

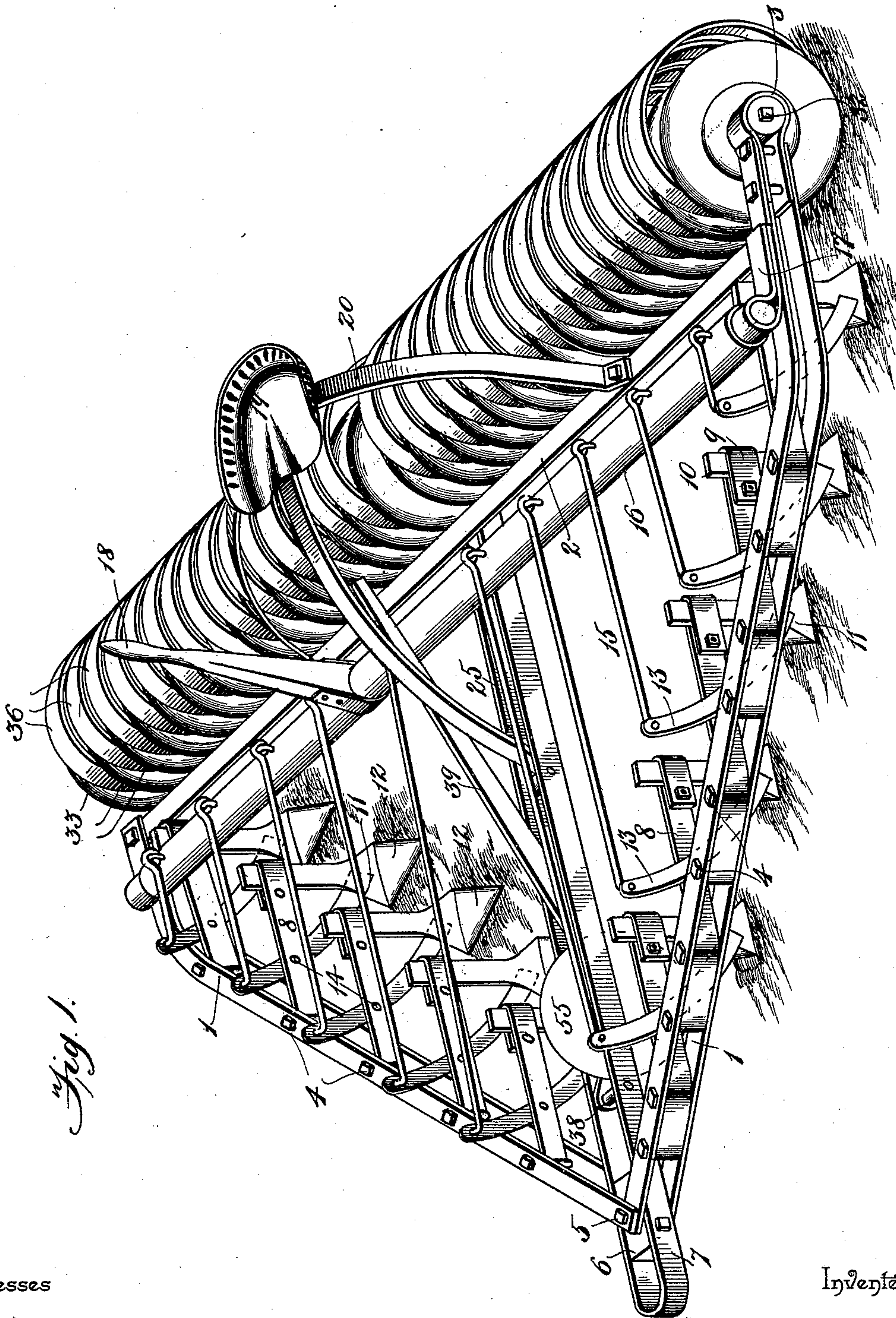
(No Model.)

2 Sheets—Sheet 1.

M. BRUNER.  
PULVERIZER OR HARROW.

No. 509,068.

Patented Nov. 21, 1893.



Witnesses

Inventor

*John C. Shaw.*  
*W. S. Duval.*

By his Attorneys,

*Martin Bruner.*

*Cash & Co.*

THE NATIONAL LITHOGRAPHING COMPANY.  
WASHINGTON, D. C.



