No. 827,235. PATENTED JULY 31, 1906.

I. M. HACKNEY.

RATCHET MECHANISM.

APPLICATION FILED DEC. 5, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

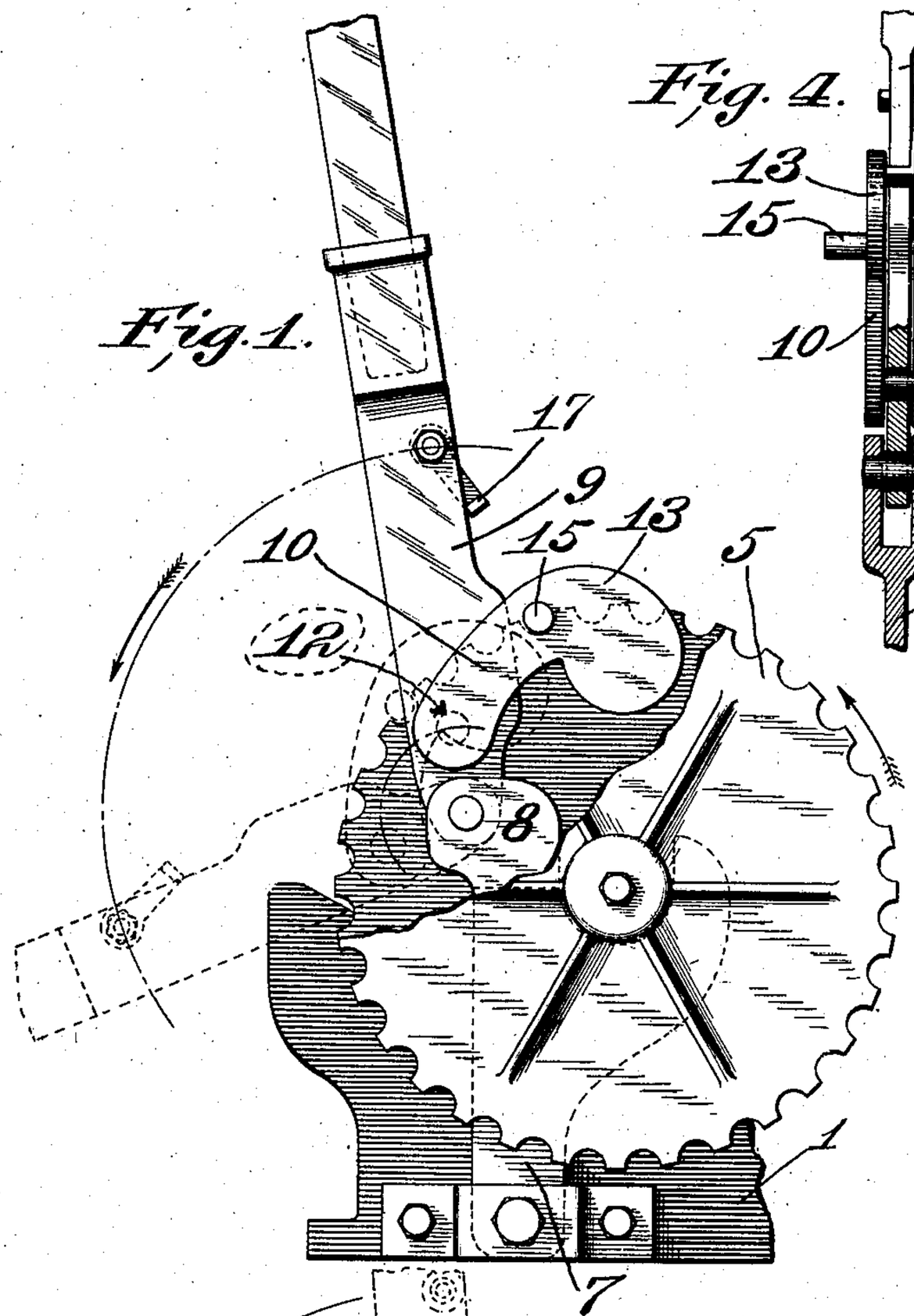


Fig. 4.

