

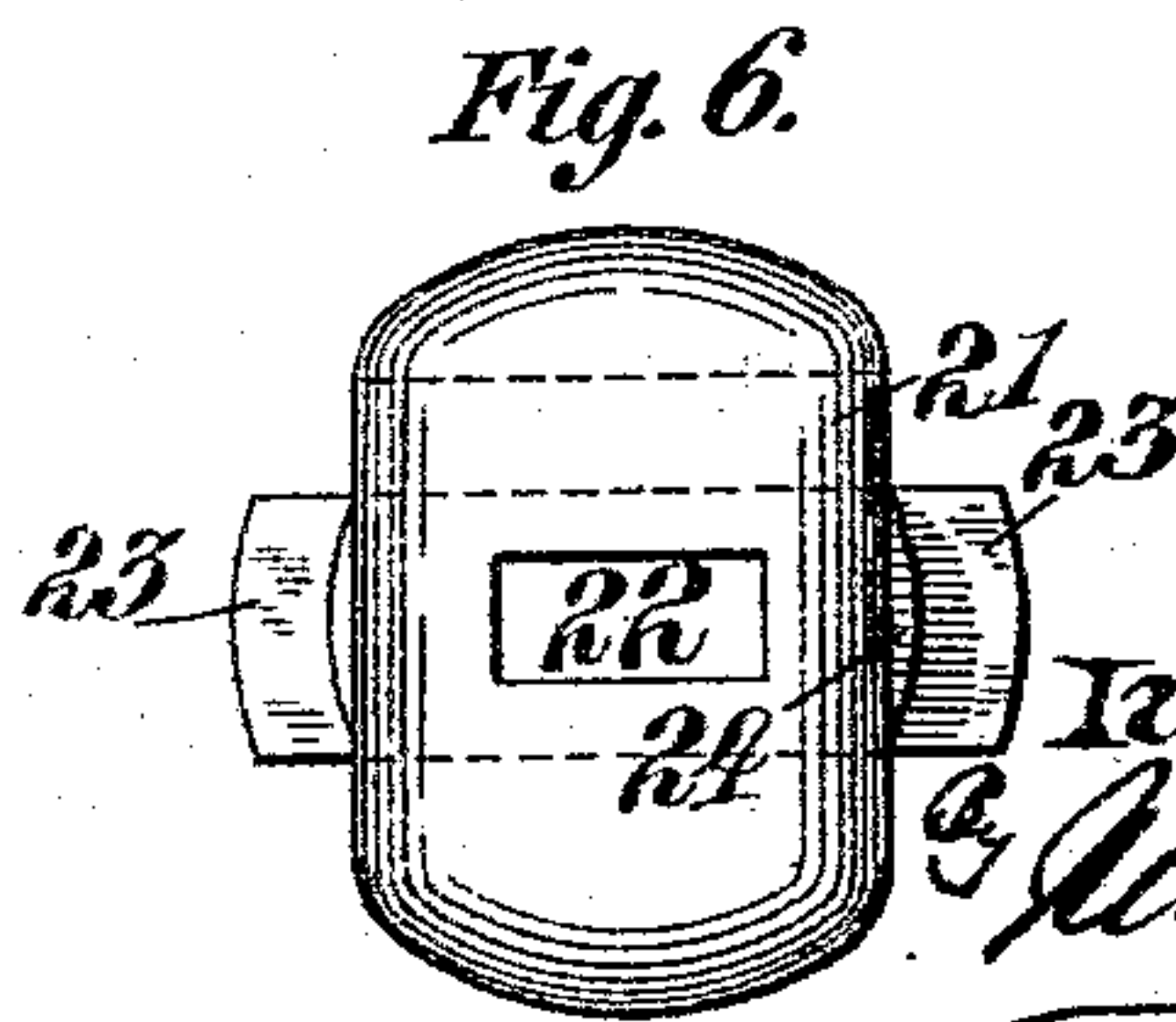
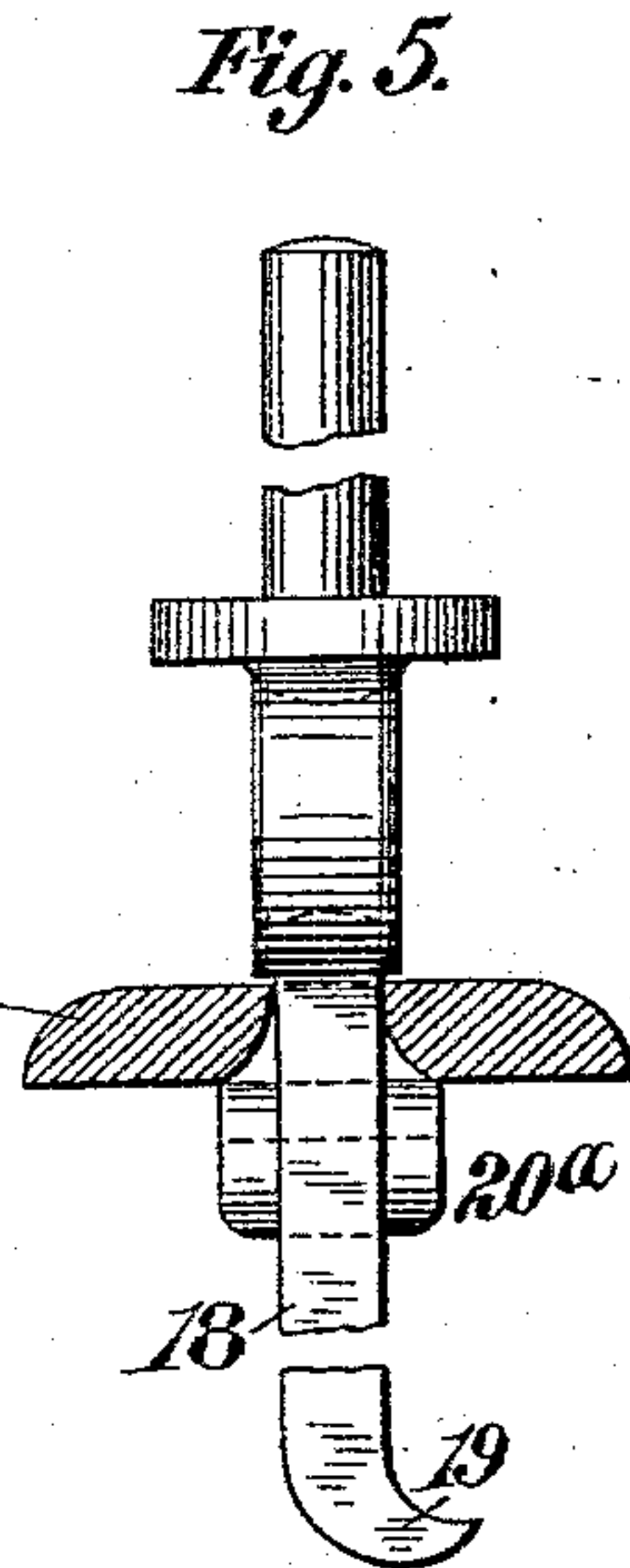
