

No. 688,239.

Patented Dec. 3, 1901.

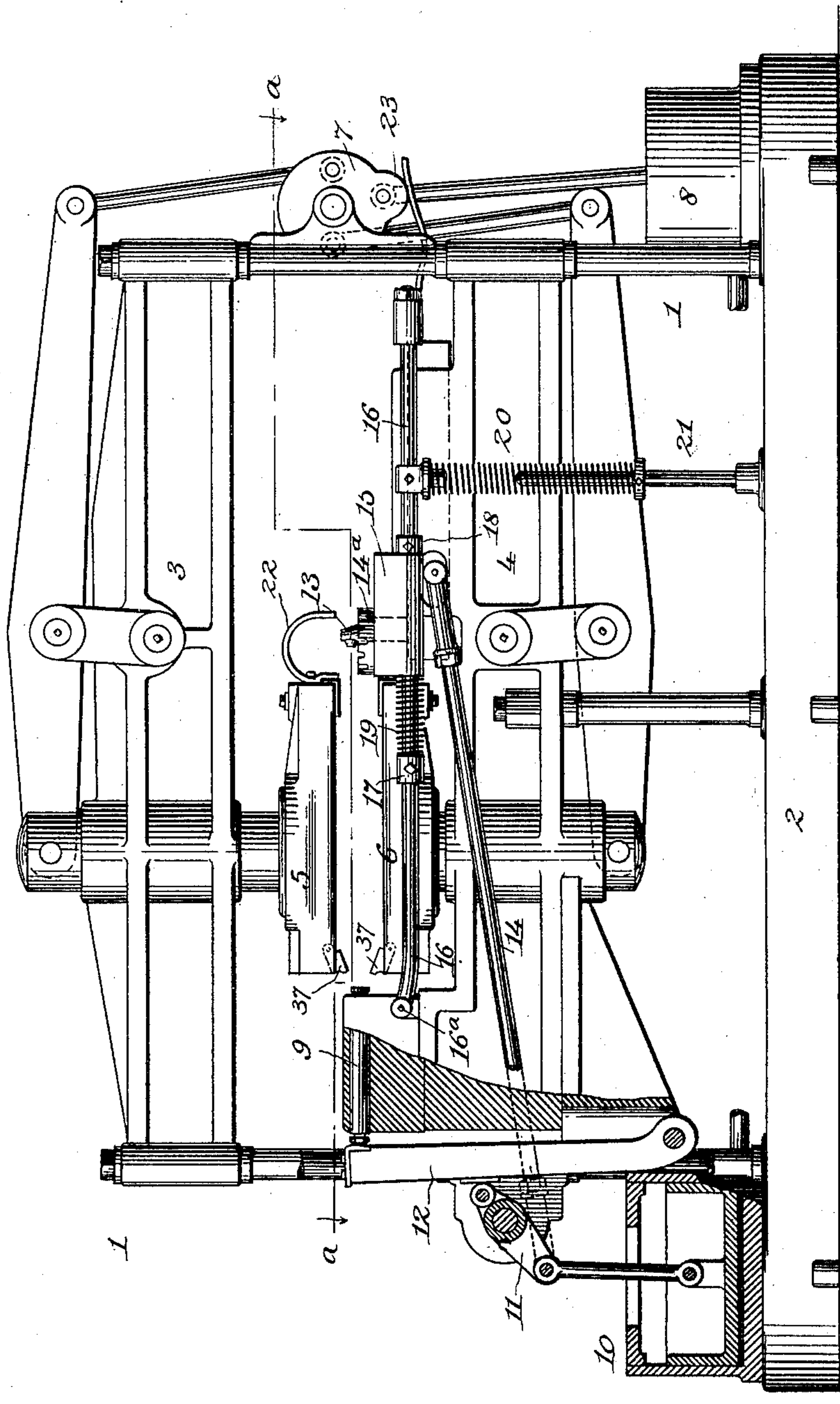
E. EINFELDT.
MACHINE FOR MAKING METAL WHEELS.

(Application filed Sept 23, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



Witnesses
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Fig. 2.

