

No. 655,011.

Patented July 31, 1900.

**D. W. REYNARD.
POWER MACHINE.**

(Application filed Aug. 19, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

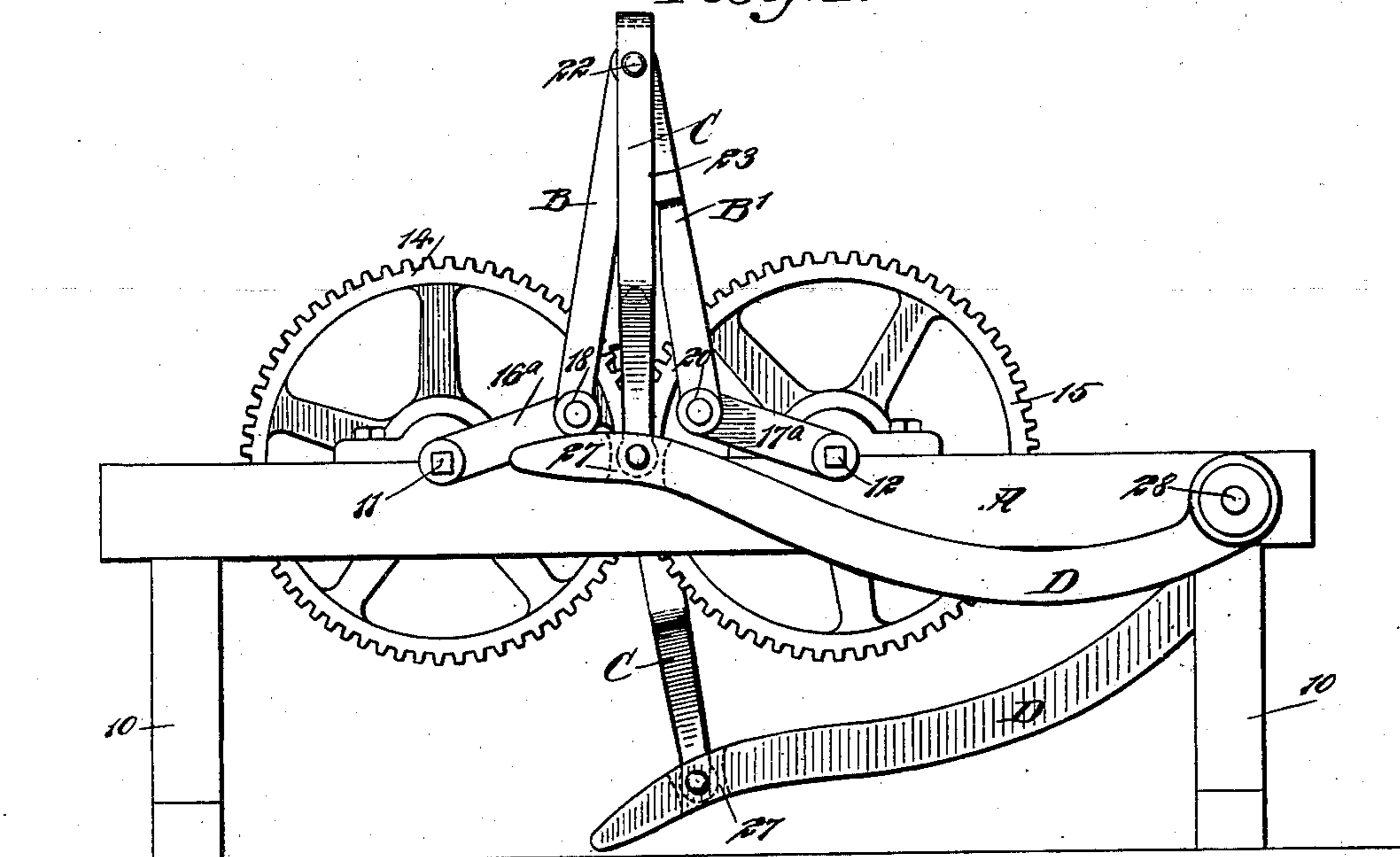
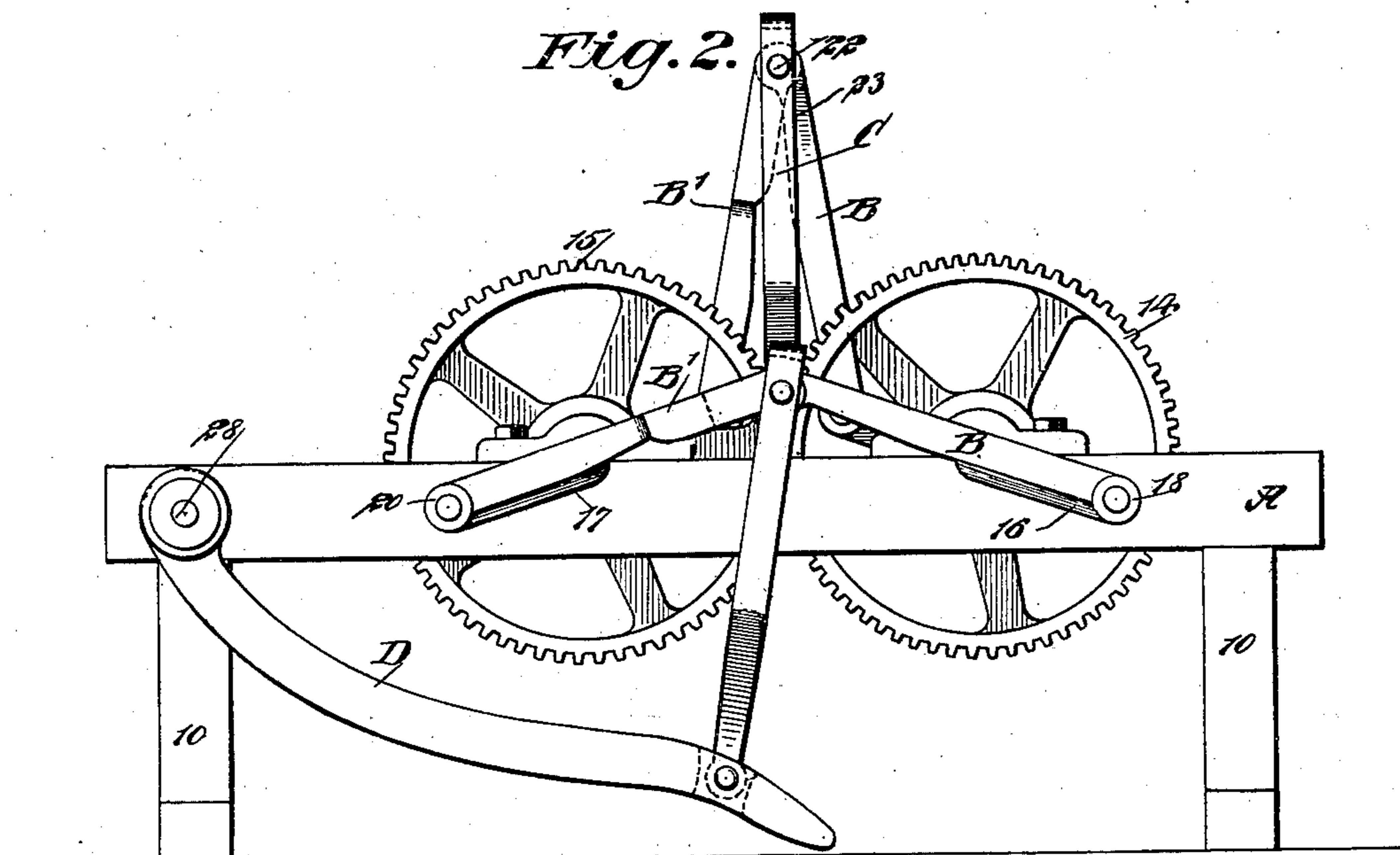


Fig. 2.



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Fig. 3.