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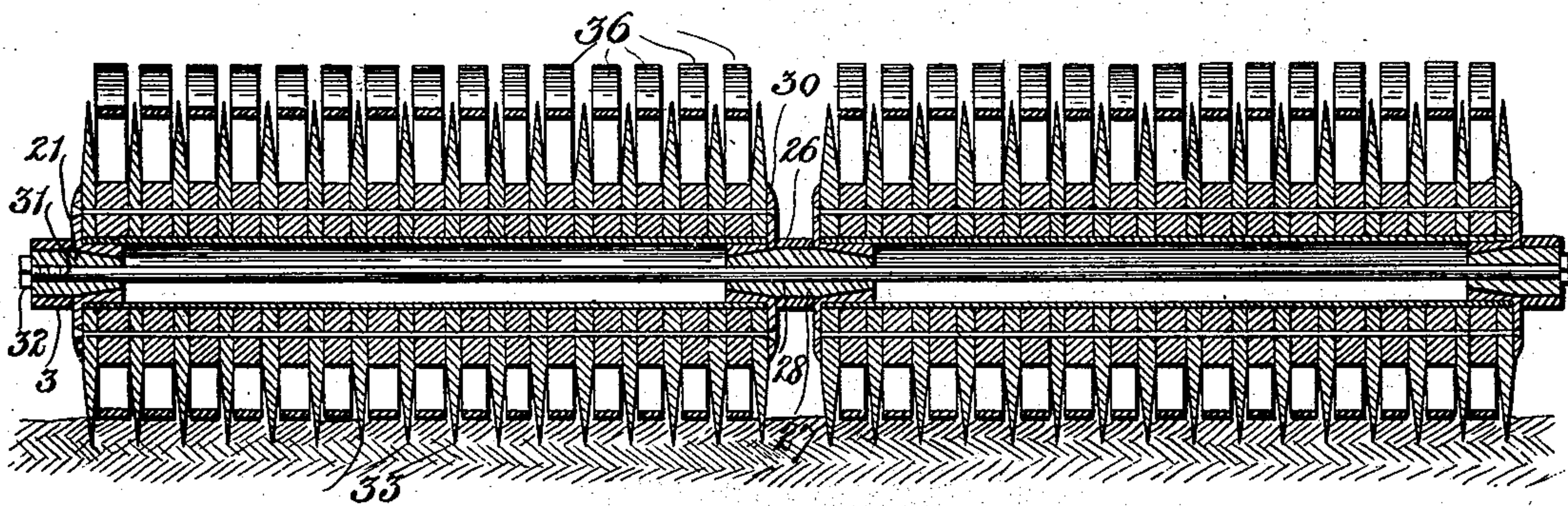


Fig. 2.