Fig. 2.

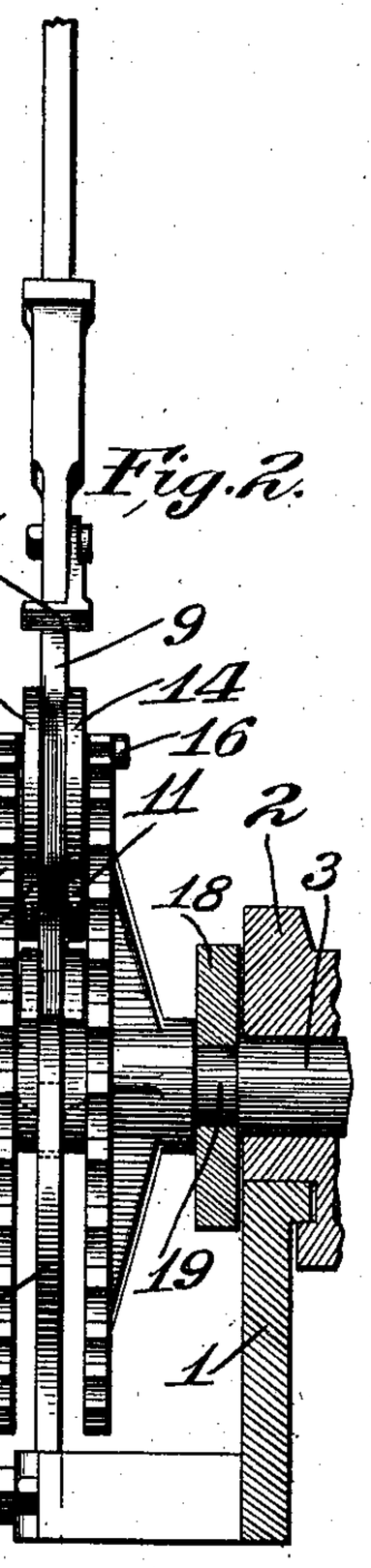


Fig. 5.

