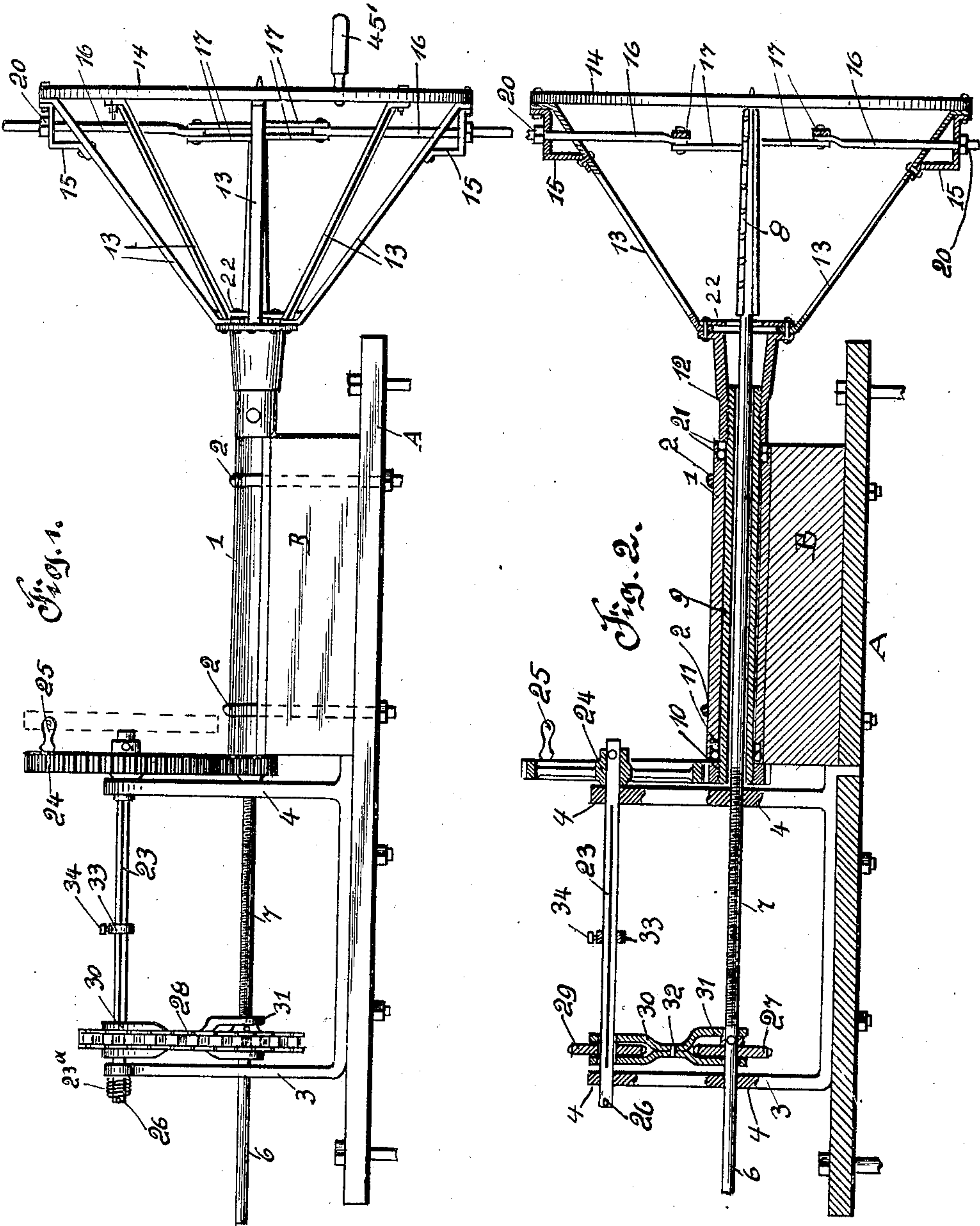


No. 832,415.

PATENTED OCT. 2, 1906.