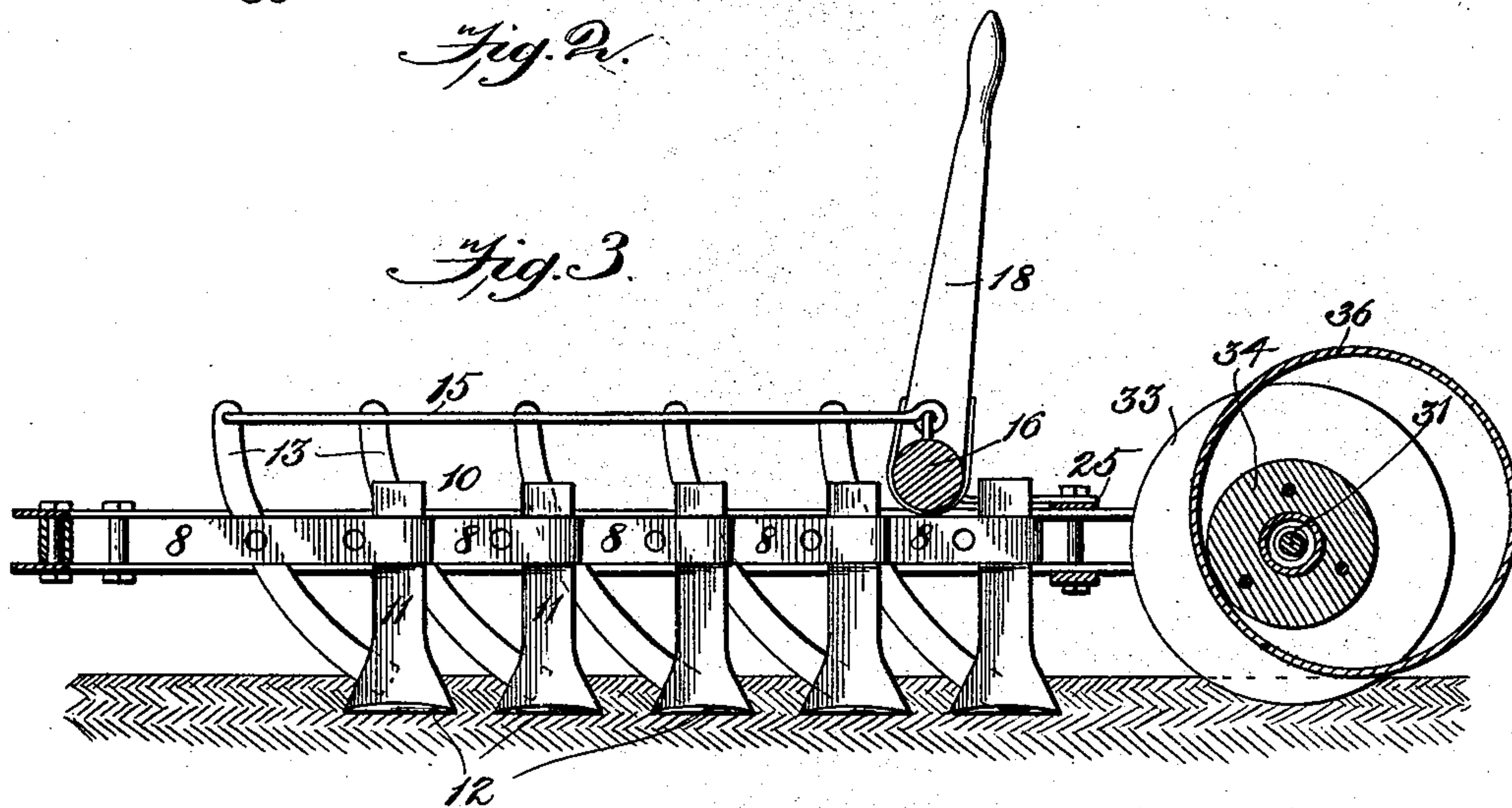


Fig. 3.