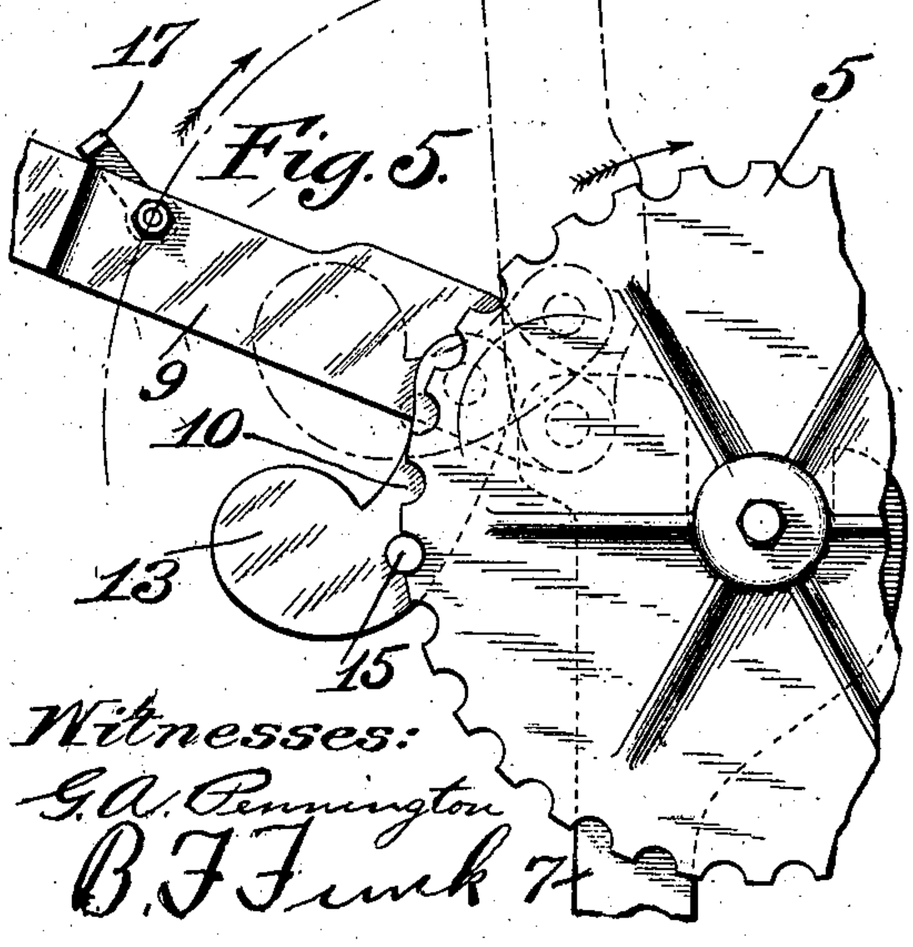
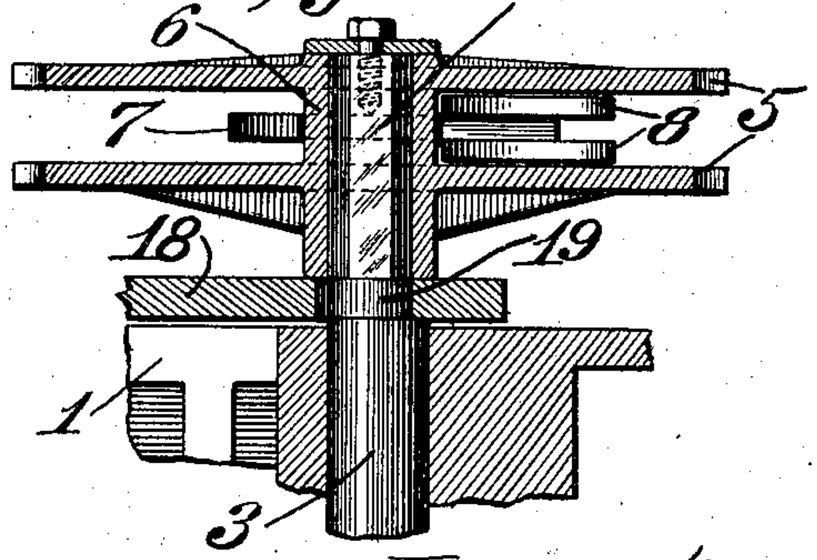


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 8.