F. W. & C. H. PRICE.
HUB BORING MACHINE.
APPLICATION FILED SEPT. 6, 1905.

2 SHEETS—SHEET 1.



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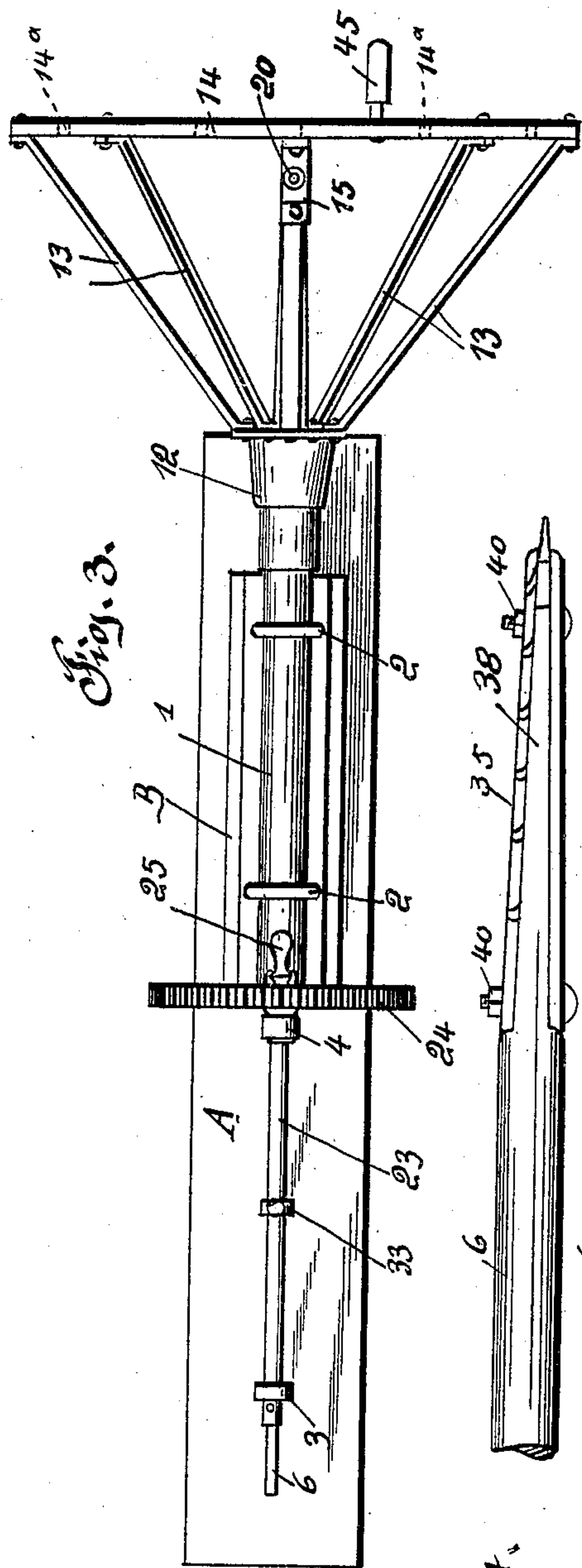


Fig. 3.



Fig. 4.

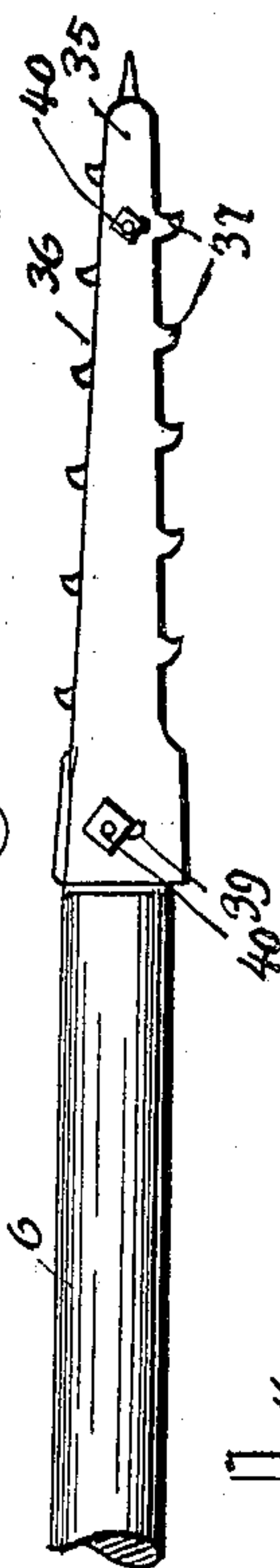


Fig. 5.