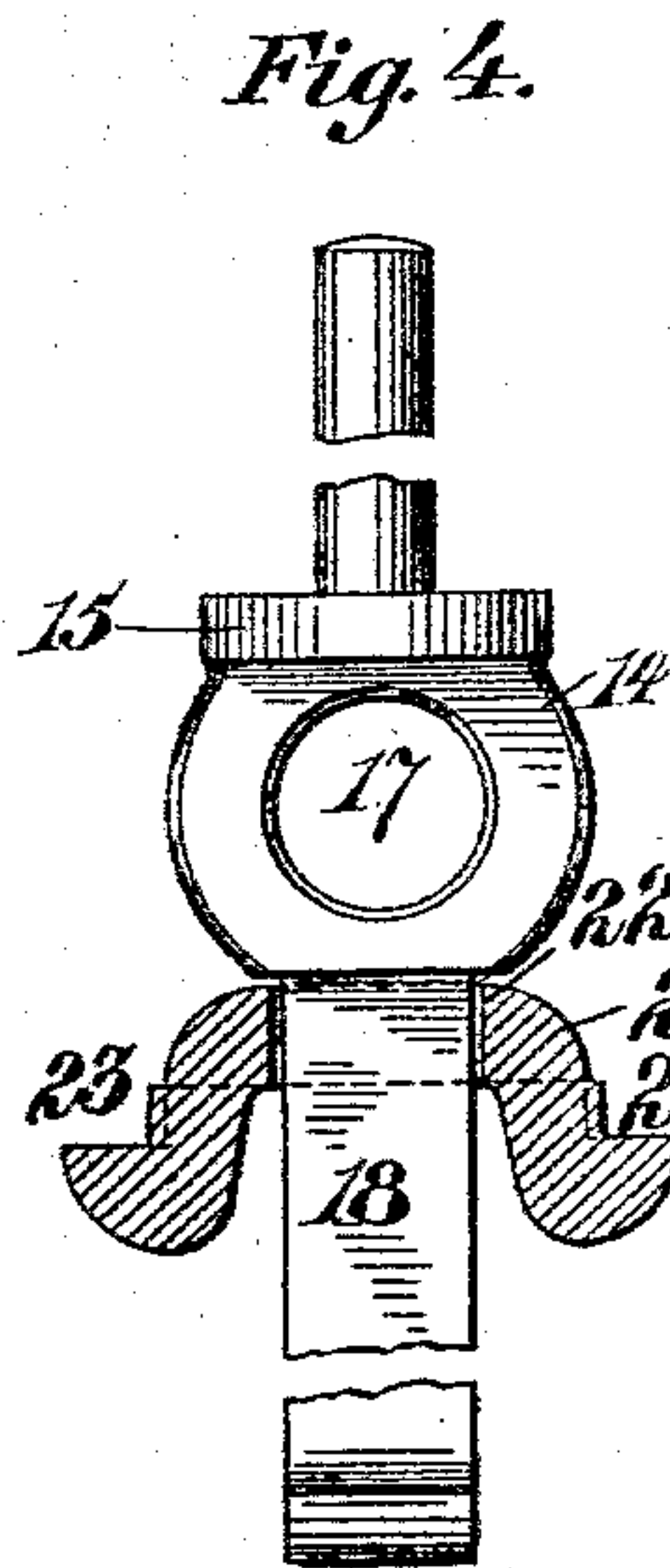
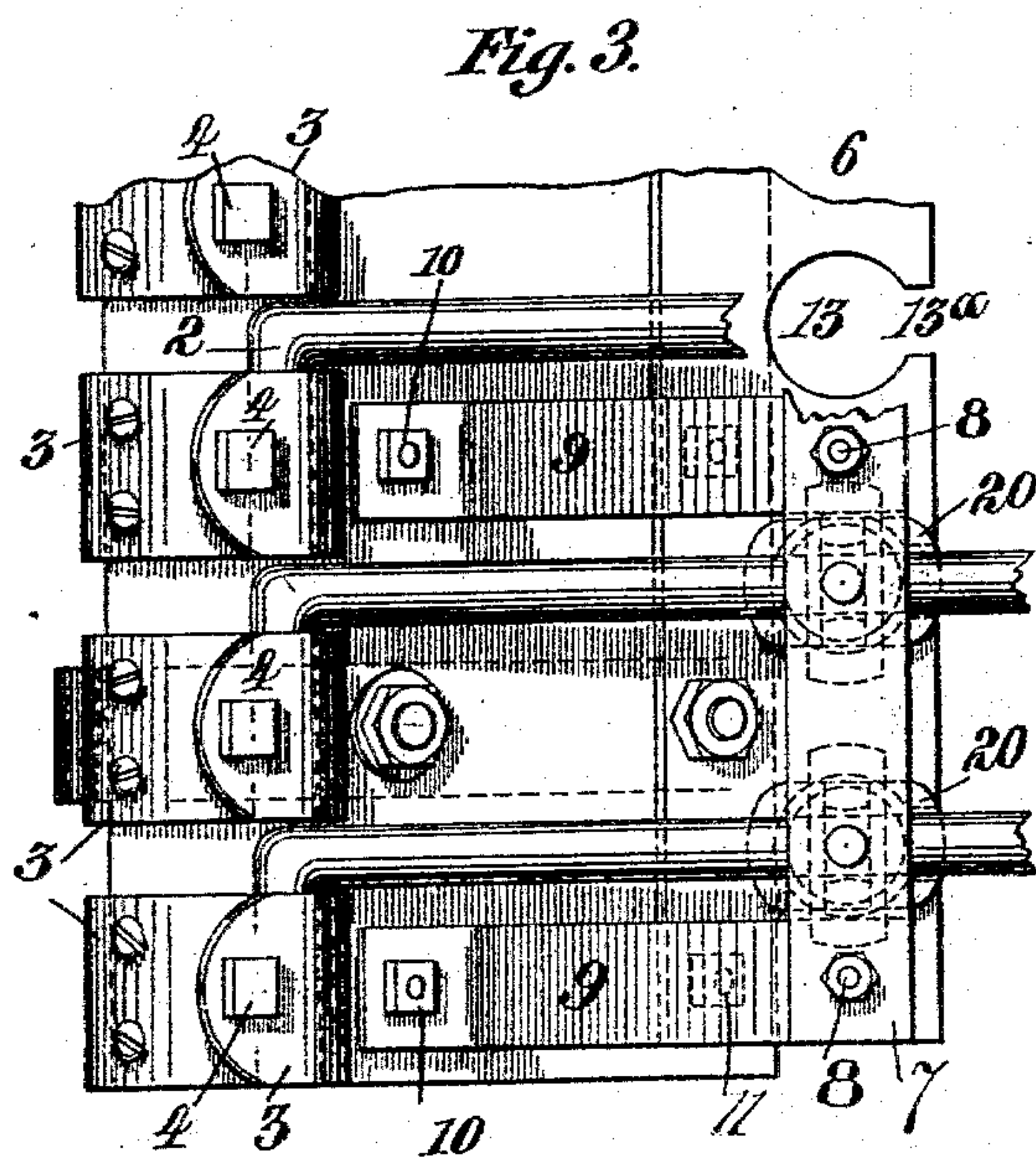