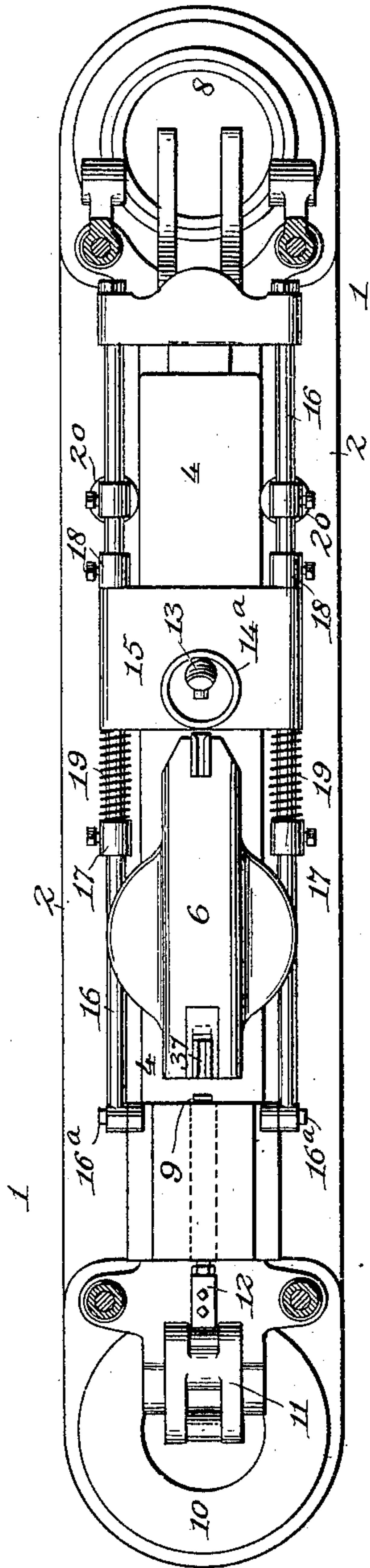


Fig. 4.