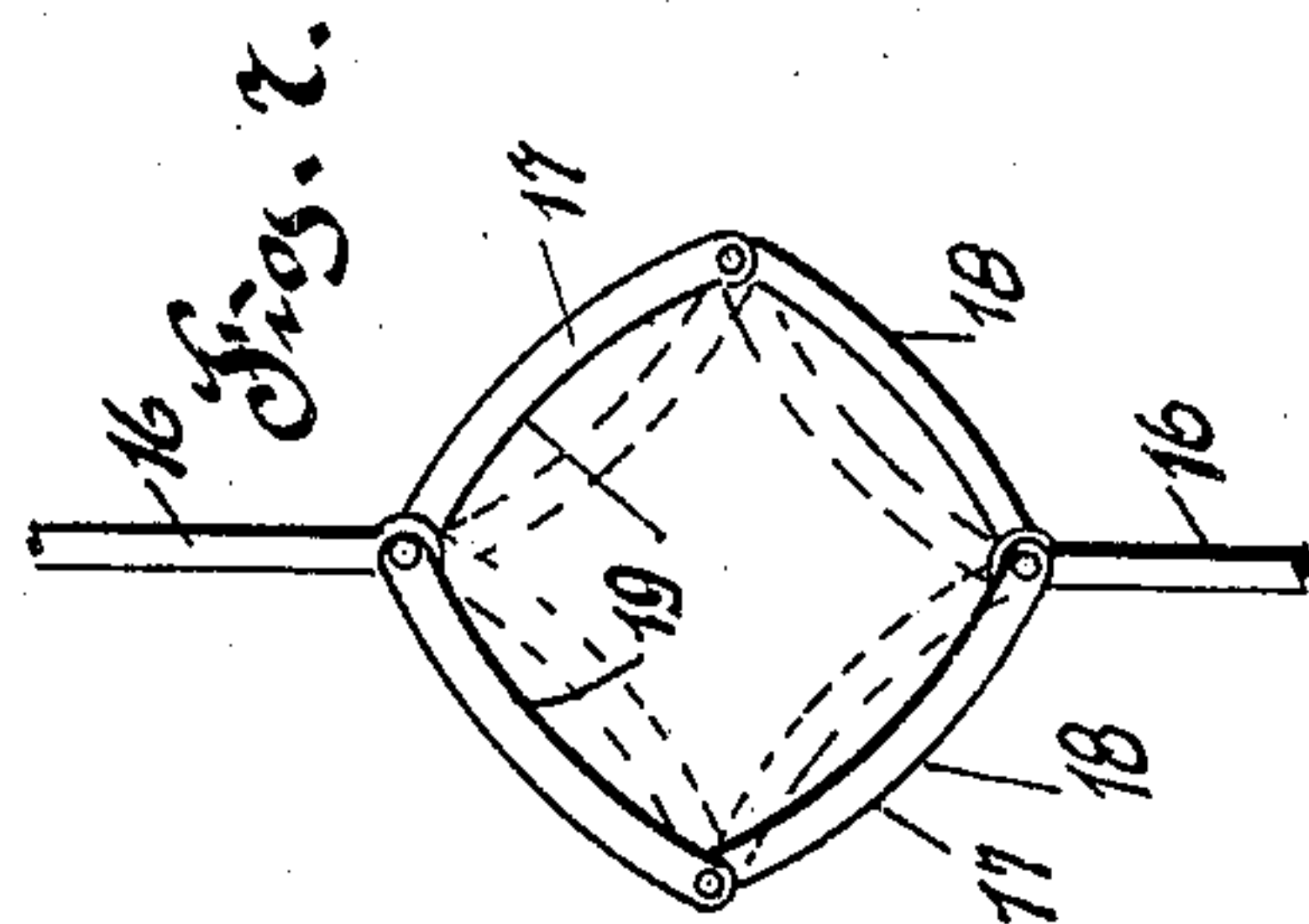


Fig. 2.