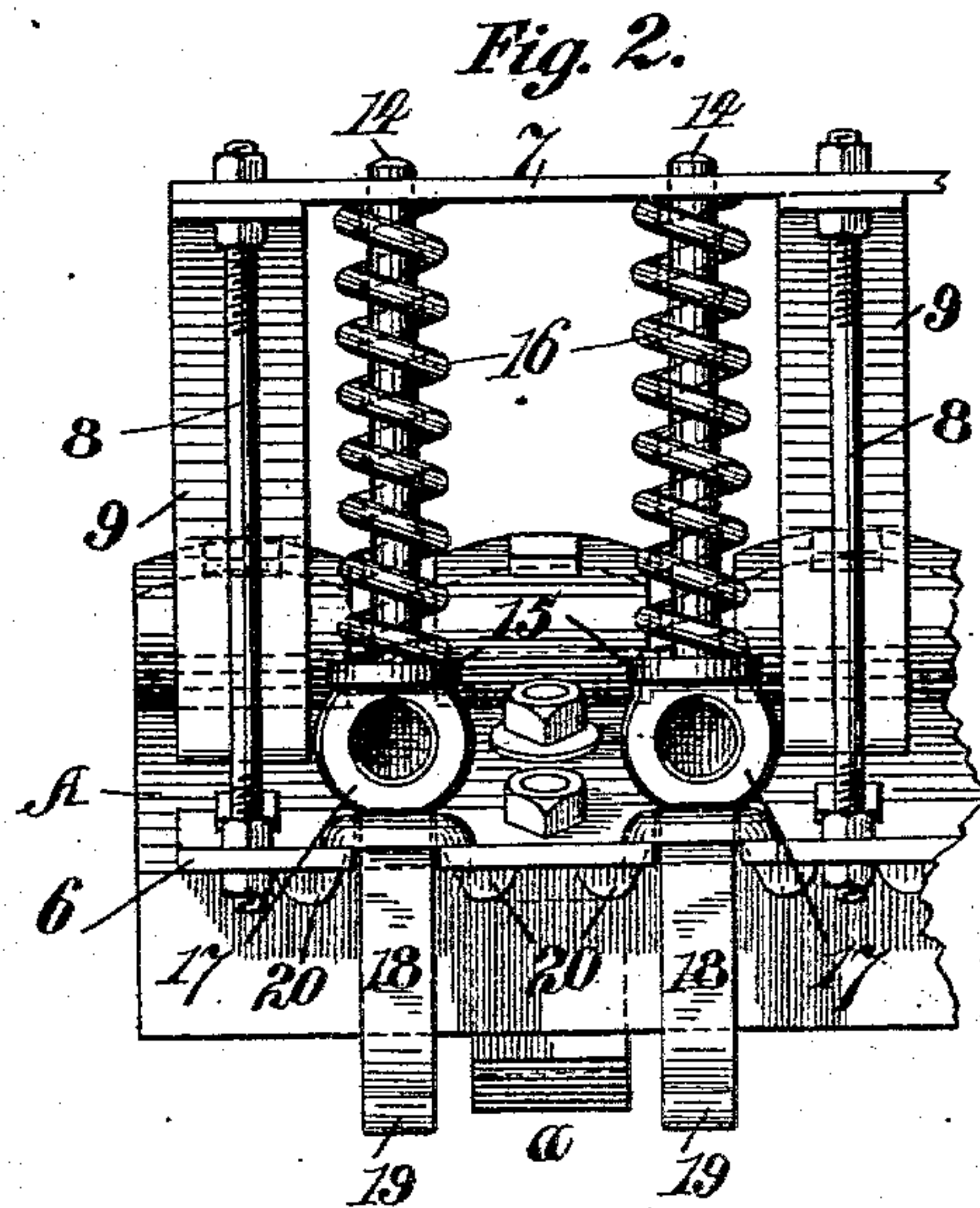
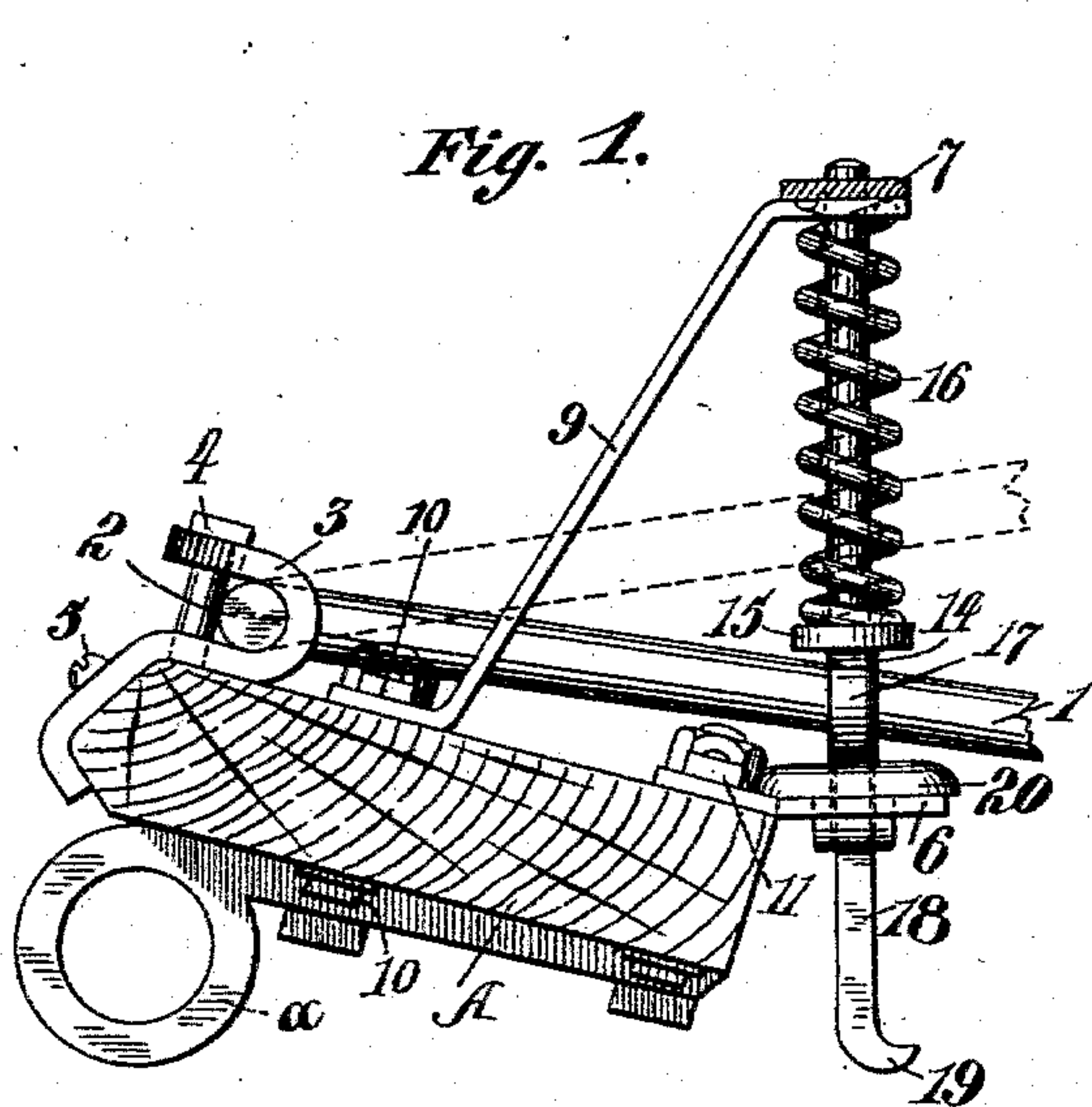
(No Model.)