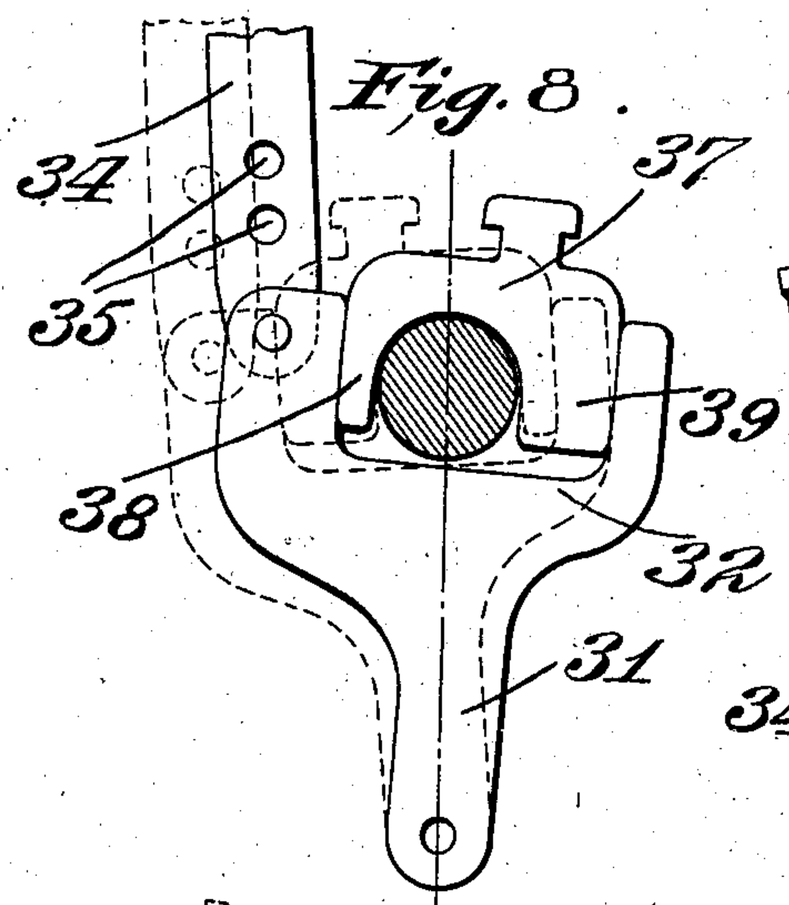


Fig. 6.