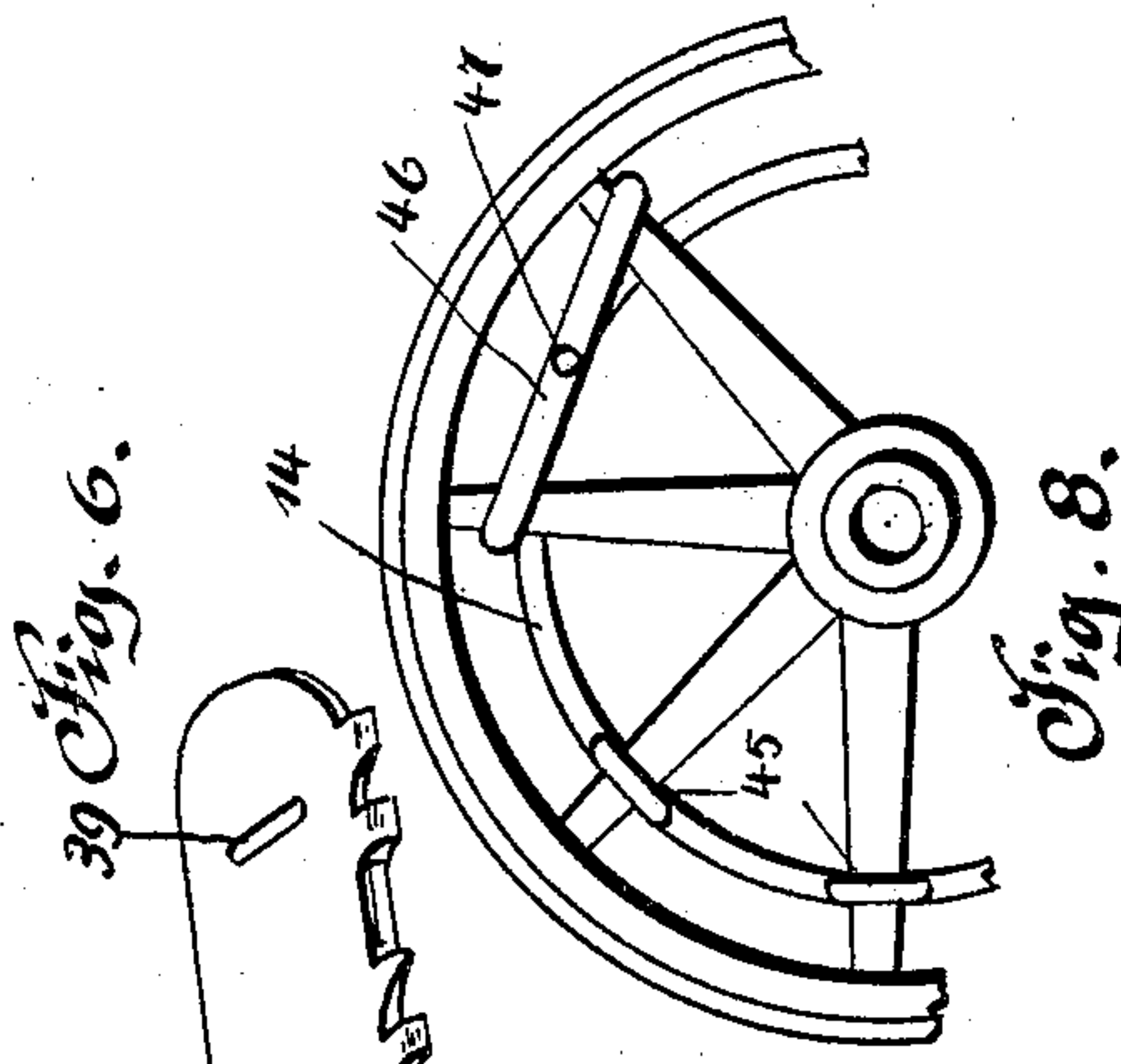


Fig. 6.

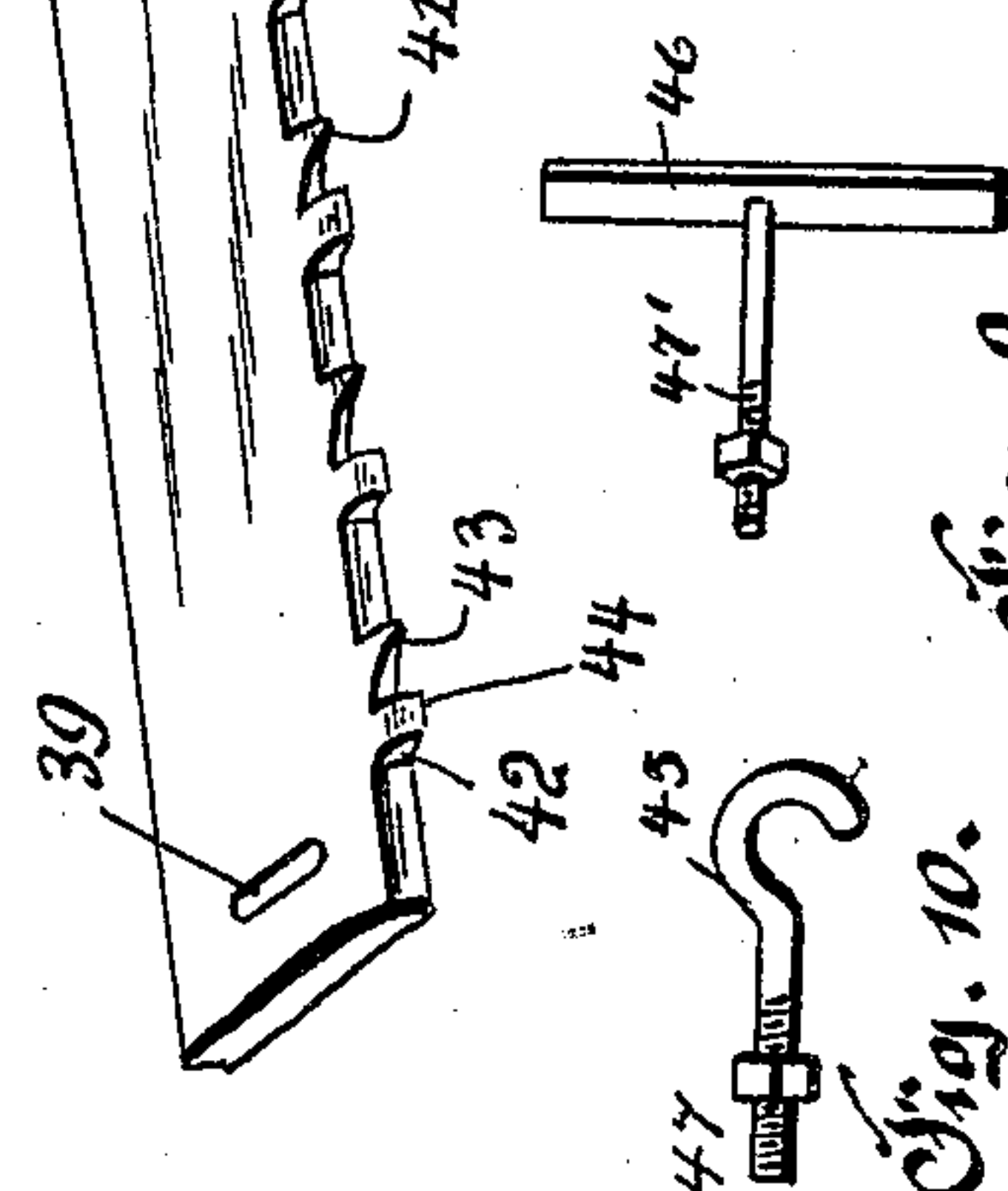


Fig. 9.