2 Sheets--Sheet 1.

I. J. BÖRSUM.
HORSE RAKE.

No. 511,037.

Patented Dec. 19, 1893.



Witnesses:
H. G. Dieterich
B. W. Sommers

Inventor:
Ivar J. Börsüm,
Atty.

(No Model.)

I. J. BÖRSUM.
HORSE RAKE.

2 Sheets—Sheet 2.

No. 511,037.

Patented Dec. 19, 1893.

Fig. 8.

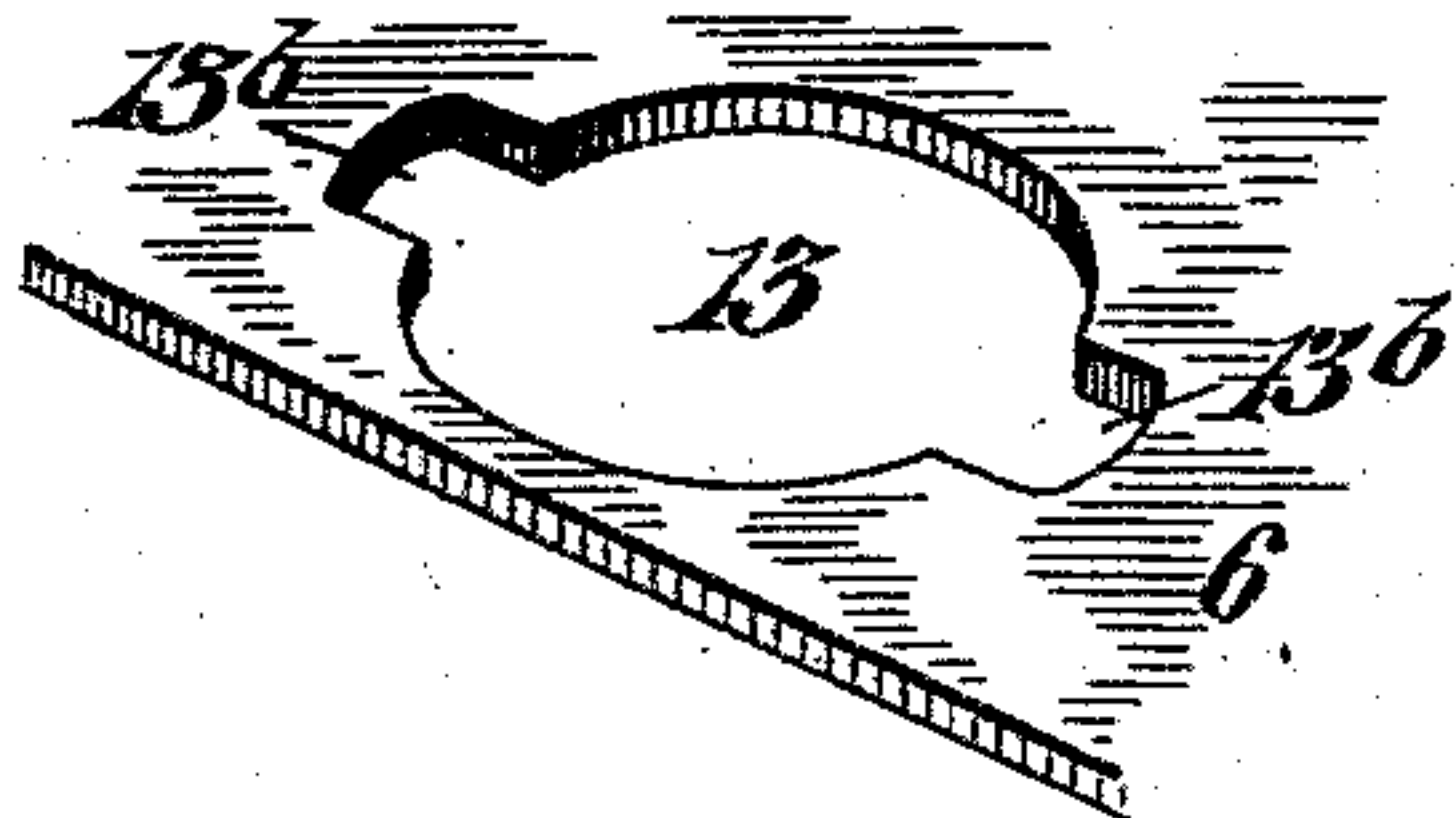


Fig. 7.

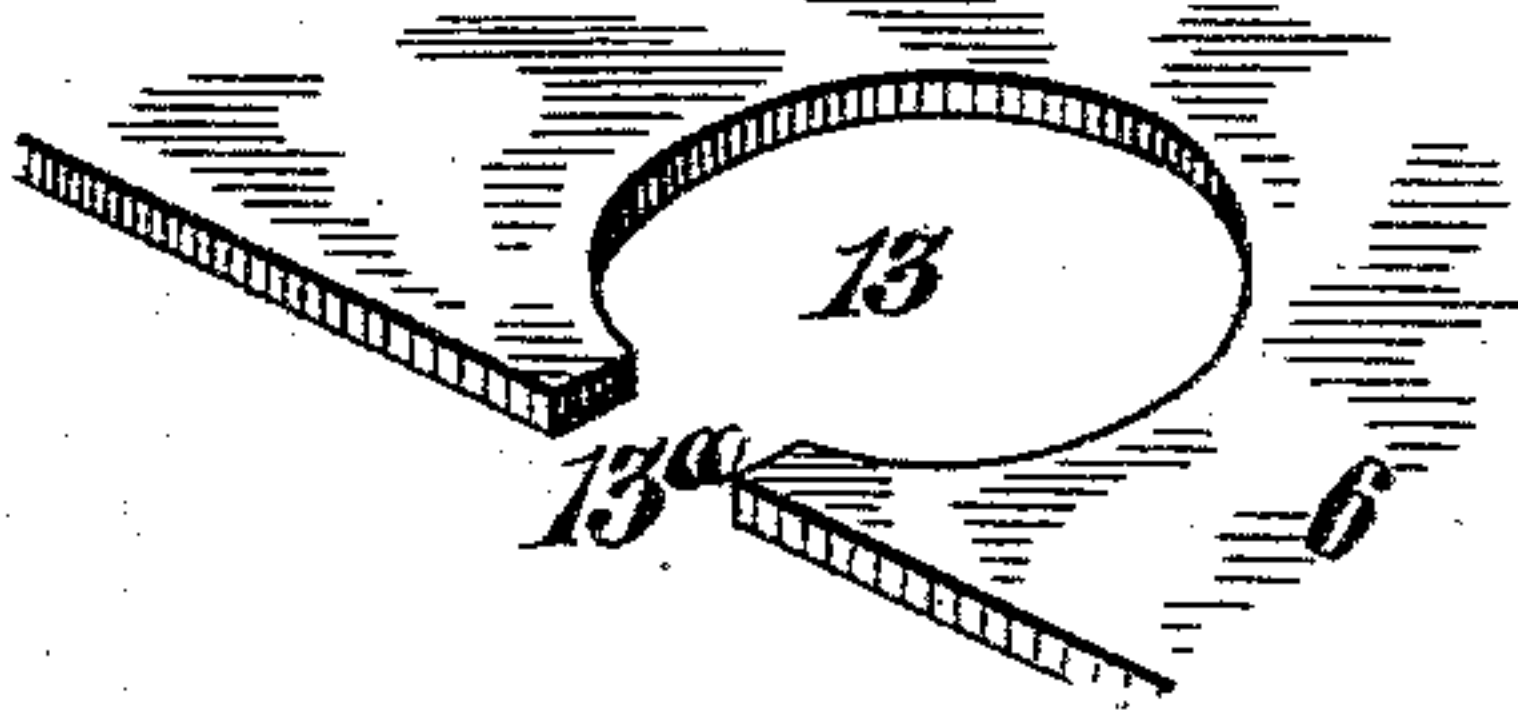


Fig. 10.