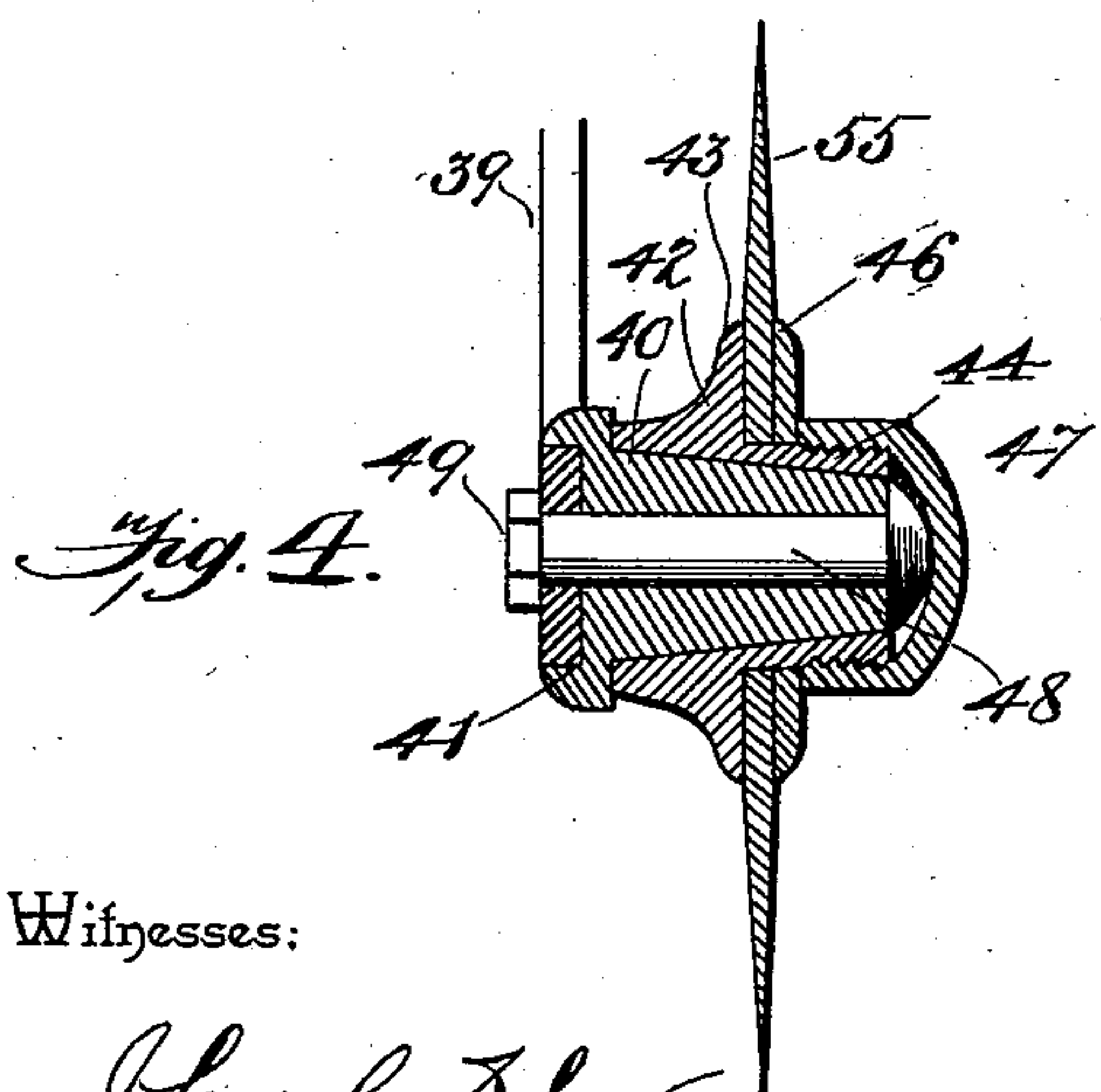


Fig. 4.