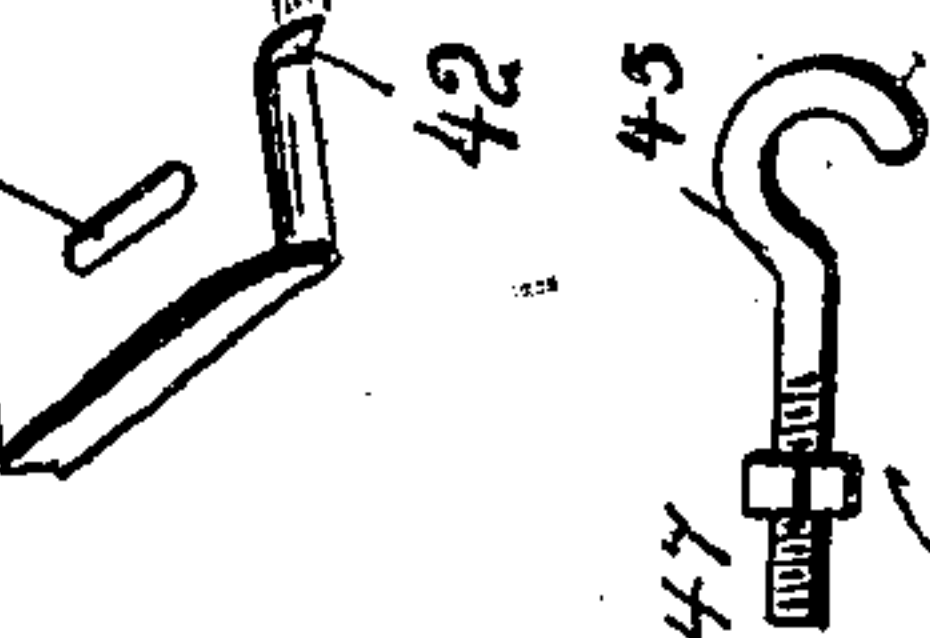


Fig. 10.

