

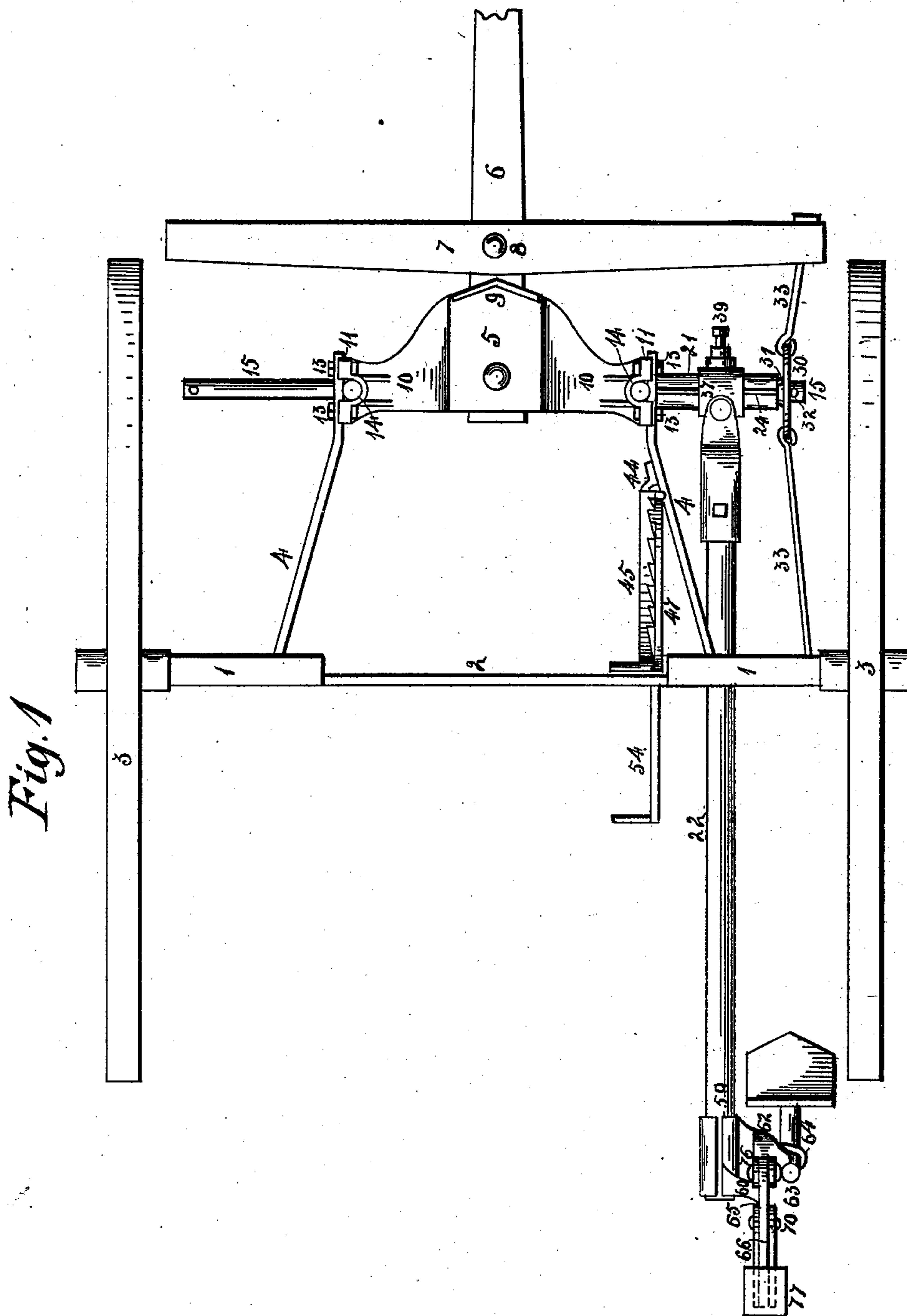
(No Model.)

4 Sheets—Sheet 1.

W. H. TRAPHAGEN.
CULTIVATOR.

No. 504,406.

Patented Sept. 5, 1893.