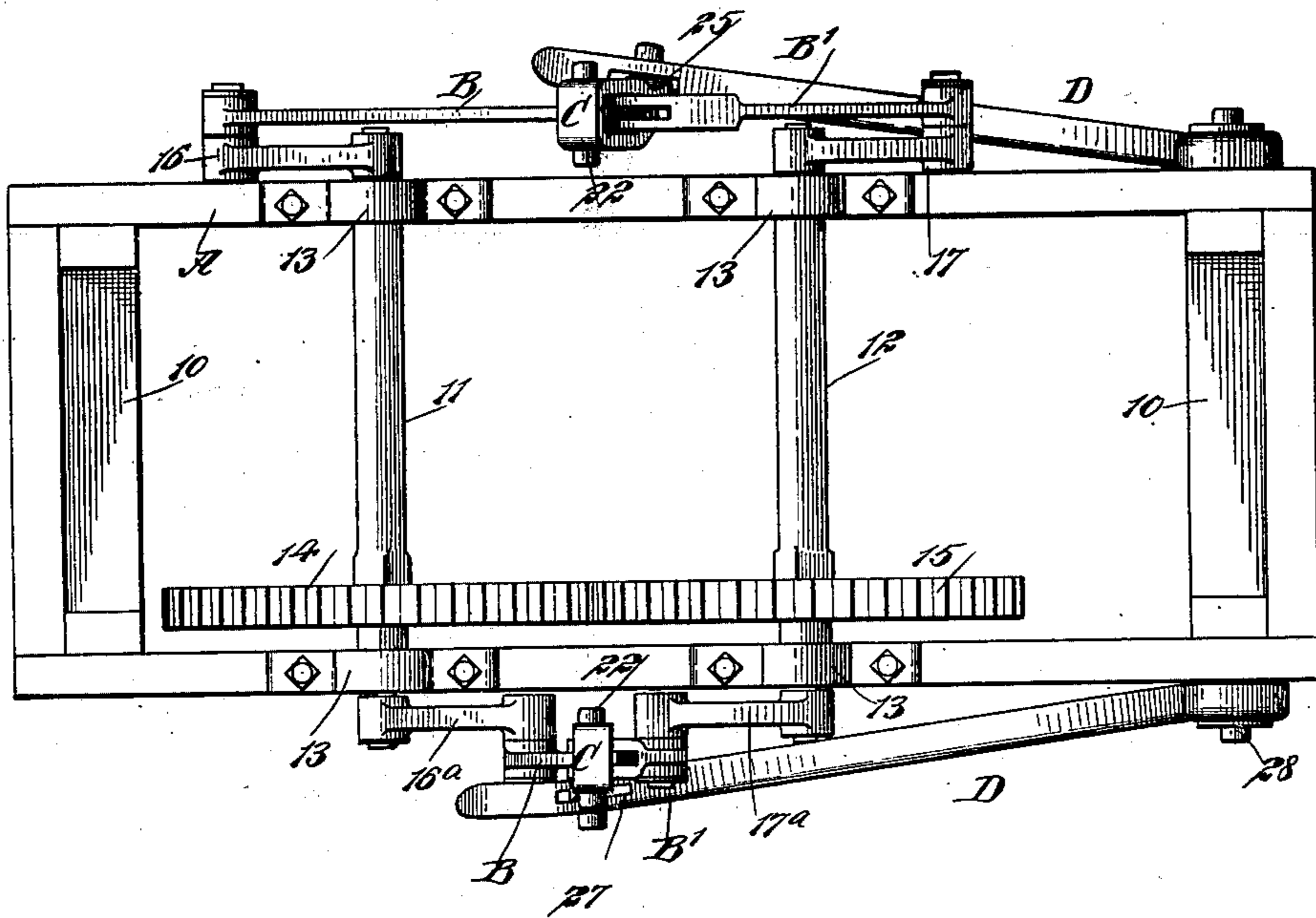


Fig. 4.