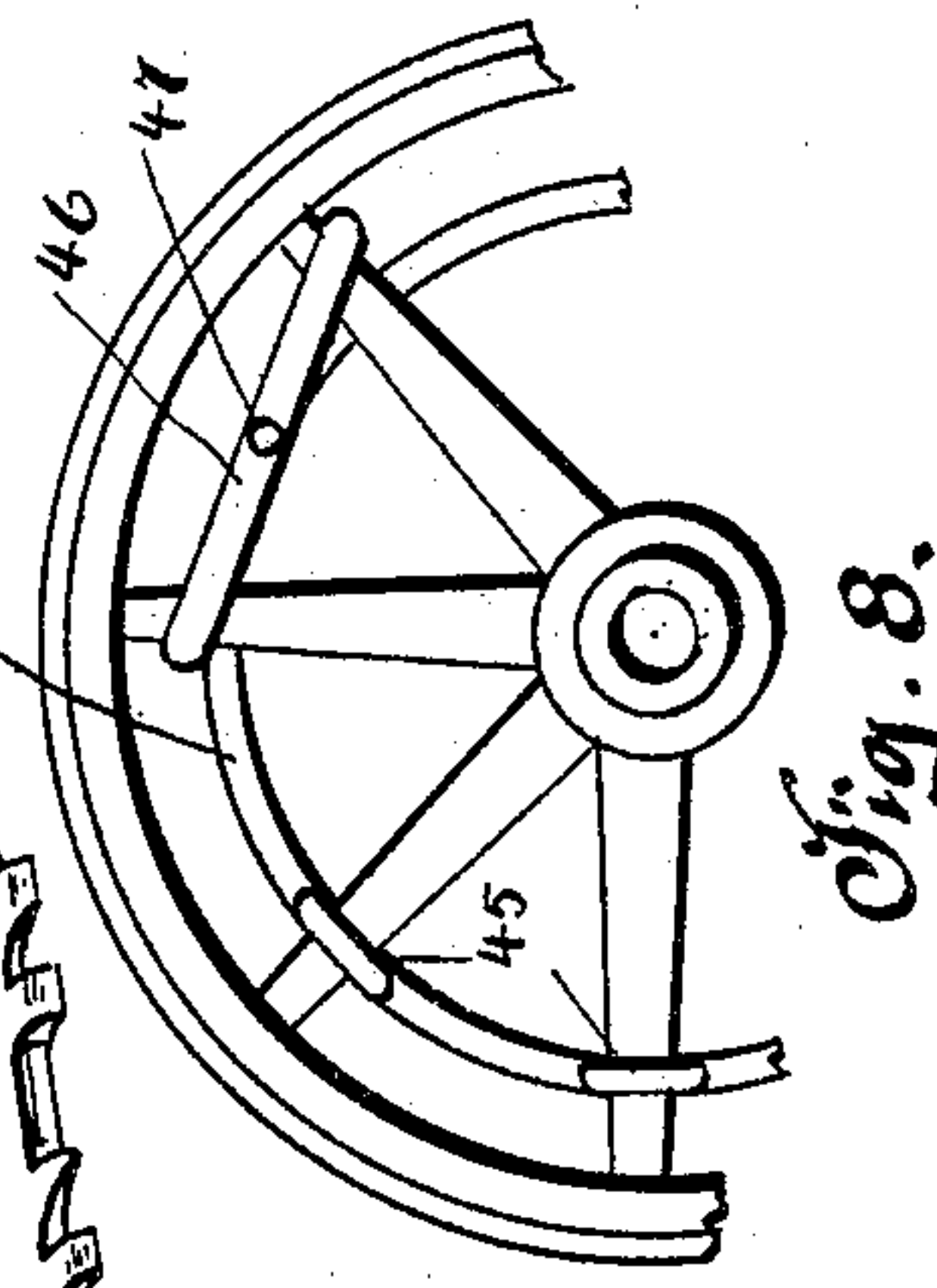


Fig. 8.

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UNITED STATES PATENT OFFICE.

FRANK W. PRICE AND CHARLES H. PRICE, OF FINLEYVILLE, PENN-
SYLVANIA.

HUB-BORING MACHINE.

No. 832,415.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed September 6, 1905. Serial No. 277,270.

To all whom it may concern:

Be it known that we, FRANK W. PRICE and CHARLES H. PRICE, citizens of the United States of America, residing at Finleyville, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Hub-Boring Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to new and useful improvement in hub-boring machines.

The primary object of the present invention is to provide means for automatically stopping the machine when the bore in the hub shall have been drilled a predetermined length.

To the furtherance of this object the invention comprises a suitable support upon which are mounted concentrically-disposed shafts, one shaft serving as a feed-shaft for the bit and the other shaft being adapted to carry a wheel-holder to hold the wheel the hub of which is to be drilled.

Another important detail involved in the present invention is a hub-support which is self-centering with relation to the bit.

The detail construction will appear in the course of the following description, in which reference is had to the accompanying drawings, which form a part of this application, in which like characters of reference designate corresponding parts throughout the several views, in which—

Figure 1 is a side elevation of our improved machine. Fig. 2 is a longitudinal sectional view thereof, showing the relative arrangement of the parts in their assembled position. Fig. 3 is a top plan view thereof. Fig. 4 is a detail side elevation of a novel form of bit employed. Fig. 5 is a similar view taken at a right angle to Fig. 4. Fig. 6 is a perspective view of a modified form of bit. Fig. 7 is a front elevation of a self-centering hub-holder. Fig. 8 is a front elevation of a portion of the wheel-holder, showing the manner in which the wheel is held upon the machine. Figs. 9 and 10 are detail views of the wheel-holder.

Referring specifically to the drawings, the invention comprises a bed A, upon which is mounted a block B, coasting with said bed for supporting the machine. A hollow tubular bearing 1 is mounted upon the block B and is held thereon by means of straps 2,

which straddle said bearing and block B and are secured to the bed A. Mounted upon the bed A in the rear of said block B is a U-shaped bracket 3, which is formed with superposed axially-alined openings or bearings 4 in the legs thereof. A longitudinal shaft 6 is journaled in the lower set of bearings 4 and extends through the bearing 1. The shaft 6 is formed with a threaded portion 7, which is threaded into one of said bearings 4, preferably the inner one, said shaft carrying at its end a bit 8 of peculiar construction, to be hereinafter described. A hollow shaft 9 is also journaled in the bearing 1 and surrounds said shaft 6. The shaft 9 carries at one end a pinion 10, which is rigidly mounted thereupon and the side of which abuts the confronting face of the bearing 1, being relieved of friction in movement by antifriction-rollers 11. The shaft 9 has mounted upon its outer end or otherwise secured thereto a collar 12, upon which is mounted a frame for supporting the wheel. This frame is of substantially open conical shape and embodies a plurality of inclined radially-extending bars 13, which are secured at their ends to a rim or annulus 14. The rim or annulus 14 is formed with threaded openings 14^a, arranged at regular intervals, in which are secured the wheel-holding devices which may consist either of a hook 45, embracing the spokes of the wheel, as shown in Fig. 8, or of a T-shaped member 46, which has its horizontal arm arranged on the exterior of a pair of adjacent spokes, as shown in the same figure. It is of course only necessary to employ half as many members 46 for holding the wheel as the members 45, and it is to be noted that the members 45 and 46 are formed with threaded shanks 47 47', respectively, which extend through said openings 14^a.