Witnesses;
L. A. Clark.
N. M. Southworth

Inventor;
William H. Zaphagen
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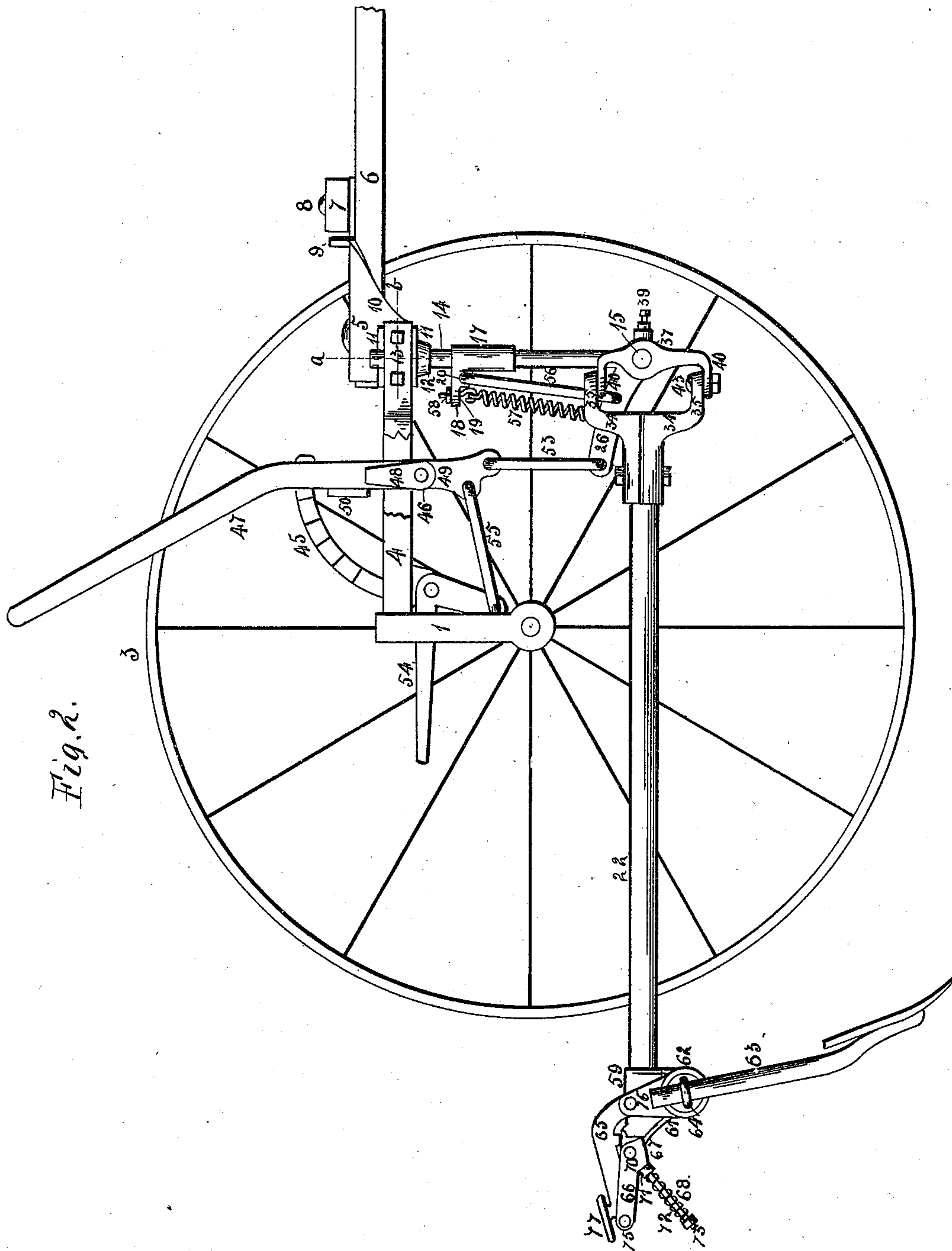
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4 Sheets—Sheet 3.

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Fig. 3.

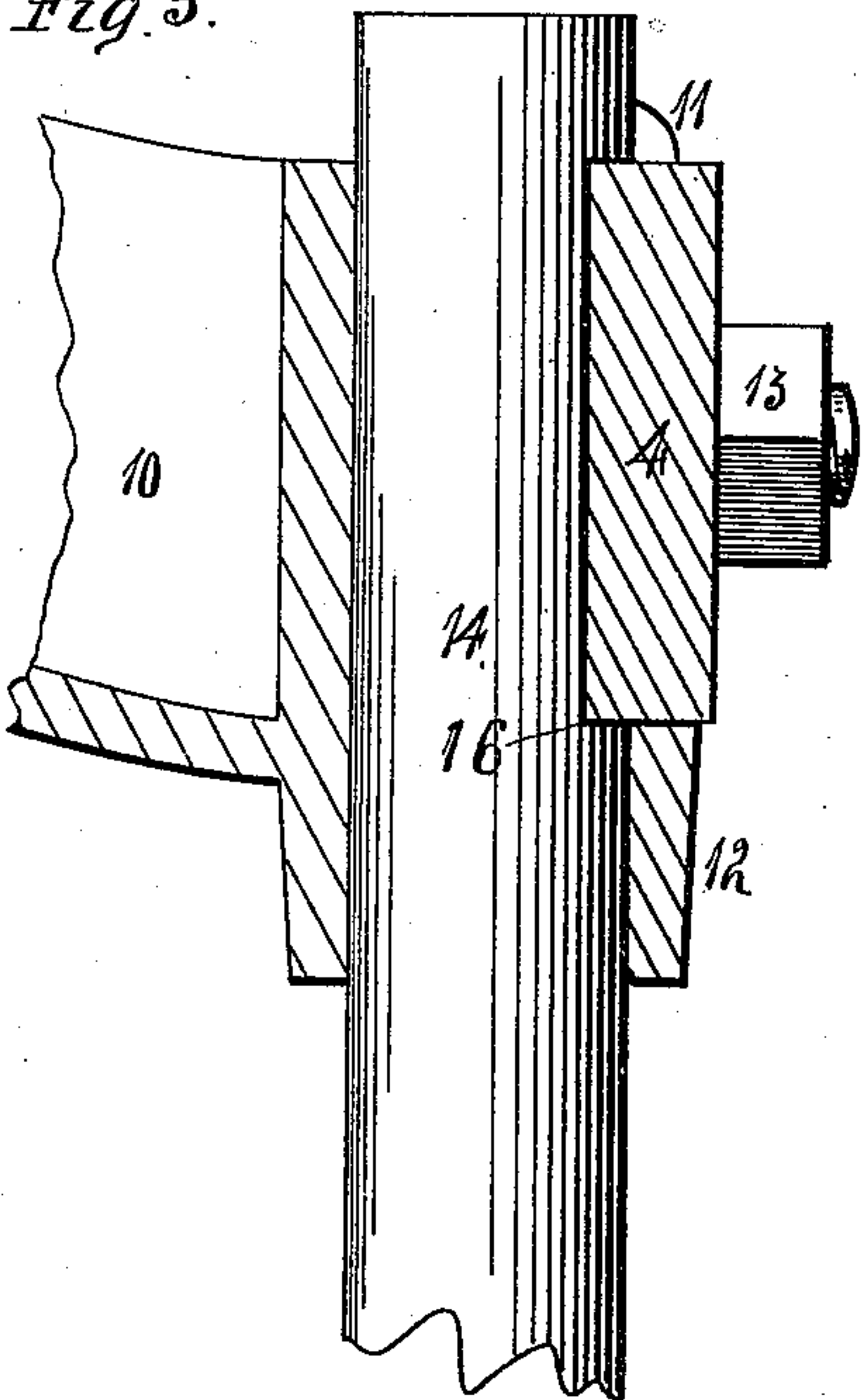


Fig. 5.