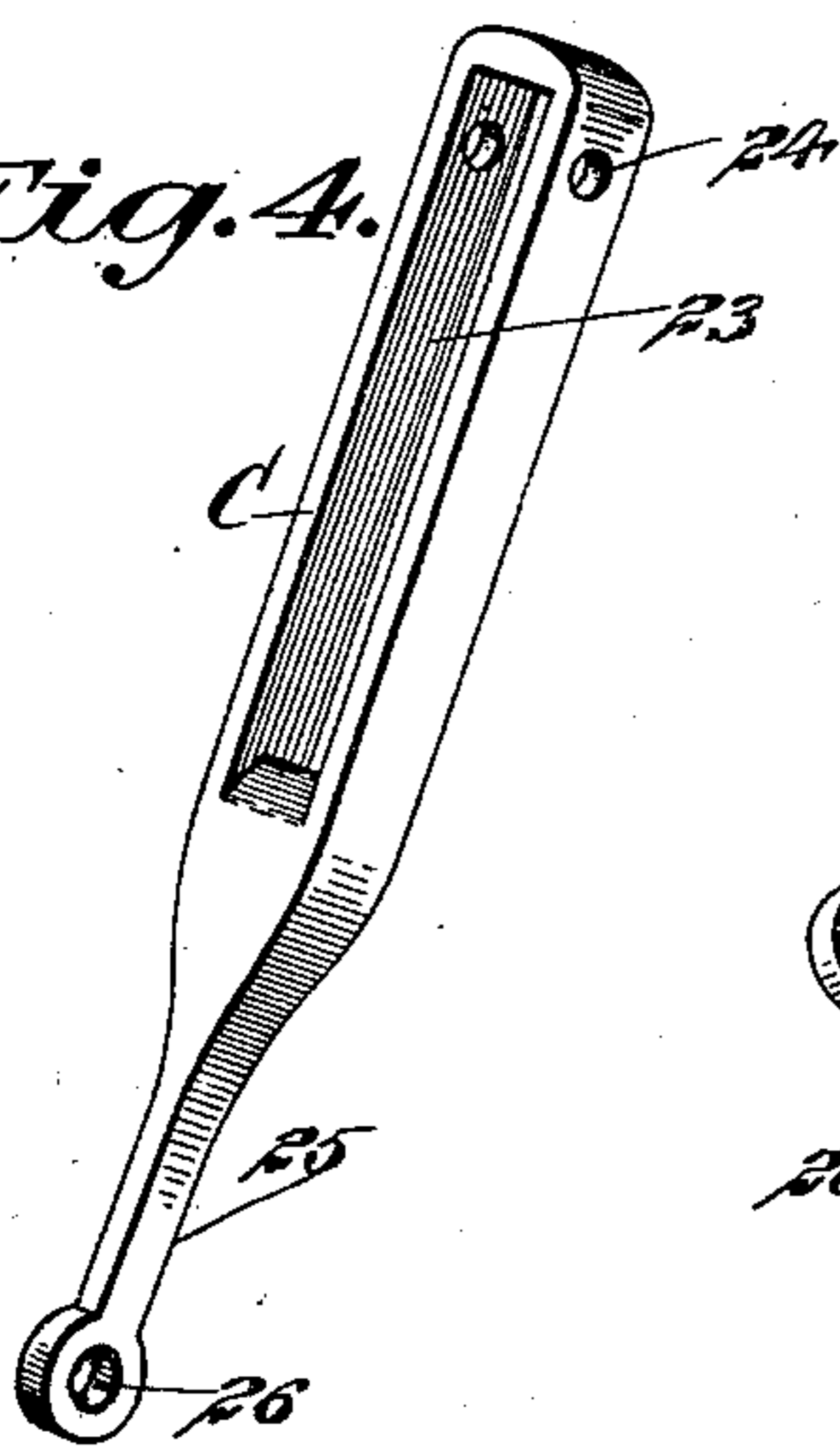


Fig. 6.