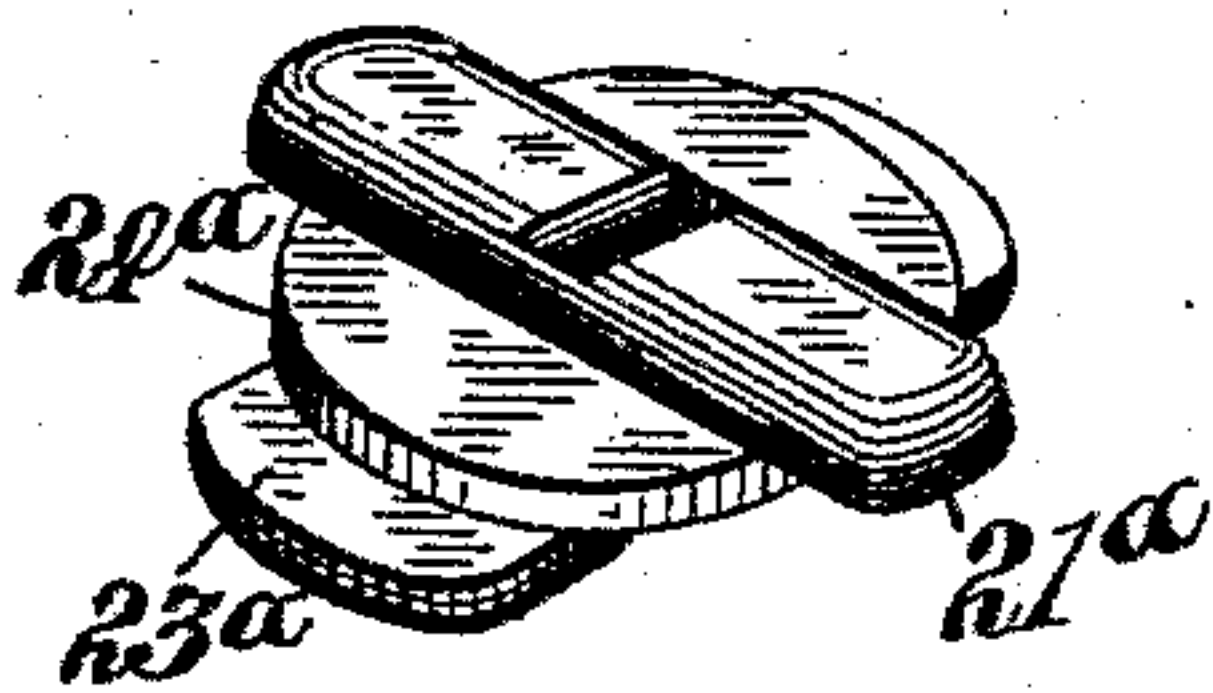


Fig. 9.

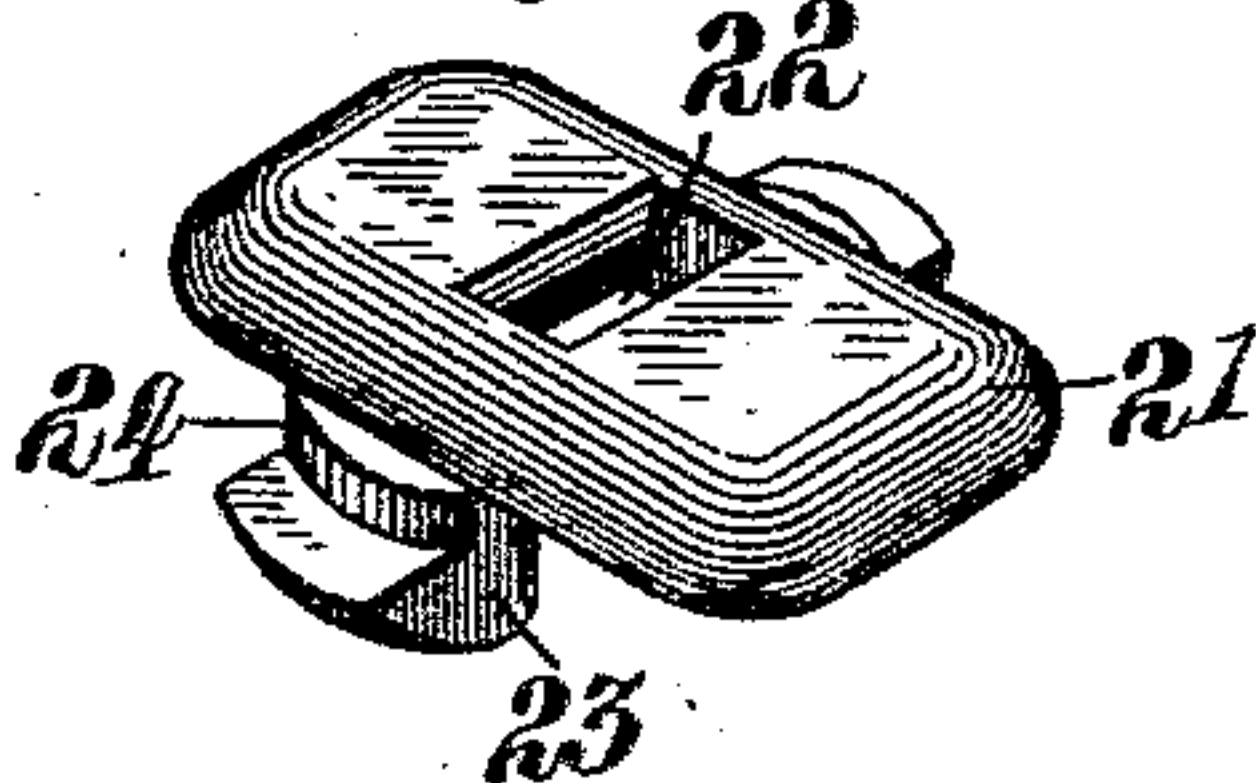


Fig. 12.