A pair of oppositely-disposed L-shaped brackets 15 have their ends secured to the respective bars 13 and to the rim 14. These brackets 15 are formed with axially-alined openings, in which are loosely mounted the connecting-rods 16 of the self-centering workholder, embodying a set of toggle-links 17, having pivotal connection with one another at their ends and preferably four in number. These toggle-links are shown in detail in Fig. 7 and are formed with concave sides 18 and with convex sides 19, so that they may be reversed to assume the position in dotted lines

without need of further adjustment when it is desired to have a small center. The adjustment of the links 16 with relation to the toggles 17 is effected by means of nuts 20, 5 mounted upon the end of said links, said nuts performing the dual function of maintaining said links in their position in the brackets 15 and of adjusting said links to vary the size of the centering device.

10 The end of the collar 12 to which the work-holding frame is secured abuts the end of the bearing 1, but is relieved from friction in its movement by the use of antifriction-rollers 21. For the purpose of protecting the bear- 15 ing 1 and the shafts 6 and 9, mounted therein, from dust we have secured to the end of the collar 12 a disk-shaped guard 22, through which the bit 8 passes.

Mounted in the upper set of bearings 4 is a 20 longitudinal shaft 23, which carries at its one end a pinion 24, provided with a handle 25, the purpose of which will hereinafter appear. The shaft 23 is adapted under certain conditions to have a limited slidable movement in 25 its bearings 4, but is held in normal position by an expansive spiral spring 23^a, mounted on the outer end thereof and interposed between the bracket 3 and a pin 26, mounted in the end of said shaft, which limits the slid- 30 able movement thereof. A sprocket 27 is mounted upon the shaft 6, being secured thereto in such a manner as to rotate therewith. Said sprocket 27 is connected by a chain 28 with a sprocket 29, preferably of the 35 same size, which is slidably mounted upon the shaft 23. The sprockets 27 and 29 are arranged to lie in the same plane and are positively held therein by virtue of connecting- 40 straps 30, said straps 30 having their central portions secured together by rivets or other desired means, as at 32. The spaced parallel ends 31 of said straps 30 straddle the sprocket- 45 wheels 27 and 29 and serve as guides for the latter in its sliding movement along the shaft 23. We have stated that the sprocket 29 is slidably mounted upon the shaft 23, but it is 50 desired that the shaft 23 should rotate with and be rotated by said sprocket 29 and the operation of the machine. This is effected by means of the rectangular or squared cross- 55 sectional contour of said shaft 23, said shaft extending through an opening of corresponding contour in said sprocket 29.

In the course of the operation of the ma- 55 chine it is desired that one of the legs 31 of the respective straps 30 should engage means rigid upon the shaft 23 to throw the pinion 24 thereupon out of gear with the pinion 10. This means is provided in a collar 33, which 60 is adjustably mounted upon the shaft 23, being set in position by means of a set-screw 34. The pinions 24 and 10 are normally in mesh, so as to transmit rotary motion from the shaft 9 to the shaft 23 and again by means 65 of the sprocket-gearing to the shaft 6.

In connection with an apparatus constructed as above and designed for the purpose set forth we employ a novel form of bit, which is illustrated in Figs. 4 and 5 and of which a 70 modification is shown in Fig. 6. The bit 35 is formed with a straight edge 36 and is provided on its opposite edge with curved pointed teeth 37, arranged at regular intervals. The bits 35 are of wedge-shaped contour and 75 are mounted in pairs upon a tapered head 38. Each head is integral with the end of the shaft 6. The wedge-shaped contour of the bits 35, as well as the tapering form of the head 38, give to the bore formed in the hub a substantially conical shape, which is employed 80 in hubs of conventional form. It is to be noted that the bits 35 are mounted in pairs upon the head 38 and are disposed on opposite faces thereof in such a manner that the teeth 37 will extend in opposite directions. 85 When it is necessary to adjust the dimensions of the bit in accordance with the size of the bore to be drilled in the hub, we perform this function by moving the bits 35 laterally a very slight distance in either direction. 90 For this purpose we have provided said bits, adjacent the ends thereof, with transverse elongated slots 39, through which extend securing screws or bolts 40, which may be tightened or loosened at will. In Fig. 6 the 95 bit is provided with a series of teeth which are arranged in pairs at regular intervals. The forward tooth of each pair (designated 41) is pointed and serves to cut through the wood as the bit-head rotates. The rear 100 tooth of the pair 42 is formed with a sharp edge 44, the edge 44 serving to still further cut into the surface of the wood.