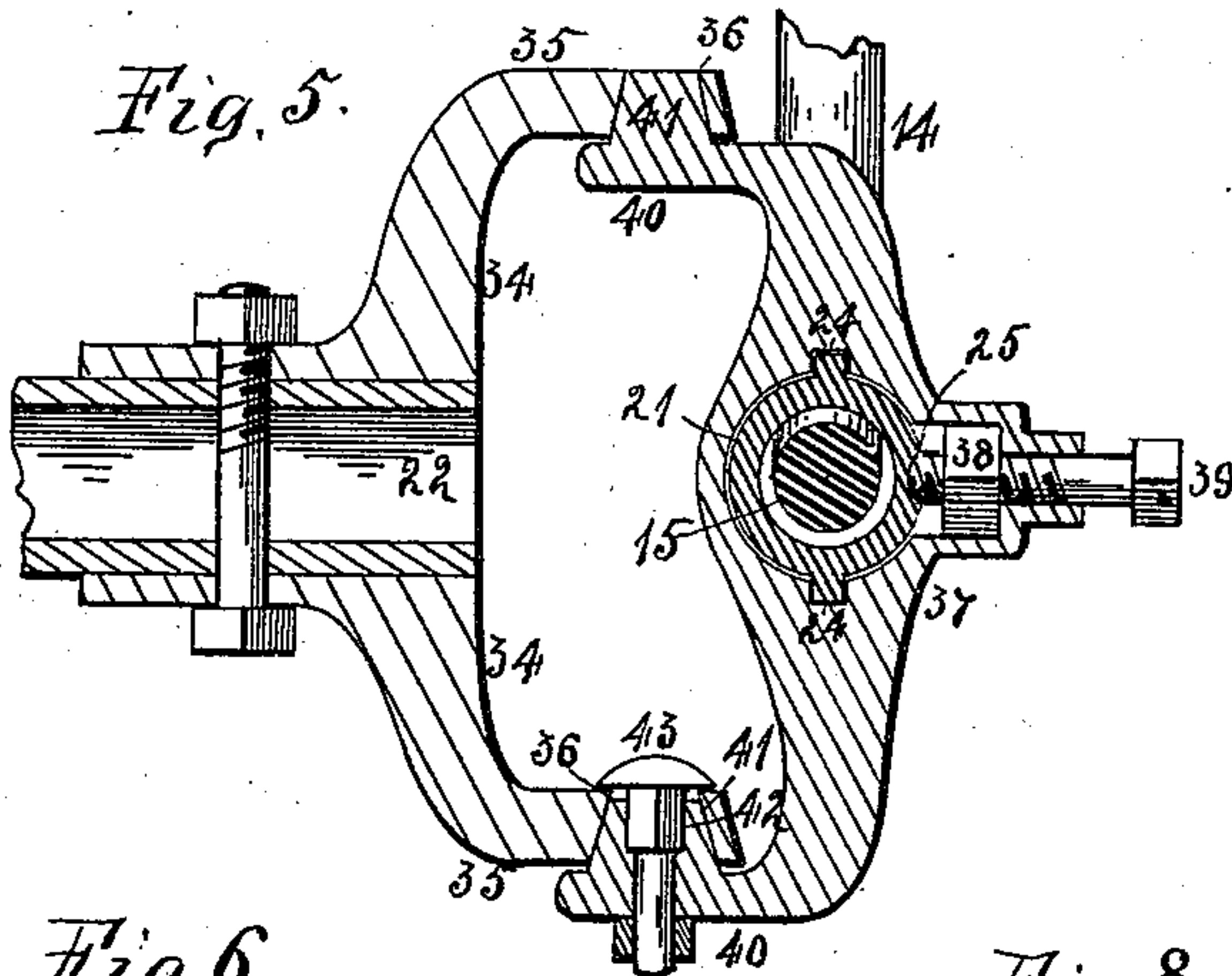


Fig. 6.

