided with a perforation at its inner end, of a sleeve having a laterally-projecting pin engaging with the perforation in said spring, and a shaft having a flat-sided portion adapted to engage with a correspondingly-shaped opening in said sleeve, substantially as set forth.

Witness my hand this 25th day of November, 1890.

MICHAEL REISCH.

Witnesses:

THEO. L. POPP,  
GEO. M. HARDING.