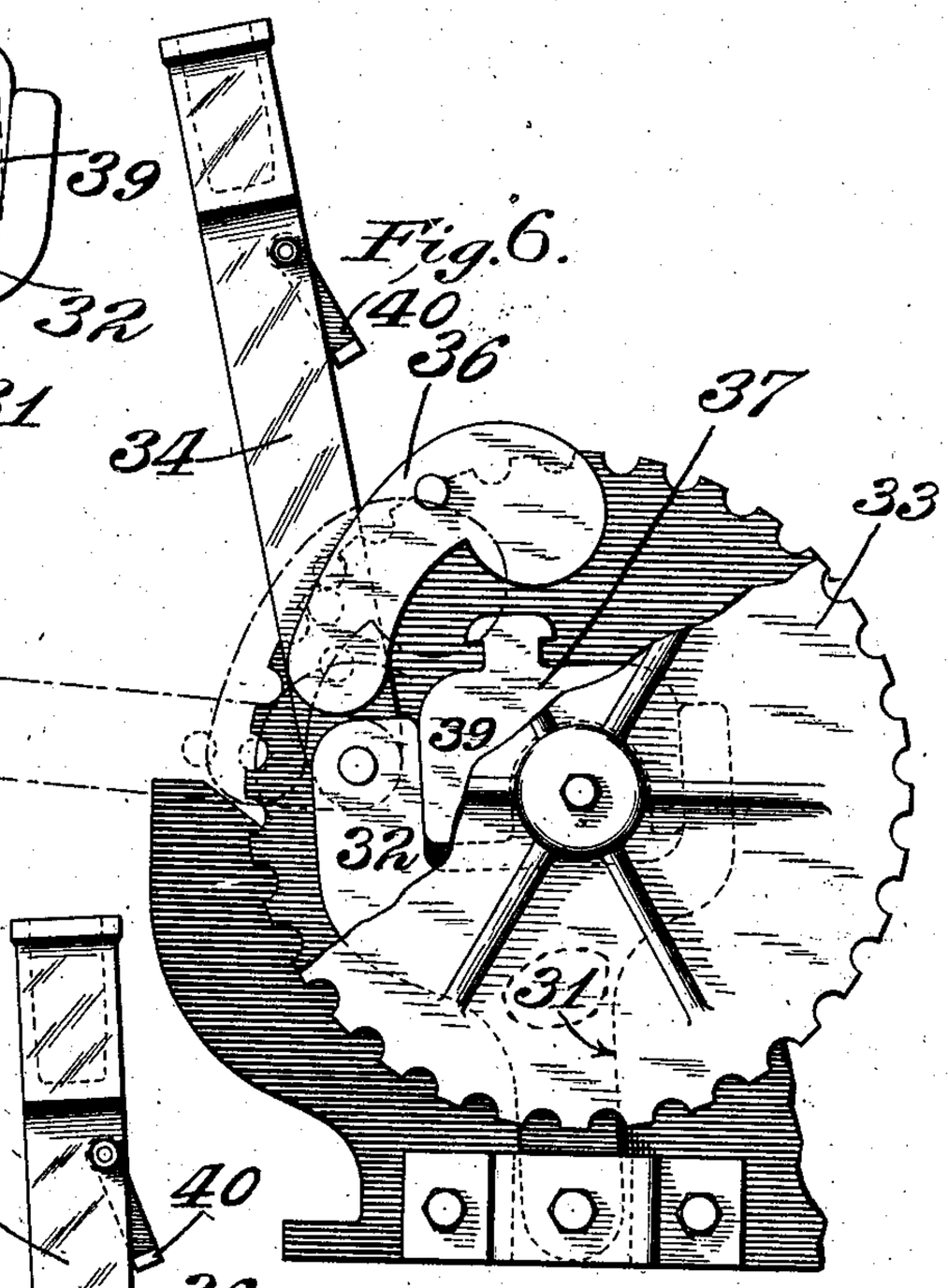
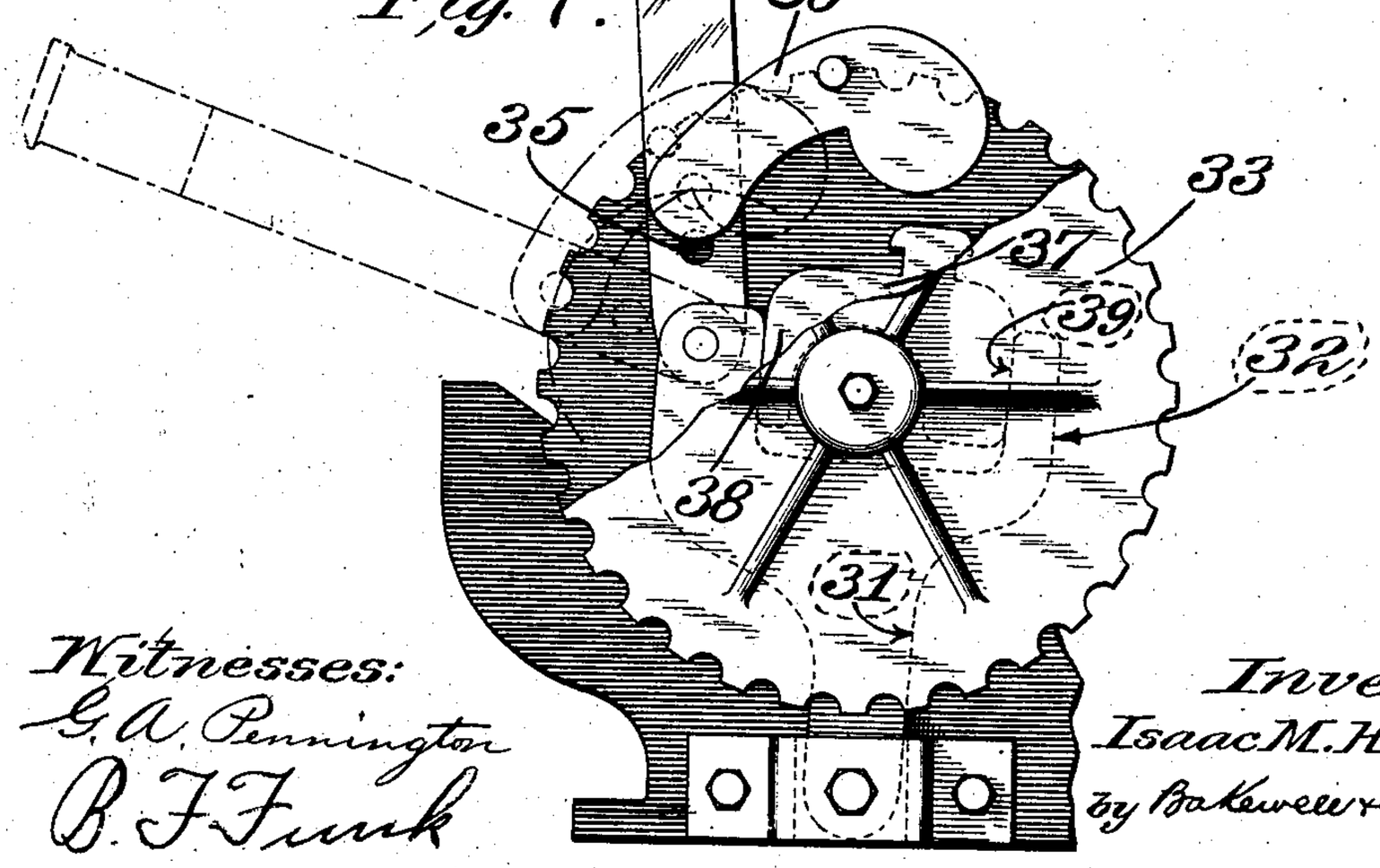