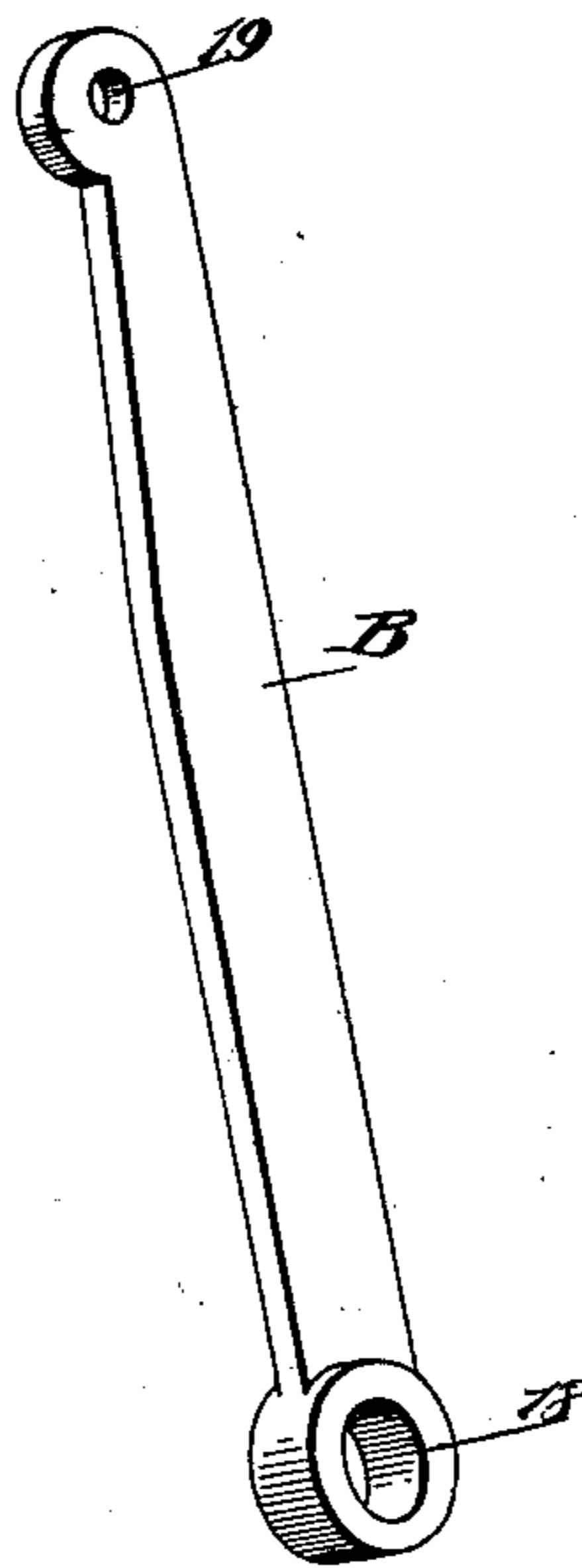