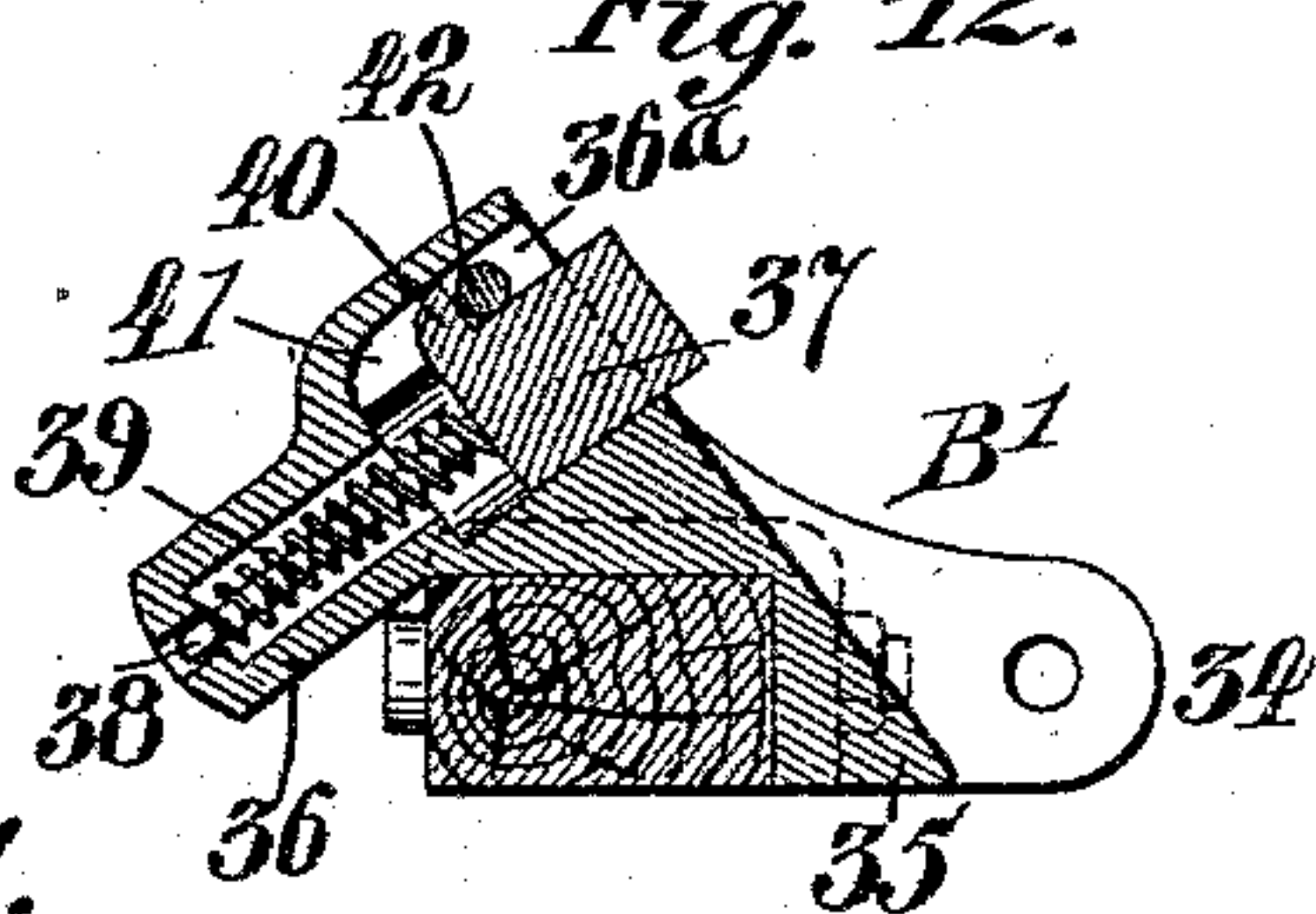


Fig. 11.

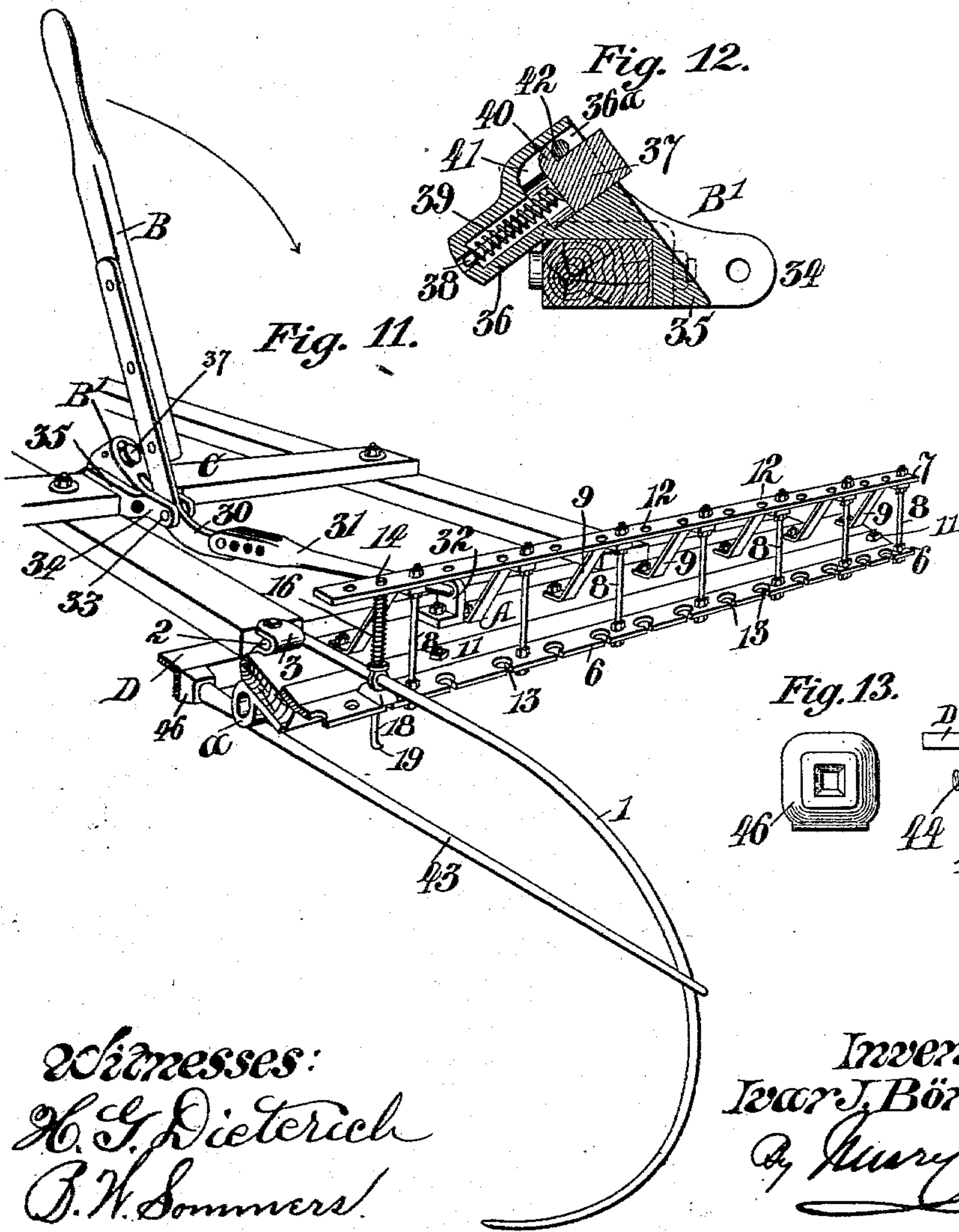


Fig. 13.