Fig. 7.



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UNITED STATES PATENT OFFICE.

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RATCHET MECHANISM.

No. 827,235. Specification of Letters Patent. Patented July 31, 1906.

Application filed December 5, 1904. Serial No. 235,510.

To all whom it may concern:

Be it known that I, ISAAC M. HACKNEY, a citizen of the United States, residing at Wichita, Sedgwick county, Kansas, have invented a certain new and useful Improvement in Ratchet Mechanisms, of which the following is a full, clear, and exact description, 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, forming part of this specification, in which—

Figure 1 is a side elevational view of a power device constructed in accordance with my invention, parts being broken away to show the position of the pivoted dog on the lever. Fig. 2 is an end view of the power device. Fig. 3 is a cross-sectional view through the ratchet-wheel, the eccentric shaft of the ratchet-wheel being shown in elevation. Fig. 4 is an edge view of a portion of the lever, the operating-dogs, and the standard to which the lever is fulcrumed. Fig. 5 is a fragmentary view of the ratchet mechanism, showing the location of the dog in its reversing position. Fig. 6 is a view, partly in elevation and partly in section, of a modified form of ratchet mechanism having a bearing for providing a short throw of the lever with a maximum power. Fig. 7 is a similar view showing the bearing positioned to provide a long throw of the lever with reduced power; and Fig. 8 is a detail view of the standard, the bearing, and the lever.

This invention relates to a ratchet mechanism, and it is particularly designed for use in connection with tire-setting machines, the form illustrated in Figs. 1 and 2 being shown in an application for patent filed by me November 23, 1903, and given Serial No. 182,327, which said application is a continuation of a similar application filed by me June 4, 1902, and given Serial No. 111,658.

One of the objects of this invention is to provide a power device whereby the manual power exerted upon a lever may be multiplied.

Another object is to provide an efficient means for manually operating an eccentric shaft so as to impart a partial revolution thereto and to provide means for restoring the shaft to its original position.

Another object of the invention is to provide a cheap, durable, and efficient device for use in connection with tire-setting machines, and particularly for drawing the movable head or heads thereof toward or away from each other.

The form of device illustrated in Figs. 1 and 2 consists of a frame of which the part designated by the numeral 1 is one side, the opposite side being similar and supporting a sliding member 2, in which is an eccentric portion 3 of a shaft having an angular end 4 to receive a double ratchet 5, provided with an intermediate hub portion 6, which rests in a bearing in the standard 7, pivoted beneath the ratchet, which standard 7 is provided with a rearwardly-extending arm 8, to which is connected a pivoted lever 9. This lever 9 carries a divided dog, comprising two members 10 and 11, connected by the pivot 12, which passes through the lever, the opposite free ends of the members 10 and 11 of the dog being weighted, as at 13 and 14, so that the dog will have a tendency to gravitate to force the pins 15 and 16 into engagement with the spaces between the teeth of the ratchet, as will be described more fully hereinafter.

The pivoted stop 17, carried by the lever, is adapted to act as a retarding medium to normally prevent the passage of the dog members beyond the pivotal point thereof; but said member 17 may be raised so as to permit this as occasion may demand.