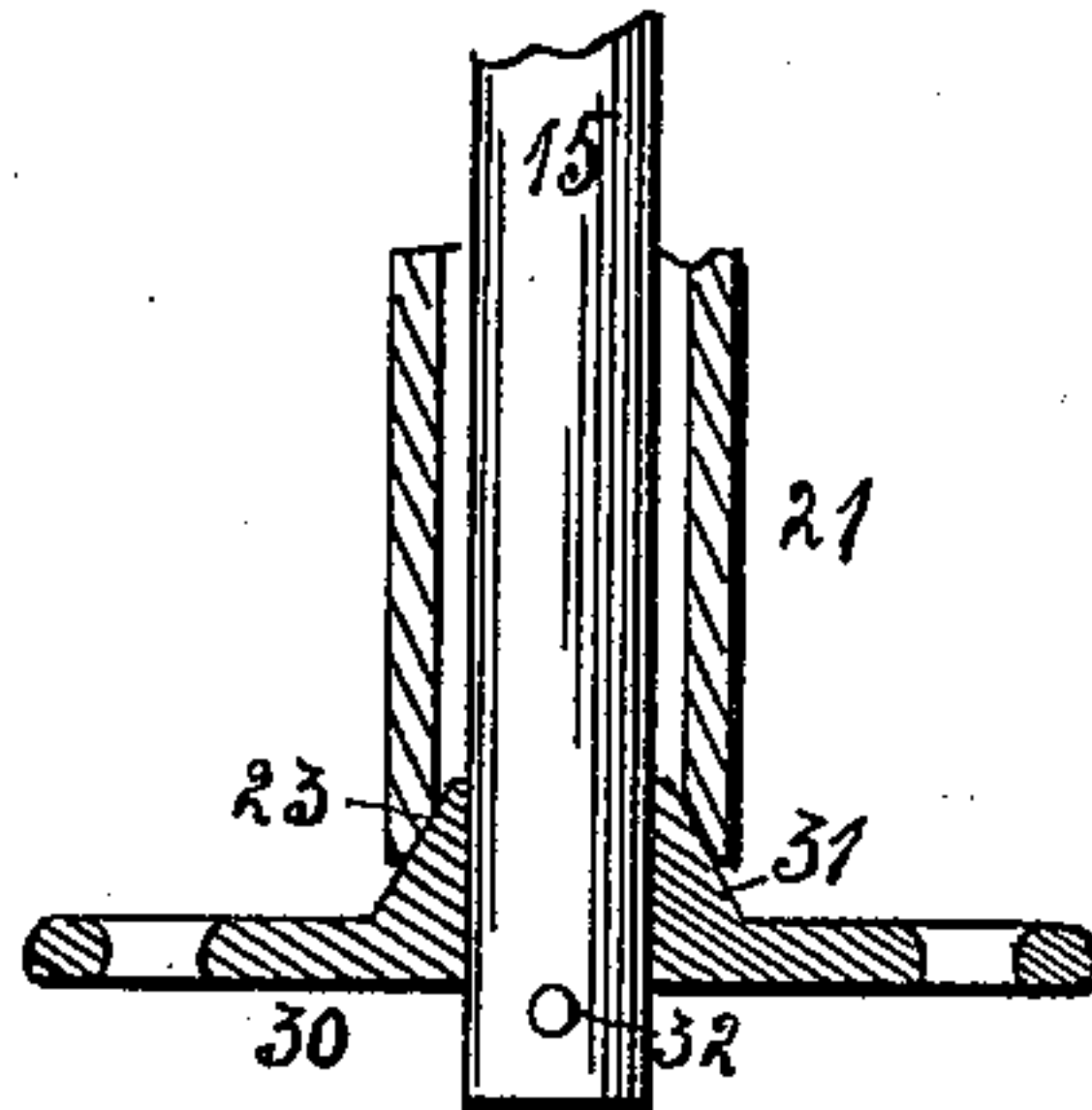


Fig. 8.

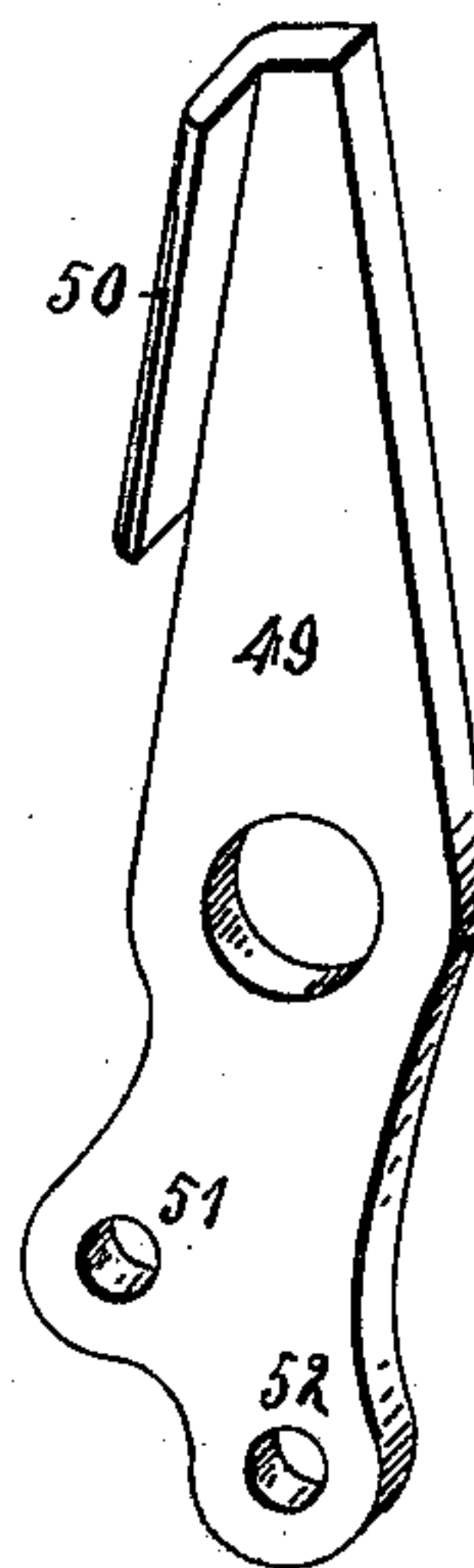


Fig. 4.