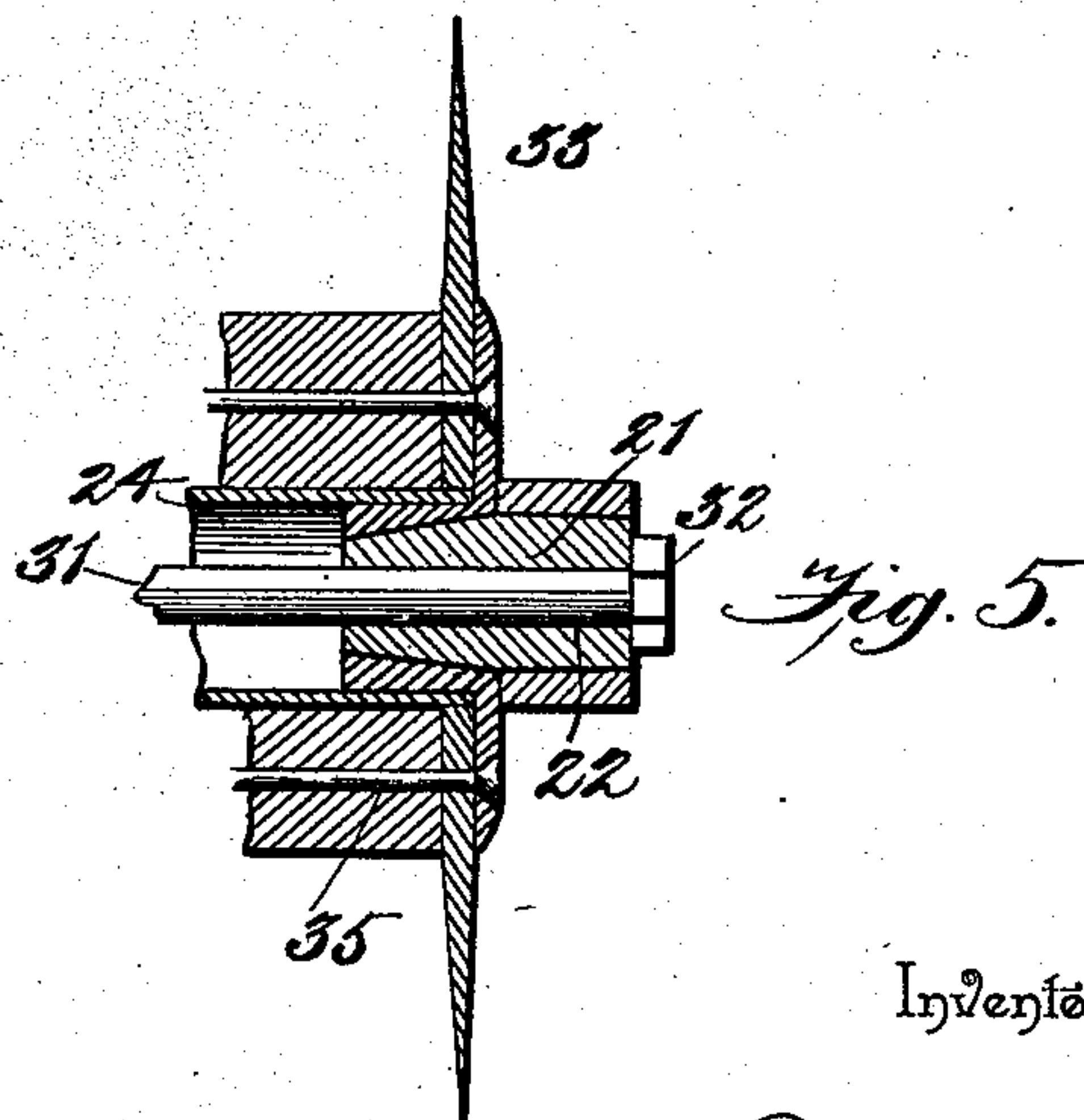


Fig. 5.

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Inventor



# UNITED STATES PATENT OFFICE.

MARTIN BRUNER, OF BUCKLAND, OHIO.

## PULVERIZER OR HARROW.

SPECIFICATION forming part of Letters Patent No. 509,068, dated November 21, 1893.

Application filed March 23, 1893. Serial No. 467,373. (No model.)

*To all whom it may concern:*

Be it known that I, MARTIN BRUNER, a citizen of the United States, residing at Buckland, in the county of Auglaize and State of Ohio, have invented a new and useful Pulverizer or Harrow, of which the following is a specification.

My invention relates to improvements in pulverizers or harrows adapted to be employed for pulverizing the soil after the same has been plowed and previous to the planting.

The objects of my invention are to provide a machine of this class and adapted for this purpose, the same being of cheap and simple construction, strong and durable, and designed to pulverize and destroy the clods of earth without turning the same, whereby I secure a lightness of draft in the machine; furthermore, to obviate the liability of the destruction of the teeth by reason of contacting with hard objects, as stones, that may lie in the path thereof; and finally to provide for an automatic cleaning of the disks from all adhering soil and yet at the same time to obviate increasing the draft of the machine by reason of the presence of such scrapers or cleaning-agents.

With these and various other objects in view the invention consists in certain features of construction hereinafter specified and particularly pointed out in the claims.

Referring to the drawings:—Figure 1 is a perspective view of a machine constructed in accordance with my invention. Fig. 2 is a transverse sectional view through the harrow-disks. Fig. 3 is a vertical longitudinal sectional view through the machine. Fig. 4 is a transverse section through the bearing of the front disk-carrying shaft. Fig. 5 is a similar view of the bearing for the main disk-carrying shaft.

Like numerals of reference indicate like parts in all the figures of the drawings.

In constructing the machine I preferably form the frame of a general triangular-shape, the same consisting of the two converging side-bars or beams 1, and the rear connecting-bar or beam 2. The bars or beams 1 are constructed of metal strap-iron of sufficient gage, each bar or beam being formed in a single piece preferably, and accomplished by a bending of the blank of each upon itself thereby