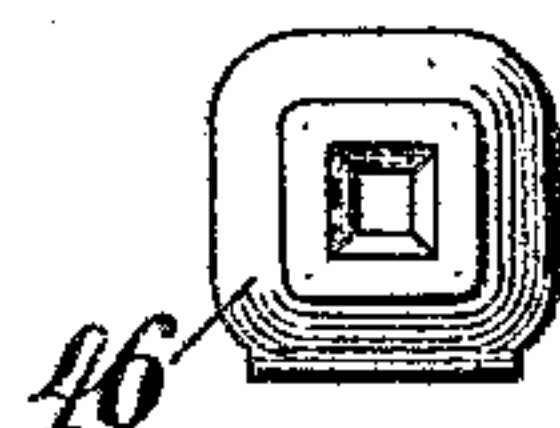
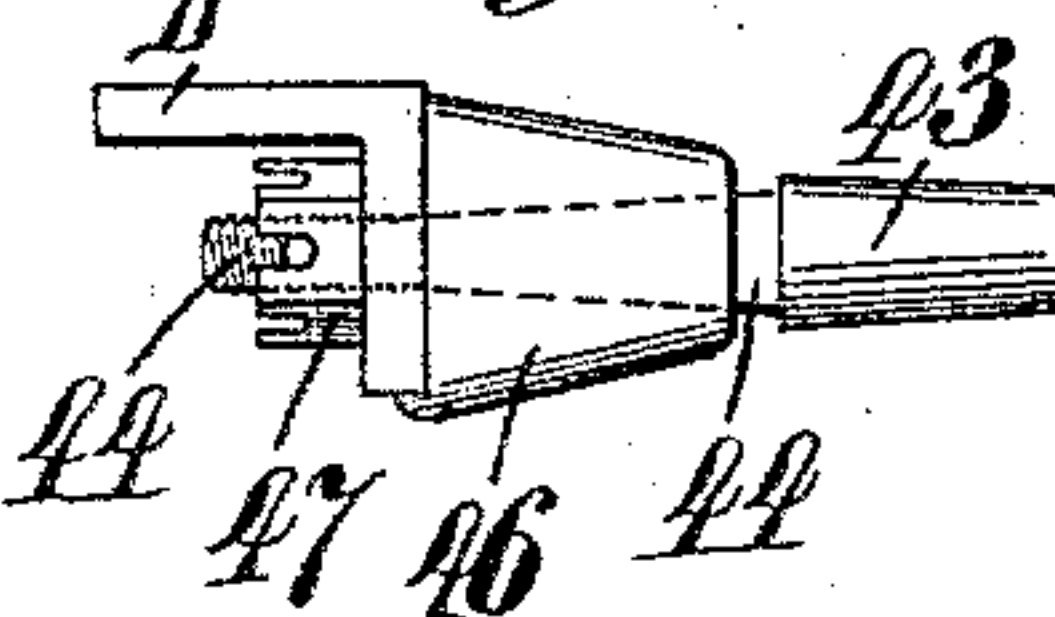


Fig. 14.



Witnesses:
H. G. Dieterich
J. W. Sommers

Inventor:
Ivan J. Börsüm,
By Harry M. W. Atty.

UNITED STATES PATENT OFFICE.

IVAR JULIUS BÖRSUM, OF LILLEHAMMER, NORWAY.

HORSE-RAKE.

SPECIFICATION forming part of Letters Patent No. 511,037, dated December 19, 1893.

Application filed November 25, 1892. Serial No. 453,092. (No model.) Patented in Norway March 11, 1891, No. 2,197, and September 12, 1891, No. 2,409, and in Sweden March 24, 1891, No. 3,393.

To all whom it may concern:

Be it known that I, IVAR JULIUS BÖRSUM, a subject of the King of Sweeden and Norway, residing at Lillehammer, in the Province of Söndre Gudbrandsdalen and Kingdom of Norway, have invented certain new and useful Improvements in Horse-Rakes, (for which I have obtained Letters Patent in Norway, No. 2,197, dated March 11, 1891, and No. 2,409, dated September 12, 1891, and in Sweden, No. 3,393, dated March 24, 1891;) and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
15 pertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specifica-
20 tion.

My invention has relation to horse rakes, and consists in the means for securing the rake teeth to the tilting or rocking rake carrier; in the combination with the teeth of a resilient abutment to adapt each individual
25 tooth to accommodate itself to the surface of the ground over which it is dragged; in the combination with the rake teeth and rake carrier, of means for locking the same against lateral motion to the carrier; in the combi-
30 nation with the rake carrier lifting lever of a buffer operating to take up the impact of said lever when released after lifting the rake carrier; in the means for securing the clearer fingers to the rake frame, and in details of
35 construction as will now be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a cross section of the rake, a portion of the rake tooth shown being broken
40 away. Fig. 2 is a rear elevation, and Fig. 3 is a top plan view of a portion of said rake. Figs. 4 and 5 are sectional face and side elevations of one of the holders and guides for the rake teeth. Fig. 6 is a top plan view and
45 Fig. 9 a perspective view of one form of clamp for locking the rake tooth holders against lateral motion on the rake head. Fig. 7 is an isometric view of a portion of the lock plate on the rake head illustrating one form of
50 bearing for the clamping device, shown in Figs. 1 to 5 and 9. Fig. 8 is a like view illus-

trating the form of bearing for a modified construction of clamp, shown in Fig. 10 by a perspective view. Fig. 11 is a perspec-
55 tive view of a portion of a horse rake illustrating my improvements, all the rake teeth but one being removed. Fig. 12 is a sectional view of the buffer used in combination with the rake lifting lever, and Figs. 13 and 14 are
60 detail views illustrating the means for connecting the clearer fingers with the rake frame.

Similar symbols denote like parts wherever such may occur in the above described fig-
65 ures of drawings.

The rake frame is or may be of any usual or preferred construction, the rake proper com-
70 prising a rake head, A, rake, teeth, 1, and suitable guides for guiding said teeth in their vertical movements and locking the same against lateral motion to the rake head, as
75 will hereinafter appear. The rake head A, is as usual provided with suitable bearings, a, and is loosely mounted on the wheel axle. Not shown. The rake teeth, 1, are of any
80 usual or well-known form, except that their pivot end is bent at right angles to form the journal or pivot, 2, on which said teeth can turn, the rake head A being provided with
85 bearings 3 for said journals. These bearings, as clearly shown in Figs. 1, 3, and 11, consist of a strap suitably bent into U-shape, the journal of the rake tooth being confined with-
in the U-shaped portion by a bolt, 4, while the strap itself is bolted to the rake head by
a bolt 5.