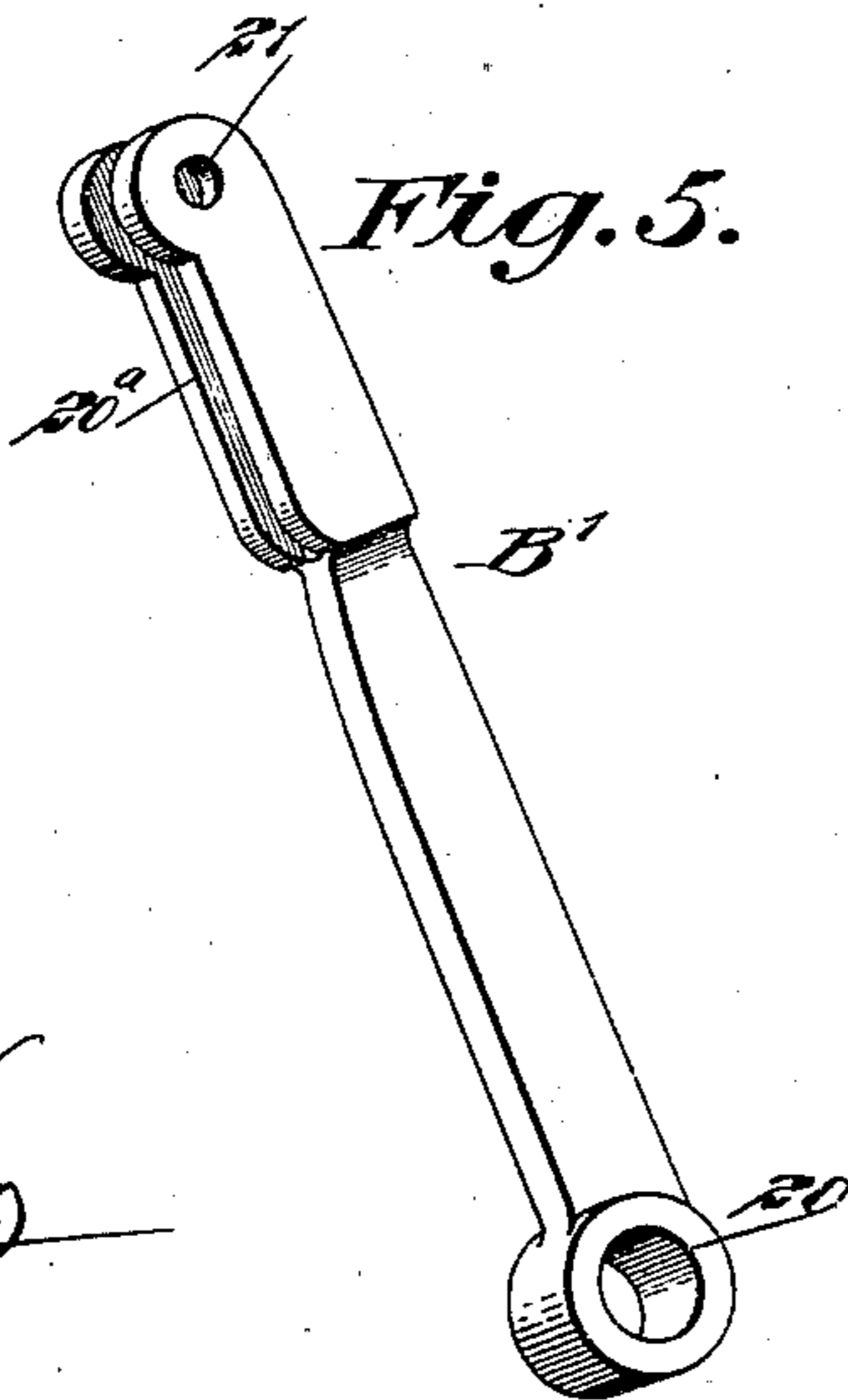