producing the rear eyes 3. Between the terminals of the beam thus formed spacing-bolts 4 are located, and the front terminals of the beams overlap each other and are bolted as at 5 to a head-block 6 to the sides of which are bolted the terminals of a draft-clevis 7. To every other spacing-bolt of the series there is pivoted the front end of a bell-cranked arm 8, the bending of each arm embracing or occurring opposite the next adjacent spacing-bolt and the rear end of the arm extending to the rear and being disposed directly in the line of draft of the machine. The rear ends of these arms are in the present instance folded upon themselves to form sockets 9, and in the same are located vertical standards whose lower ends are widened and their front edges beveled to form cutting edges 11, below which the said standards are shaped to form triangular horizontally-disposed blades 12. To each of the arms 8 there is pivoted as at 14 a curved colter 13, the upper ends of which are connected by means of rods 15, to a transverse rock-shaft 16, whose ends are journaled in bearings 17, mounted upon the beams 1 in front of their eyes 3. The rock-shaft is operated through the medium of a hand-lever 18, which is located in close relation to a seat 19, for the accommodation of the driver, the seat being supported upon suitable standards 20, secured to the framework. In each of the eyes 3 there is located a cylindrical, and preferably wooden, bearing-block 21, whose inner end is conical, and said bearing-block is provided with a longitudinal bore 22.

The outer ends of a pair of tubular shafts 23, are provided with conical bushings 24, which fit over the inner ends of the bearings and have their outer ends provided with annular securing-flanges having perforations. A central beam 25, likewise formed of strap-iron has its rear end bent to form an eye 26 (see Fig. 2), and the same receives a double-ended conical wooden bearing-block 27, having a central bore 28. Conical bushings 29, fit the inner ends of the shafts and the outer conical ends of the bearing-blocks, and said bushings are provided at their outer ends with perforated flanges 30. Passing through the two tubular shafts and the bearing-blocks 21 and 27 is a tie-rod 31, and the same is provided at its ends with nuts 32 located beyond



the ends of the end-bearings 21. Located upon these shafts 23 is a series of alternately arranged harrow-disks and space-disks, designated at 33, and 34, respectively, and through the entire series securing-rods 35 are passed, the ends of the rods also passing through the flanges at the outer ends of the bosses of the end-bearings. Thus it will be seen that all wear of the bearings may be compensated for by a tightening up of the nuts 32, and also that the bearings are so constructed as to reduce to a minimum the possibility of dust gaining access thereto.

Alternating with and located between the disks 3, loose rings 36 (nearly equaling in diameter said disks 33), are located, the same being formed of spring-metal, and the functions of the same are to clean the sides of the disks from all adhering soil. Their operation will be readily apparent upon an examination of Figs. 1 and 3 of the drawings, and it will be seen that as the disks sink into the ground the rings are pressed upward by the weight of the disks so that the weight of the machine itself causes the rings to rise and consequently scrape the soil from the surfaces of the disks and prevent the picking up of the soil by the disks. While thus adapting the weight of the machine to operate the cleaning devices the draft of the machine is not increased by the presence of the rings, which is the case where the ordinary scrapers are employed which constantly scrape the sides of the disks.

Fulcrumed in the central beam 25, as indicated at 38, is a lever 39, which at its rear end extends within easy grasp of a person sitting upon the seat 19, and this lever is let into a conical wooden bearing-block or stud 40, recessed upon its outer side, as at 41, for the reception of the lever, all as shown in Fig. 5. Mounted upon the conical bearing-portion of the block is an interiorly and conically bored boss 42, which at its middle is provided with an annular flange 43, and at its outer end is screw-threaded as at 44. A harrow-disk 45 is mounted on this end, and a washer 46 slipped over the end against the disk, the same being held in place by means of a cap-nut 47. The bearing-stud 40 is bored, and a bolt 48 passes through the stud and the lever 39, and at the side of the latter is provided with a nut 49. This disk is located in advance of the space formed by the central bearing 26 and the beam 25, so that no portion of the soil remains unharrowed.

In operation the lever 18 is first swung to the rear so as to depress the colter-blades 13 a desired distance, and to a certain extent regulate the depth of penetration of the triangular plows or blades 12, which may be given more or less inclination by means of the adjusting-bolts which hold them in position. When the colter-bars have been lowered and the plows or blades 12 properly adjusted the machine is started and the colter-bars serve to cut the soil in front of the plows, and

the latter passing loosely thereunder loosen it up. At the same time it will be seen that the soil is not turned by the plows, but being loose is simply slipped under the same, and being followed by the harrow-disks, it will be obvious that the soil loosened from underneath, is then slit by the colters and the edges of the plows, and finally the disks finely chop or comminute any clods that may have not become broken by the colters and the plows. By raising and lowering the front disk it will be seen that the plows are elevated from the ground or are lowered to the position that may be desired, so that the machine may be transported when the plows are in such elevated position. The plows it will be seen will naturally remain in the line of draft, but should they at any time come in contact with an obstruction through which they could not pass they will, by reason of their loose pivoting and the inclined edges at the front, be deflected by such object, the said inclined front edges riding against the object after which the plows are returned automatically to the line of draft.