To the rake head A, is bolted a spacing and supporting frame for the rake teeth, composed of a cross girt 6, a tie bar 7, and locking and
90 guide rods, 14. The cross girt 6 is bolted by means of bolts 11 to said rake head A, so as to project rearwardly therefrom, and the tie bar 7, is connected with the bar 6 by means of stay rods 8, and with the rake head by means of braces 9. The cross tie 7 is pro-
95 vided with as many circular openings, 12, as there are rake teeth, the cross girt 6 being likewise provided with a corresponding number of circular openings 13, into which leads a radial slot, 13^a, formed in the edge of said
100 cross girt, as shown in Figs. 2, 3, 7 and 11, or said circular opening in the girt may be pro-

vided with two radial slots, 13^b, as shown in Fig. 8, according to the construction of clamping device used. When the girt 6 has the edge slotted openings 13, the clamping device is constructed so that it can be inserted through said edge slot into the circular opening. As shown in Figs. 4, 5, 6 and 9, the clamp consists of a broad clamping plate 21, provided centrally with a polygonal opening, 22, for the stay and guide rod, 14, and on opposite sides of said opening said plate has two clamping lugs, 23, each provided with a segmental bearing 24, the center of the circle of said bearings being that of the plate and of the circular openings in the bar 6. It is obvious that when the said clamp is slipped into the slot 13^a of the circular opening until the bearings 24 lie within said opening with the plate 21 on the upper face and the clamping lugs 23 on the under side of said girt 6, and a half turn is imparted to the clamp, it will be locked to the girt. The clamp shown in Fig. 9 embodies precisely the same structural features with the exception that the plate 21^a is made sufficiently narrow to pass through the slots 13^b, when inserted from below, the arc described by the circular bearings 24^a being correspondingly greater, and as shown the bearing surface of the clamping lugs 23^a is also somewhat larger. If this clamp is inserted from below through the slots 13^b (Fig. 8) in girt 6, and turned one-half around, it will be locked to the said girt. In either construction of clamp the joint is substantially a bayonet joint.

The locking and guide rods 14 are for a portion of their length cylindrical in cross section, said cylindrical portion terminating in an annular flange or collar 15, that forms the abutment for the lower end of a coil spring 16, whose upper end has bearing on the under side of the tie bar 7. Below the collar 15 the rod has a circular opening 17 through which the rake tooth 1 passes, and that portion, 18, of the rod, 14, below the circular bearing, 17, is polygonal or of other angular form in cross-section, so as to fit the opening 22 in the clamp, and the lower end of said portion 18 is bent outwardly to form a stop shoulder, 19, that prevents the rod from being moved out of its bearing in said clamp when the rake tooth is lifted from any cause. These parts are assembled as follows: The clamp is slipped upon the lower portion 18 of the locking and guide rod 14, the spring 16 is next placed upon the cylindrical portion of said rod, and the upper end of the latter is slipped into the proper hole in the bar 7, after which the clamp is slipped through slot 13^a into its seat in girt 6, and turned half way around; finally the rake tooth is slipped through bearing 17 in rod 14, and its journal 2 inserted in its bearing 3 and locked against endwise motion by means of the bolt 4 passing through an opening in the upper lug of the U-shaped bearing and being screwed into the lower leg thereof. If a clamp con-

structed as shown in Fig. 10 is used it is first slipped onto the rod 14, and the latter with the spring 16 applied is passed from below through bearing 13 its upper end being inserted in the proper hole in tie bar 7, after which the clamp is seated in said bearing 13 and turned half around to lock it. It will readily be seen that by means of the described arrangement the rake tooth is free to turn on its journal against the stress and with the stress of the spring 16 on rod 14, and at the same time locks the clamp and rod 14 against rotary motion, while the said rod locks the rake tooth against lateral motion. It is obvious that by means of the said arrangement any one of the rake teeth may be detached from the rake without disturbing the others, and that this can be done without the use of tools except a screw driver or bolt wrench to remove the bolt 4, in case its removal cannot be effected by hand. It is not absolutely necessary that the bolt 4 should be tapped into bearing 3. It may pass loosely into an opening in the lower limb of said bearing, and to prevent its being jolted out, said opening may merge into a socket in the rake head A.

As above stated, the rake head is journaled on the driving axle and is adapted to be tilted thereon, to lift the rake teeth off the ground, by means of a bell crank hand lever B, journaled to a buffer bolted on one of the cross girts, as C, of the rake frame. The short arm 30 of the lever is pivotally connected with one end of a link 31, whose other end is pivotally connected, in any suitable manner, with the rake head A. It will be understood that when the lever B is moved in the direction of the arrow Fig. 11, the link 31 will be drawn in a reverse direction, or toward said lever, and the rake head B tilted upwardly and forwardly. Inasmuch as the weight of the rake head and parts connected therewith is considerable, and to avoid strain on the lever as well as on the rake teeth by sudden and violent impact with the ground, I provide the buffer B', Figs. 11 and 12, which consists of a casting of such a form as to adapt it to fit and be bolted to a cross girt of the framing, said casting having a tubular portion 36, the upper end of which is enlarged as shown at 36^a; within said enlarged portion is seated the buffer block 37, that has a stem 38 whose free end has bearing in an opening in the lower end of the tubular portion 36, and carries a buffer spring 39, the movement of the block under the stress of its spring being limited by a stop pin 42.

In order to clear the rake teeth of hay when lifted off the ground I employ as usual, clearing fingers or arms at suitable intervals along the rake, said fingers being secured to a cross girder which is made of angle iron. The fingers 43 have a tapering tang 44, screw-threaded at its outer end, the angle girder has holes formed therein for the insertion of said tangs and in order that a more solid bearing may

be provided for the fingers 43, I provide them with a bearing sleeve 46, the bore of which corresponds with the taper and outline of the tang or shank of the finger, which tang or shank is preferably polygonal in cross section. This mode of securing the clearer fingers is clearly shown in Figs. 11, 12 and 13, the retaining nut 17 having peripheral slots for a locking pin that is inserted in the threaded end of the tang 45 to lock the nut against accidental rotation.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a horse rake, the combination with the rake teeth and the rake head provided with a separate journal bearing for each tooth, of a guide frame secured to said rake head, spring actuated guide rods 14, one for each rake tooth, provided with a bearing 17 through which the rake tooth passes, said bearing also serving to limit the movement of the rod in one direction, and a clamp comprising an apertured plate provided with locking lugs projecting from opposite sides thereof in which the guide rod has vertical motion, said clamp detachably connecting the rod with the rake head, for the purpose set forth.

2. In a horse rake, the combination with the rake teeth having their heel end bent at right angles to form a journal, and the rake head A provided with a journal bearing for each of said teeth, consisting of a U-shaped strap 3 bolted to said rake head, and a retain-

ing bolt 4 extending through one leg of the U-shaped portion of the strap into the other, substantially as and for the purpose set forth.

3. In a horse rake, the combination with the rake teeth, the rake head A provided with a journal bearing for each of said teeth, the girt 6 bolted to the rake head and provided with bearings 13, and the tie bar 7 connected with the rake head and with said girt 6, of the guide rods 14 provided with a bearing 17 through which a rake tooth passes, with a collar 15, and with a lower bent or hooked end 19, the spring 16 on said rod between its collar and the bar, and a clamp comprising an apertured plate provided with locking lugs projecting from opposite sides thereof, said girt provided with suitable openings 13 for the clamp, said parts being arranged for co-operation substantially as and for the purpose specified.

4. The combination with the rake teeth, the guide rods provided with an eye for the passage of said teeth and the cross girt 6 provided with openings 33, of clamps comprising an apertured plate provided with locking lugs projecting from opposite sides thereof, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

IVAR JULIUS BÖRSUM.

Witnesses:

ALFRED J. BRYN,
L. DAAE.