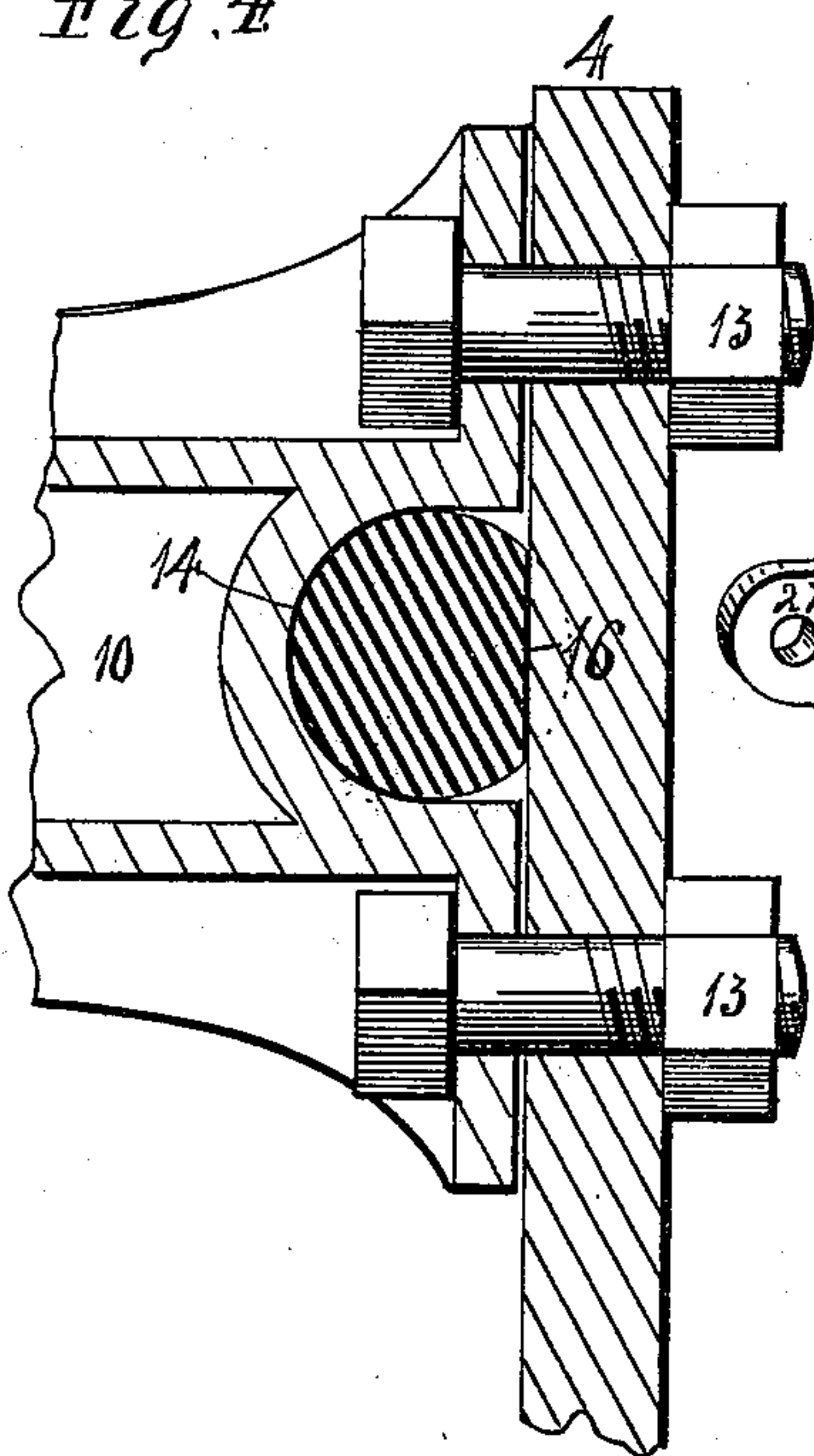
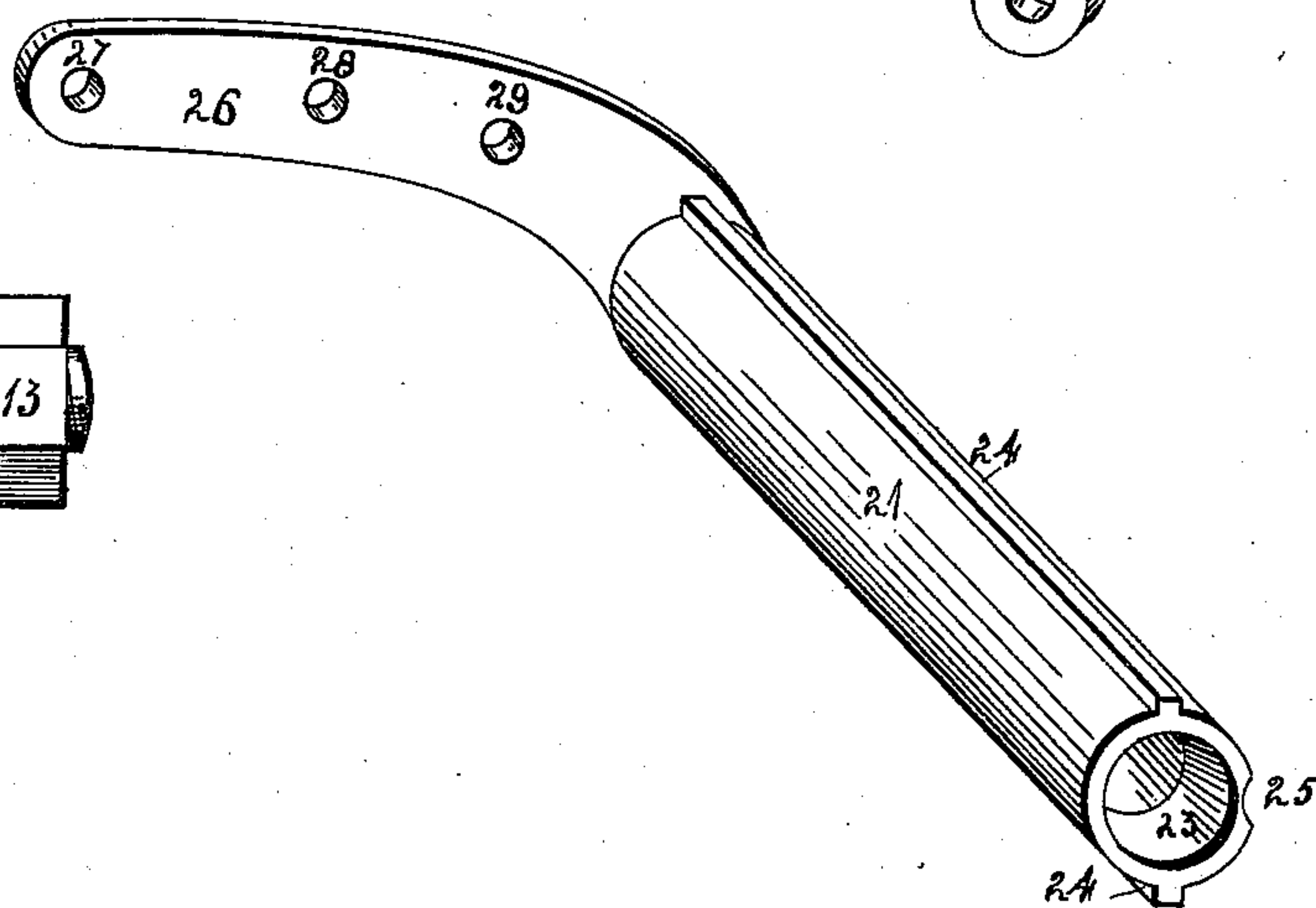


Fig. 7.