From the foregoing description in connection with the accompanying drawings, it will be seen that I have provided a pulverizer or harrow adapted to most effectually operate upon plowed ground without turning the same and thereby increasing the draft; furthermore, that the disks are all self-cleaning, requiring no attention, and are operated in their capacities by the weight of the machine, and thereby do not increase the draft by their presence.

Various changes in the details of my invention will suggest themselves to those conversant with this class of machines, and I therefore do not limit my invention to those details herein shown, but hold that I may vary the same to any degree and to any extent within the knowledge of persons conversant with the same.

Having described my invention, what I claim is—

1. In a harrow, the combination with a harrow-bar, of arms loosely pivoted to the harrow-bar and having their rear ends bent upon themselves to form sockets, binding-screws passed through the bent portions in front of the sockets, standards arranged in the sockets, and triangular plows arranged at the lower ends of the standards, substantially as specified.

2. In a harrow, the combination with a harrow-bar arranged diagonally to the line of draft, and consisting of upper and lower metal sections, and spacing-bolts connecting the sections, of bell-cranked shape arms pivoted to every other spacing-bolt and bent around the next adjacent bolt, and plow-carrying standards connected to the rear ends of the arms, substantially as specified.

3. The combination with a triangular harrow-frame, a rock-shaft journaled in the rear end thereof, and a hand-lever for operating



the shaft, of a series of arms loosely connected to the converging side-beams of the harrow-frame, plow-carrying standards connected to the rear ends of the arms, curved colter-bars pivoted to the arms and located at the sides of the standards, and connecting-rods between the shaft and the upper ends of the colter-bars, substantially as specified.

4. In a harrow, the combination with a triangular-frame, a rock-shaft and its handle-lever, said shaft being journaled at the rear end of the frame, of a series of arms connected to the converging beams of the frame, standards connected to the arms and provided with plows at their lower ends, curved colter-bars pivoted to the arms and taking at the sides of the standards and having their front convex edges reduced to form cutting edges, and connecting-rods between the rock-shaft and the upper ends of the colter-bars, substantially as specified.

5. In a harrow, the combination with opposite bearing-eyes, conical plugs seated in the eyes, a binding-rod passing through the plugs and having nuts, a hollow shaft mounted on the rod and flared to bear upon the plug, a flange at each end of the shaft, and a series of harrow-disks and space-disks alternately arranged upon the shaft, substantially as specified.

6. In a harrow, the side and central beams formed of strap-metal doubled at their rear ends to form eyes, the double-ended conical bearing-block 27, located in the eye of the central beam, the conical bearing-block 21, located in the eyes of the side-beams, the two tubular shafts 23, located between the end and central bearing-blocks, the internal bored

conical bushings located in the ends of the shafts and provided at their outer ends with annular perforated securing-flanges or disks, of the binding-rod passed through the bearing-blocks, the nuts on the ends of the same, the series of harrow and spacing-disks alternately arranged upon the shafts, and tie-rods passing through the same and the flanges of the bushings, substantially as specified.

7. In a harrow, the combination with a triangular frame, a transverse shaft in rear of the same, a series of disks carried by the shaft, and a rock-shaft in front of the disks, of a lever for operating the rock-shaft, a series of arms pivoted to the converging side-beams of the frame, plow-carrying standards secured to the rear ends of the arms, colter-bars pivoted upon the arms at the sides of the standards, and connecting-rods between the upper ends of the colter-bars and the rock-shaft, substantially as specified.

8. In a harrow, the combination with the triangular frame having the opposite end and central bearings, the two shafts journaled in the bearings, the harrow and spacing-disks alternately located upon the shafts and secured together, of the series of plows arranged in front of the disks and connected to the side-beams of the frame, the curved lever pivoted to the central beam, and the disk carried thereby, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

MARTIN BRUNER.

Witnesses:

GEORGE DELASHMUTT,  
D. C. BRORIEN.