Carried by the shaft, near the respective ends thereof, are links, one of which is shown in Figs. 2 and 3, said link being designated by the reference-numeral 18. Links 18 are connected to the eccentric portions 19 of the shaft 3, so that the rotation of the shaft will cause a forward or rearward movement of the sliding member 2.

The path of movement followed by the lever is illustrated in Fig. 1. When it is desired to impart power to the shaft 3, the lever will be raised or tilted forward so that the dog will engage in the double rows of ratchet-teeth of the ratchet-wheel. By applying power manually or otherwise so as to cause the lever to travel in the direction indicated in Fig. 1, so that the lever will assume the position shown in dotted lines in said figure, the shaft will be rotated, so that the eccentric on the shaft which passes through

the opening in the link 18 will cause a movement of the sliding member 2, or in the event that the member 2 is made a rigid member and the opposite member, to which the link is attached, is a sliding member the opposite member will be caused to move toward or away from the member 2 in an obvious manner. In some instances it may be desirable to make both members slidable, in which event the rotation of the shaft 3 will impart a sliding movement to both members.

By reference to Figs. 1 to 5 it will be observed that the intermittent engagement of the dog with the ratchet-wheel will cause a progressive movement to be imparted to the ratchet-wheel and to the shaft, so that the extent of movement of the movable part controlled by the shaft may be regulated. Inasmuch as the dog is pivoted to the lever close to the fulcrum and the lever is of considerable length and as the lever is fulcrumed near the periphery of the ratchet-wheel, it is obvious that considerable power may be exerted upon the ratchet-wheel, although the extent of the rotary movement imparted to the ratchet-wheel will be slight. The necessary rotation, however, may be imparted by successively and intermittently engaging the teeth through the medium of the dog.

Under certain conditions it is desirable that less than a complete rotation of the shaft be effected before the shaft is returned to its original position, and when such a condition arises the shaft can be returned to its original position by throwing the dogs past their pivotal points, causing them to assume a position similar to that indicated in Fig. 5, and by reversing the operative movement of the lever an opposite movement can be imparted to the ratchet-wheel and to the shaft.

It will be observed that the ratchet-engaging portions 15 of the dog 13, carried by the lever 9, are of such form as to engage the recesses in the periphery of the ratchet, so that during the movement of the ratchet the ratchet-engaging portions of the dog carried by the lever 9 will have a rotary movement in the engaged seat on the ratchet, so as to avoid liability of accidental displacement of the engaging portion of the dog with the ratchet during the operation of the device. In other words, the projections 15 rock in the seats, and thereby remain in engagement with the seats during the movement of the ratchet.

In Figs. 6 to 8 a modified form of the invention is disclosed, in which provision is made for varying the fulcrum of the lever so as to vary the power as well as the operating stroke of said lever. In this form the increased stroke of the lever may be effected at the sacrifice of power, or at least the power will not be as great as when the lesser stroke is made. The difference in the stroke is effected by governing the distance between the fulcrum of the lever and the axis of the ratchet-wheel.

In the form illustrated in Figs. 6 to 8, 31 designates a pivoted standard having an upper jaw 32, which straddles the hub of the ratchet-wheel 33, one arm of the jaw supporting the lever 34, which is pivoted thereto. This lever is provided with a plurality of perforations 35 for the reception of the connecting portion of the dog, which dog is substantially the same in structure as the dog illustrated in Figs. 1 to 4, and said dog is here designated by the reference-numeral 36. 37 is a removable and reversible bearing which comprises a block having substantially parallel arms 38 and 39 of different thicknesses, which arms are adapted to be interposed between the arms of the rigid jaw on the standard 31 so as to cause the arm to which the lever is fulcrumed to move away from or toward the axis of the wheel 33, the two positions being respectively illustrated in Figs. 6 and 7. In the position illustarted in Fig. 6 the fulcrum for the lever 34 is more distant from the axis of the wheel 33 than in the position shown in Fig. 7. In this position the connecting-bar for the dog is in the lowermost hole and nearest the fulcrum for the lever 34, so that but a slight movement can be imparted to the ratchet-wheel at each swing of the lever; but a maximum power is provided on account of the lever-fulcrum being far away from the axis of rotation of the wheel. In the position illustrated in Fig. 7 the dog is in the opening most distant from the fulcrum-point of the lever, and the reverse position of the member 36 causes the fulcrum for the lever to be nearer the axis of rotation of the wheel 33, so that a longer stroke of the lever is provided, but less power is exerted on the shaft supporting the wheel. It will therefore be seen that in the constructions shown in Figs. 6 to 8 the stroke of the lever and the power can be varied to a considerable degree by changing the thickness of the insertible and reversible members 36 and the relative positions of the dog on the lever with relation to its fulcrum-point.