Fig. 5.



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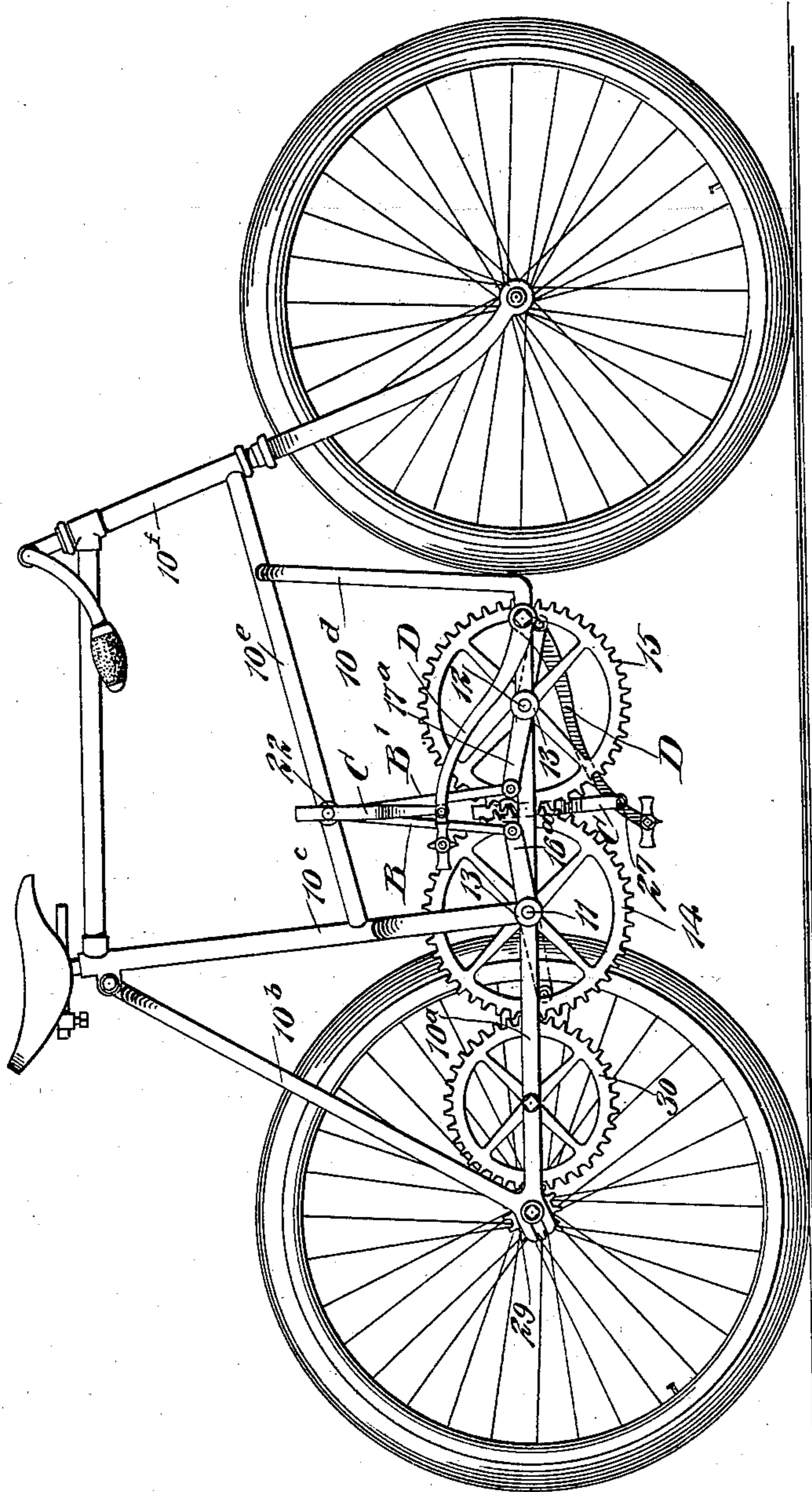
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Fig. 7.



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UNITED STATES PATENT OFFICE.

DAVID W. REYNARD, OF MORRIS, PENNSYLVANIA.

POWER-MACHINE.

SPECIFICATION forming part of Letters Patent No. 655,011, dated July 31, 1900.

Application filed August 19, 1899. Serial No. 727,801. (No model.)

To all whom it may concern:

Be it known that I, DAVID W. REYNARD, of Morris, in the county of Tioga and State of Pennsylvania, have invented a new and Improved Power-Machine, of which the following is a full, clear, and exact description.

One object of the invention is to provide a novel, simple, and economic propelling power for bicycles and other machines arranged to be brought into action through the medium of hand or foot levers oppositely disposed and adapted to be alternately forced downward, the intermediate mechanism compelling one lever to rise when the other is depressed.

A further object of the invention is to provide a mechanism of the character above mentioned in which dead-centers will be avoided and which will require but little effort on the part of an operator to start and maintain the mechanism in action.

The invention consists in the novel construction and combination of the several parts; as will be hereinafter fully set forth, and pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a view of one side of the machine, and Fig. 2 is a view of the opposite side of the machine. Fig. 3 is a plan view of the improved machine. Figs. 4, 5, and 6 are detail views of parts of the machine, and Fig. 7 shows the application of my improved power mechanism of a bicycle.