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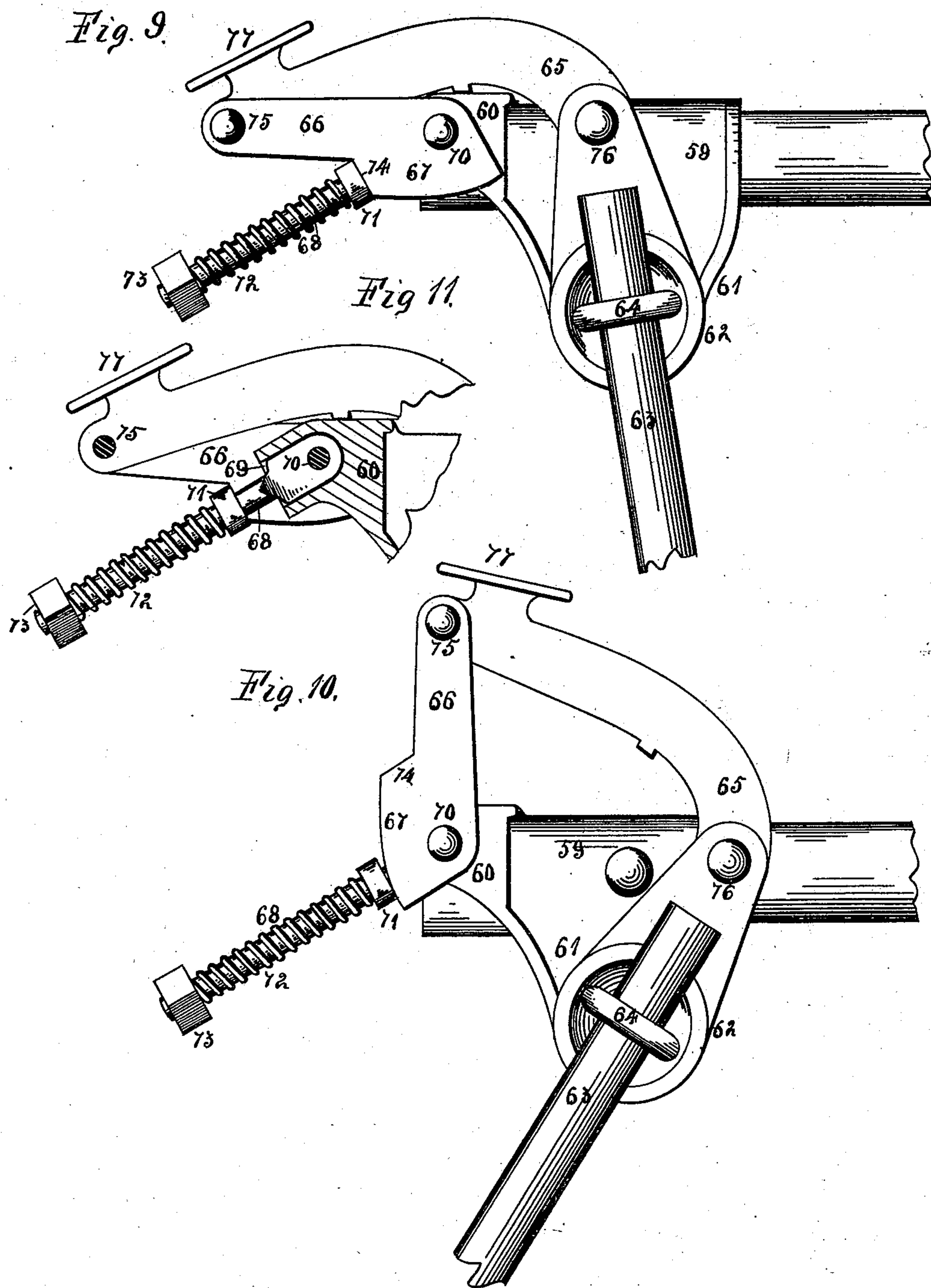
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4 Sheets—Sheet 4.

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UNITED STATES PATENT OFFICE.

WILLIAM H. TRAPHAGEN, OF ROCKFORD, ILLINOIS, ASSIGNOR TO EMERSON,
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CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 504,406, dated September 5, 1893.

Application filed July 29, 1892. Serial No. 441,629. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. TRAPHAGEN, a citizen of the United States, residing at Rockford, county of Winnebago, Illinois, have invented certain new and useful Improvements in Cultivators, of which the following is a specification.

The object of this invention is to provide a metallic bracket which connects the coupling arms with the tongue, to support the evener and to form stops limiting the movement of the evener.

The further object of this invention is to provide a combined hand and foot lever having a connection with the drag bar so that by means of the hand lever the depth to which the shovels shall run may be regulated and the drag bar raised by the foot lever independent of the hand lever, and a spring connection to assist in raising the drag bar and shovels attached thereto.

The further object of this invention is to form a connection between the lifting devices and the drag bar, consisting of two yoke formed arms, one of these arms provided with cone shaped projections, and the other arm provided with cone shaped recesses which receive the cone shaped projections, by means of which the wear of the parts may be taken up and held together by means of a single bolt passing through one projection and recess.

The further object of this invention is to form one end of the sleeve to which the drag bar is connected with a cone shaped recess which receives a cone projection and permits of only an oscillatory movement of the sleeve.

The further object of this invention is to hold the shovel standards in their forward or working position by means of a spring acting upon the table levers, forming a connection between the standard and drag bar, so that when an obstacle is met the shovel will yield in a rearward direction and which can be replaced to its original position by the foot of the operator.