In the form illustrated in Figs. 6 to 8 the reversibility of the dogs is provided for, the T-shaped member 40 on the lever being substantially the same as the member 17 in the preferred construction, so as to permit the dog 36 to be reversed.

While this device has been described as being specifically adapted for use in connection with the type of cold-tire-setting machine for which an application is now pending and from which application the form of device illustrated in Figs. 1 to 5 has been divided, it is obvious that the same may be employed for a multiplicity of purposes, and I therefore desire not to limit myself to any particular

use, but reserve the right to apply it to any purpose to which it is applicable.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. The combination with a shaft, of a ratchet-wheel fixedly secured on said shaft, a lever fulcrumed to one side of the axis of rotation of said ratchet-wheel, a dog mounted on said lever, and means for varying the fulcrum of said lever; substantially as described.

2. The combination with a shaft, of a ratchet-wheel fixed on said shaft, a pivoted standard below the axis of rotation of said shaft and having a rigid jaw, a lever fulcrumed to said rigid jaw to one side of the axis of rotation of the ratchet-wheel, a dog mounted on said lever, and an insert adapted to be engaged by the jaw for varying the fulcrum of the lever; substantially as described.

3. The combination with a shaft, of a ratchet-wheel fixed on said shaft, a pivoted standard below the axis of rotation of said shaft and having a rigid jaw, a lever fulcrumed to said rigid jaw to one side of the axis of rotation of the ratchet-wheel, a dog mounted on said lever, and a reversible insert engageable by the jaw for varying the fulcrum of the lever; substantially as described.

4. The combination with a shaft, of a ratchet-wheel fixed on said shaft, a pivoted standard below the axis of rotation of said shaft and having a rigid jaw, a lever fulcrumed to said rigid jaw to one side of the axis of rotation of the ratchet-wheel, a dog mounted on said lever, and means engageable by the jaw for varying the fulcrum of the lever; substantially as described.

5. The combination with a shaft, of a ratchet-wheel fixed on said shaft, a lever fulcrumed at its end to one side of the axis of rotation of said ratchet-wheel, a dog mounted on said lever above its fulcrum and for engagement with the ratchet-wheel, and means for varying the fulcrum of the lever to decrease the stroke and increase the power exerted by said lever; substantially as described.

6. The combination with an eccentric shaft, of a ratchet fixedly secured on said shaft, a lever, a dog mounted on said lever, and means for decreasing the stroke and increasing the power exerted by said lever; substantially as described.

7. The combination with a shaft, of a ratchet-wheel fixed on said shaft, a hand-lever fulcrumed to one side of the axis of rotation of said wheel, a dog pivoted on said hand-lever and having means for rocking in the recesses in the ratchet during the rotation of said ratchet; substantially as described.

8. The combination with a shaft, of a ratchet-wheel on said shaft, a lever fulcrumed adjacent to said ratchet-wheel, a dog on said lever, and means for varying the fulcrum of said lever; substantially as described.

9. The combination with a shaft, of a ratchet-wheel on said shaft, a hand-lever, and a dog pivoted on said hand-lever having lateral projections for engagement with recesses in the ratchet and having rotative movement in said recesses during the movement of said ratchet; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 29th day of November, 1904.

ISAAC M. HACKNEY.

Witnesses:
B. F. FUNK,
CORA BADGER.