A frame A is illustrated in the drawings as a support for the mechanism, and this frame is provided with suitable legs 10, although other sustaining devices may be employed. Two parallel shafts 11 and 12 are journaled at suitable distances apart in suitable bearings 13, carried by the frame A. The shaft 11 is provided with an attached gear 14 and the shaft 12 with a gear 15, of corresponding size, in mesh with the gear 14. The shaft 11 is provided with oppositely-directed crank-arms 16 and 16^a at its ends, and the shaft 12 is provided likewise with oppositely-directed crank-arms 17 and 17^a at its ends. In one position of the two shafts, due to the connections to be hereinafter described, the crank-arms at one end of the shafts will face each other, while

the crank-arms at the opposite end of the said shafts will be directed from each other, as shown in Fig. 3.

The crank-arms at each side of the frame are provided with a toggle connection, and said toggle connection consists of a link B, (shown in detail in Fig. 6,) provided with an eye 18 at one end adapted for pivotal connection with a crank-arm of one of the shafts, the opposite end of the link B being provided with an aperture 19. The crank-arm of the other shaft at the same side of the machine receives an eye 20, formed at the lower end of a second link B', (shown in detail in Fig. 5,) the opposite end 20^a of said link B' being bifurcated to receive between its members the apertured end of the plain link B, and the bifurcated portion of the link B' is provided with apertures 21, adapted to register with the aperture 19 of the said link B. A suitable pivot-pin 22 is passed through said apertures 19 and 21; but the connected ends of the two links B and B' at each side of the frame are received in the upper loop portion 23 of a pitman C, the said upper loop portion of the pitman being provided with apertures 24, through which the pivot-pin 22 is passed which connects the two links B and B'. The lower end of the pitman C is in the form of a single shank 25, and the shank terminates in an eye 26. The eye portion 26 of each pitman is made to enter a slot 27 in a foot or hand lever D, the pitman being pivotally mounted in the said slot, and the levers D are pivoted to opposite sides of an end portion of the frame A. These levers D are preferably shaped on the lines of a compound curve, as shown in Fig. 1, their foot or handhold portions being in advance of their pivotal connections with the pitman C, as shown particularly in Figs. 1 and 2. Under this arrangement of parts it will be observed that when the levers are alternately depressed one lever will force the other upward, and through the toggle and crank connections between the said levers D and shafts 11 and 12 the said shafts are made to revolve continuously as long as the levers are in operation. Furthermore, it is obvious that there will be practically no dead-center at any point in the operation of the machine. It will also be noted that the pressure of the levers upon the cranks

is continuous throughout the revolution thereof, so that full power may be brought to bear upon the cranks for nearly five-eighths of their revolution, if required.

5 As shown in Fig. 7, the shafts 11 and 12 of the gears 14 and 15 are journaled in bearings 13 upon the rear stays 10^a of the frame, said stays being connected at their rear ends with the rear fork 10^b in the ordinary manner and
 10 also having a connection at their central portion with the forked seat-mast 10^c. The front ends of the rear stays 10^a are connected by suspension-rods 10^d with a brace 10^e, extending from the lower end of the head 10^f to the
 15 top of the seat-mast fork. The levers D are fulcrumed on said rear stays 10^a. The rear-wheel sprocket 29 is driven from the rear gear 14 by an intermediate toothed wheel 30, fixedly supported on one of the rear stays 10^a.
 20 Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

The combination of a frame, two intermeshing gears, journaled thereon, two cranks carried by each gear on opposite sides thereof 25 and arranged at an angle to each other, toggle-links arranged in sets on each side of the gears and having their inner ends pivotally connected with each other, while the outer ends of the toggle-links are pivotally connected with the respective cranks; a pitman 30 pivotally connected with the inner ends of each set of toggle-links and a driving-lever for each set of toggle-links, said lever being fulcrumed on the frame and operatively connected with the corresponding pitman. 35

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Witnesses:

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 EDWARD H. OWLETT.