In the accompanying drawings, Figure 1, is a plan view of a cultivator embodying my improvements. Fig. 2, is a side elevation of the same, one of the supporting wheels and some of the braces being removed to more clearly

show its construction. Fig. 3, is a vertical central section on dotted line *a*, Fig. 2, through the coupling arm showing the recess within which a brace bar is placed. Fig. 4, is a horizontal section on dotted line *b* Fig. 2 of the brace and coupling arm. Fig. 5, is a vertical central section through the yoke connection between the drag bar and coupling arm. Fig. 6, is a horizontal section through the outer end of the coupling arm showing the cone projection for holding its outer end in working position. Fig. 7, is an isometrical representation of the sleeve which surrounds the horizontal portion of the coupling arm. Fig. 8, is an isometrical representation of the intermediate lever with which the foot lever has a connection. Fig. 9, is a side elevation of the spring mechanism for holding the shovel standard in its working position. Fig. 10, is also a side elevation of the spring mechanism for the shovel standard shown in its rearward, or the position it occupies when the shovel has encountered an obstruction. Fig. 11, is a vertical section through the rear end of the bracket supporting the shovel standard, showing the manner of supporting the spring devices.

The cultivator to which my improvements are shown in connection with is of a riding variety, the drag bars of which are operated by the feet of the operator, and consist of stub axles 1, connected by a bar 2. Upon the ends of the stub axles are located the supporting wheels 3. To the front face are connected braces 4, which extend forward and are connected at their forward ends by a bracket 5. To the under side of the center portion of this bracket is bolted the tongue 6. The doubletree 7, is located upon the forward end of this bracket and is held in place by means of the bolt 8. A double faced projection 9, rises from the upper face of this bracket which acts as a stop for limiting the rearward movement of the ends of the doubletree. Wings 10, extend from each side of the center portion of the bracket and slightly forward, having their free ends provided with lips 11, and the lower portion 12, of their free ends being in circular socket form. The forward ends of the braces 4, have a connection with the free ends of the wings 10, and the lips 11, overlapping the top

and bottom edges of the brace, preventing any vertical movement of the parts at that point, and the bolts 13, hold the parts firmly connected. A coupling arm serves to support the forward ends of the drag bars, and is made from round metal having a vertical portion 14, and a horizontal portion 15. The upper end of the vertical portion has a notch or recess 16, formed on its outer face, a little distance below its upper end. This coupling bar is held in place between the forward ends of the braces 4, and the free ends of the round portions, the forward end of the brace being seated in the recess 16, of the coupling arm, after having been passed upward through the socket portion 12, of the free end of the wing. Before this coupling arm is secured in position I locate a sleeve or collar 17, upon its vertical arm, said collar having a horizontal projection 18, extending rearward, and said projection provided with a vertical hole 19, and horizontal hole 20, for a purpose to appear hereinafter.

The sleeve 21, to which the drag bar 22, is attached is nearly the length of the horizontal portion of the coupling arm having a central bore of larger diameter than the horizontal portion of the coupling arm, and its outer end recessed in cone shape 23. The outer surface of this sleeve is provided with one or more lengthwise extending ribs 24, in this instance, one from its upper surface and the other from its lower surface and having its front face provided with a lengthwise depression 25. An arm 26, extends rearward from the sleeve 21, and is provided with three holes 27, 28 and 29. A washer 30, has a cone projection 31, which enters the cone shaped recess 23, in the outer end of the sleeve 21, and a pin 32, extending through the free end of the horizontal portion 15, of the coupling arm holds the projection of the washer in the recess 23, and by this connection of the parts the sleeve is forced against the curve at the junction of the horizontal and vertical portions of the coupling arm, which prevents either end of the sleeve from sagging in a vertical direction, but permits a free oscillatory movement above its support. Brace rods 33, connect the washers 30, with the stub axle and doubletree. The drag bar 22, in this instance is made from gas pipe, and at its forward end has a two part yoke secured thereto. This yoke is composed of vertical portions 34, and horizontal portions 35. The horizontal portions near their free ends are fitted with cone recesses 36, having the larger end of the recess downward. A yoke 37, consists of a horizontal portion provided with two lengthwise recesses to receive the projections 24, and a horizontal recess large enough to receive a nut 38, and a tubular projection extending from the last named recess. This yoke is slipped onto the sleeve 21, from its outer end, and by means of the nut 38 and the bolt 39 the inner end of the set screw bolt enters the lengthwise recess 25, in the front

of the sleeve, thereby clamping the yoke firmly to the extension, but in such a manner as to allow the yoke to have an adjustment in the direction of the length of the sleeve. The horizontal portions 40, of this yoke at their upper faces are provided with cone shaped projections 41. The projection extending from the lower arm is provided with a polygonal opening 46. In forming the connection between the drag bar and the sleeve the cone shaped recesses of the forward end being placed over the cone projections of the yoke 37, attached to the sleeve 21, and a bolt 43, extending through the lower projection, clamps the parts in position, but in such a manner as to permit of a horizontal movement of the drag bar, and any wear at this point may be taken up by means of the bolt 43, and by having a polygonal opening in the lower cone projection the bolt is held stationary and consequently the horizontal movement of the drag bar will not loosen the nut on the lower end of the bolt.

A brace 44, is connected with the bar 2, and its forward end connected with the inclined brace 4. This brace has its upper surface formed with a toothed segment 45, and its lower front end is perforated through with a bolt 46, extends forming a pivot for the hand lever 47, the hand lever engaging the teeth of the segment during its movement and a flat spring 48, holds the lever in a yielding manner in engagement with the teeth of the ratchet.