In operation a wheel is placed concentric- 105 ally within the rim 14, the hub thereof being held in the self-centering supporting-links 17, which automatically aline said hub centrally in front of the bits 35. The rim 14 is then rotated by a handle 45'. Rotary motion is imparted therefrom to the shaft 9, rigidly 110 secured thereto by the collar 12. Said shaft 9 in turn transmits its motion through the connecting-pinions 10 and 24 to the shaft 23. The rotary motion of the shaft 23 is transmitted to the shaft 6 by virtue of the 115 connecting-sprockets 27 and 29 and the chain 28.

It is to be noted that while the direction of travel of the shafts 23 and 6 will be the same such direction of travel will be opposite to the 120 direction of travel of the shaft 9, owing to the operation of the interposed gears 10 and 24. As the shaft 6 is rotated its threaded surface 7 will feed the same through the bearings 4 and the shaft 9, the bit the while enter- 125 ing the hub of the wheel and drilling the bore therein. The width of the bore at all points is determined or regulated in the manner above described by adjusting the bits; but the depth of the bore is regulated by 130

moving the collar 33 a corresponding length on the shaft 23 and setting the same rigidly upon said shaft by means of the set-screw 34. As the shaft 6 feeds outwardly toward the hub it will carry therewith the sprocket 27 and the connecting-straps 30, so that sliding motion will be transmitted to the sprocket 29 during the rotation of the latter. The sliding and rotary movement of the sprocket 29 is continued until the leg 31 of the strap 30 adjacent said sprocket engages the collar 33, at which time the shaft 23 will be moved outwardly in its bearings 4 by the sliding sprocket-gears until the pinion 24, mounted upon the end thereof, is out of mesh with the pinion 10 and assumes the position shown in dotted lines in Fig. 1. When this stage in the operation has been reached, there will be no means for transmitting the motion of the shaft 9, which is still in rotation. Hence the shaft 6 will cease rotating, thereby stopping the movement of the bit. The drilling operation having been thus completed and automatically stopped, the bit is fed inwardly out of the hub-box by rotating the pinion 24 manually by the handle 25 in a direction of travel opposite to that assumed in the drilling operation. This will cause the shaft 6 to feed rearwardly and place the machine in readiness for another operation.

It is apparent that various minor changes may be made, as in the form of bits, the form of self-centering work-holder, as well as the arrangement and form of gears employed. In addition to the means for manually operating the machine it is obvious that connection may be employed for operating the rim 14 and the pinion 24 from a suitable motor by the addition of various mechanisms.

The changes outlined and changes of similar character may be made without departing from the scope of the invention as defined in the appended claims.

Having fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a boring-machine, the combination of a work-holder, a hollow shaft rigidly secured to said work-holder, with a bit-shaft extending through said hollow shaft, power-transmitting mechanism connecting the hollow shaft with the bit-shaft, said mechanism being constructed and arranged so as to impart movement in opposite directions to the said shafts, means for feeding the bit-shaft toward the work-holder and means for auto-

matically disconnecting said hollow shaft and said bit-shaft after a predetermined number of revolutions of said shaft comprising a longitudinally-movable shaft above and parallel to the bit-shaft, a sprocket-wheel slidably mounted on said longitudinally-movable shaft, a sprocket-wheel on said bit-shaft, a chain connecting said sprocket-wheels, and a stop on said longitudinally-movable shaft adapted to be struck by the sprocket-wheel on said shaft.

2. In a boring-machine, the combination with a work-holder, and a hollow shaft secured thereto, of a bit-shaft extending through said hollow shaft, a pinion on said hollow shaft, a longitudinally-movable shaft supported above and parallel to said bit-shaft, a sprocket-wheel on said bit-shaft, a sprocket-wheel on said upper shaft, a chain connecting said sprocket-wheels, a gear-wheel on said upper shaft adapted to mesh with said pinion, an adjustable stop device on said upper shaft adapted to be engaged by the sprocket-wheel of said upper shaft.

3. In a boring-machine, the combination with a bed, a block mounted on said bed, a hollow tubular bearing mounted on said block, and a U-shaped bracket mounted on said bed and provided with two sets of bearings, of a hollow shaft arranged in said tubular bearing, a work-holder carried by said hollow shaft, a pinion carried by said hollow shaft, a bit-shaft mounted in said bracket and extending through said hollow shaft a second shaft carried by said bracket, a gear-wheel carried by said second shaft and meshing with the pinion on the hollow shaft, a sprocket-wheel carried on said bit-shaft, a sprocket-wheel slidably mounted on said second shaft turning therewith, a chain connecting said sprocket-wheels, a collar adjustably mounted on said second shaft, said second shaft being longitudinally movable in its bearings and adapted to be moved longitudinally so as to disconnect the gear-wheel thereon from the pinion on the hollow shaft, when the sliding sprocket-wheel contacts with said collar.

In testimony whereof we affix our signatures in the presence of two witnesses.

FRANK W. PRICE.
CHARLES H. PRICE.

Witnesses:

JOHN S. POWERS,
C. MOSTERMORN.