Upon the pivot of the hand lever and between it and the face of the brace 44, I locate an intermediate or double ended lever 49, its upper end and rear face being provided with a projection 50, which the hand lever engages as it is moved rearward. The lower end of this double ended lever is provided with two horizontal holes 51 and 52, the forward hole 52, having a connection with the arm 26, by means of a rod 53. A foot lever 54, has a pivotal connection with the brace 44, near its rear end, and a link 55, connects the foot lever 54 with the hole 51, of the double ended lever 49. By means of this double ended lever the operator can raise the drag bar by means of the hand lever through its link connection with the arm 26, which is rigid with the sleeve 21. The drag bar can be set to run at any depth within the limit of the segment 45, and by means of the foot lever the operator, by depressing thereon can raise the drag bar independent of the hand lever as the two armed lever is free to move independent of the hand lever, and by releasing the hand lever the drag bar will be lowered until the projection 50, of the upper end of the double ended lever 49, comes in contact with the rear face of the hand lever. A link 56, is connected with the arm 26, extending from the sleeve 21, in the hole 29, with the sliding sleeve 17 located on the vertical portion of the coupling arm. The spiral spring 57 is connected with the arm 26, also with the sliding

sleeve 17 and by means of the nut 35, the tension of the spring can be adjusted. It will be noticed that as the drag bar is raised by means of either the hand or foot lever, the sleeve 17 on the vertical portion of the coupling arm has a movement up and down corresponding to the relative distance, the connections of the links 53 and 56 are from the pivotal center of the sleeve 21. This sliding movement of the sleeve 17, carries the upper end of the spring with it, but as such sliding movement is not equal to the distances which the lower end of the spring is raised, the tension of the spring is relatively relaxed, so that when the drag bar is in working position I have the greatest energy of the spring 57, to help lift it. As the shovels rise out of the ground less power is required to raise them and I therefore decrease the action of the spring.

In the drawings I have shown a shovel standard, holding the shovel in working position by spring action. The arrangement of the parts which accomplish this result will now be explained. In the drawings I have only shown the connection of a rear shovel with the drag bar. To the face of the drag bar I secure a bracket 59, having a rearward extension 60, and a downward extension 61. To the downward extension 61, I pivot a socket 62, having its outer face recessed, which receives the shovel standard 63, the socket and standard being held in connection with the bracket by an eye bolt 64. To the lower end of the shovel standard is secured an ordinary cultivator shovel. The upper end of the socket 62, is provided with ears to which is pivoted a link 65. On each side of the rear extension I locate swinging arms 66, having their ends 67, near the pivot in cam form. The end of the link 65 is located between the free ends of the arms 66, and the pivot connects the parts, but in such a manner as to form a moving joint. So far as described I have a link connection between the shovel standard and the arms 66, connected to the rear extension in order that any movement imparted to the shovel standard in the direction of the length of the machine, will also be imparted to these arms 66. A bolt 68, has a connection with the rear extension 60, of the bracket by entering a socket 69, formed therein, and is held in place by means of the rivet 70. This bolt has its free end, screw threaded. A washer 71, is first placed on the bolt, then a spiral spring 72, which are held in position by the nut 73. When the shovel is in working position, the washer 71, is held against the face 74, of the lower ends of the arms 66, so that the three pivots 70, 75 and 76 are nearly on a line but the pivot 75 being slightly above the line of the other two. Should the shovel come in contact with any hard substances the standard and the socket will move upon their pivotal connection with the bracket. This movement will draw forward on the link 65, consequently moving the arms 66, upon their pivots 70, with sufficient

force to compress the spring far enough to allow the washer 71, to ride on the lower face of the cam formed ends of the arms 66, as shown at Fig. 10. To replace the parts in their normal position the operator places his foot upon the rest 77, a part of the rear end of the arm 65, and by pressing down thereon the arms 66 will be depressed, moving the shovel forward and allowing the spring to seat itself.

In the drawings I have not illustrated a driver's seat, but the ordinary construction of such seat can be applied to the cultivator herein represented, and is so located that the driver will be within reach of the hand lever, foot lever and foot piece of spring mechanism for holding the shovel standard.

I claim as my invention—

1. A bracket secured to the tongue consisting of a base provided with uprising stops near its front end limiting the rearward movement of the evener, wings extending laterally and downward from the base to which the coupling arms are connected.

2. A bracket secured to the tongue consisting of a base provided with uprising stops near its front end limiting the rearward movement of the evener, wings extending laterally and downward from the base its ends made in socket form, a coupling bar having a notch or flattened surface near its upper end, a brace rod lying in contact with the flattened surface and bolts holding the parts together.

3. A sleeve for supporting the front end of a drag bar, consisting of a horizontal tubular shell located on the coupling arm and having a rearwardly extending arm provided with a series of holes and a lifting lever having a connection with the arm.

4. A spring supporting device for the drag bar of a cultivator consisting of a coupling arm, a sleeve on the arm having a rearwardly extending arm and a link and spring connection between the rearwardly extending arm and a sliding sleeve.

5. A spring supporting device for the drag bar of a cultivator consisting of a coupling arm, a sleeve on the arm having a rearwardly extending arm, a link and spring connection between the rearwardly extending arm and a sliding sleeve, and a lever connection with the rearwardly extending arm for raising the drag bar.

6. A connection for the forward end of a drag bar consisting of a sleeve supported on a coupling bar, a yoke adjustably connected with the sleeve and having cone shaped projections, the smaller portion of each being on a higher plane than the base portion, a yoke connected to the end of the drag bar provided with cone shaped recesses having their smaller ends on a higher plane than their larger ends and adapted to receive the cone shaped projections, and a bolt holding the parts together.

7. A drag bar, a bracket secured thereto,

4
a shovel standard pivotally connected with the bracket, a cam shaped lever having a pivotal connection with the support of the standard, and a spring exerting its force to
5 hold the shovel standard in working position.

8. A drag bar, a bracket secured thereto, a shovel standard pivotally connected with the bracket, a cam shaped lever having a pivotal connection with the support of the

standard, and a spring exerting its force to hold the shovel standard in working position, and a foot piece secured to the link for returning the shovel to its working position.

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