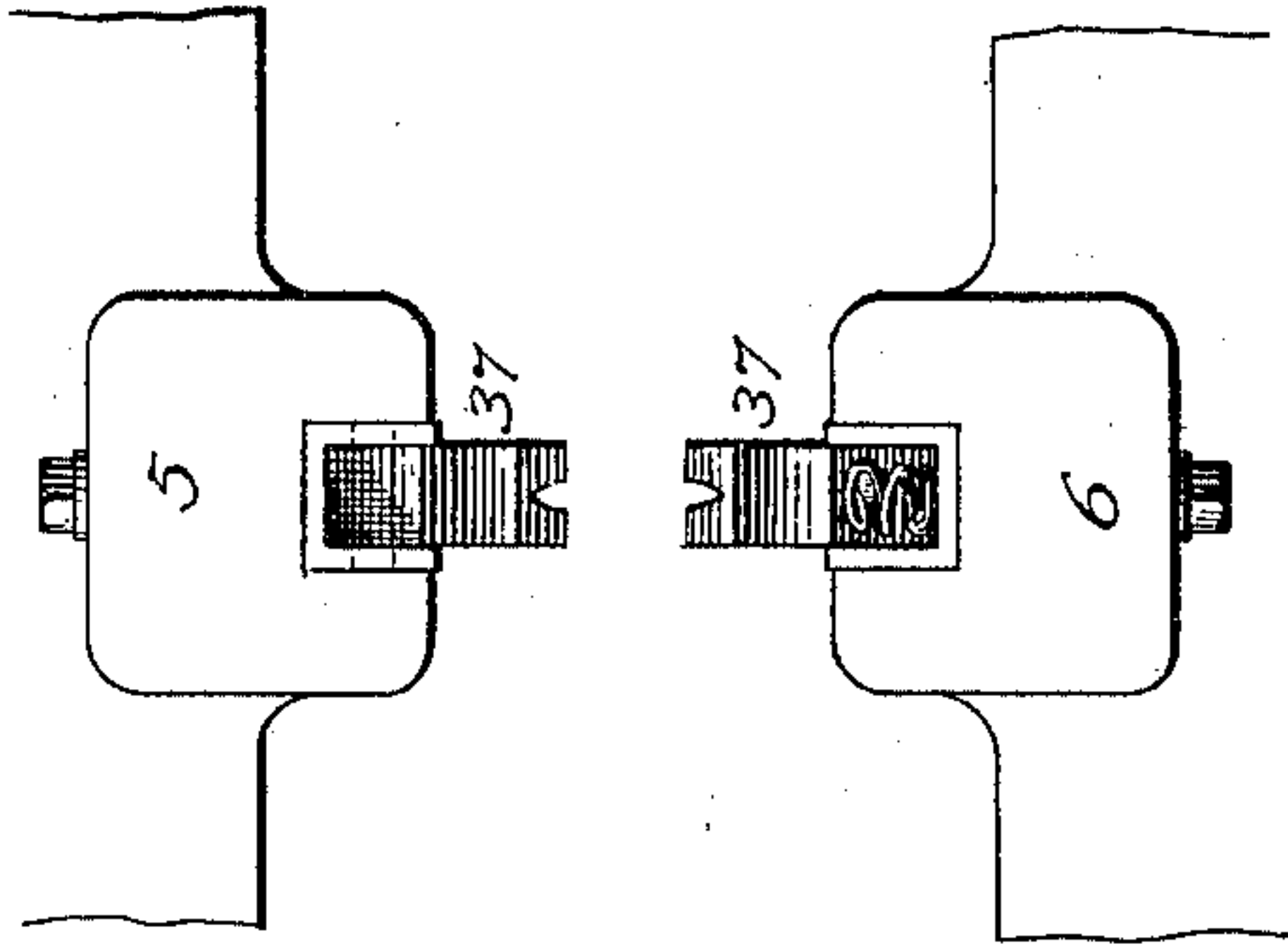


Fig. 6.

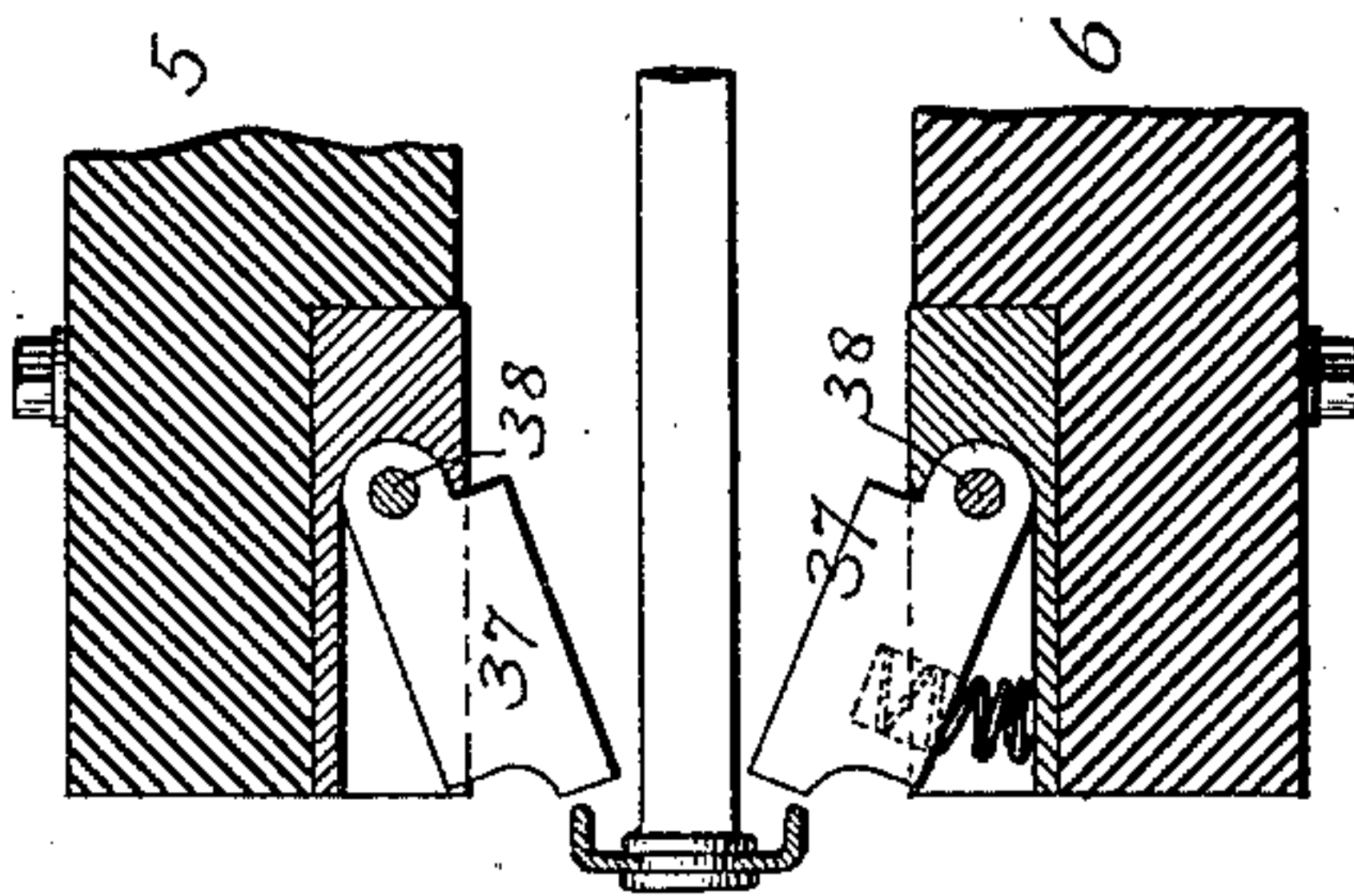
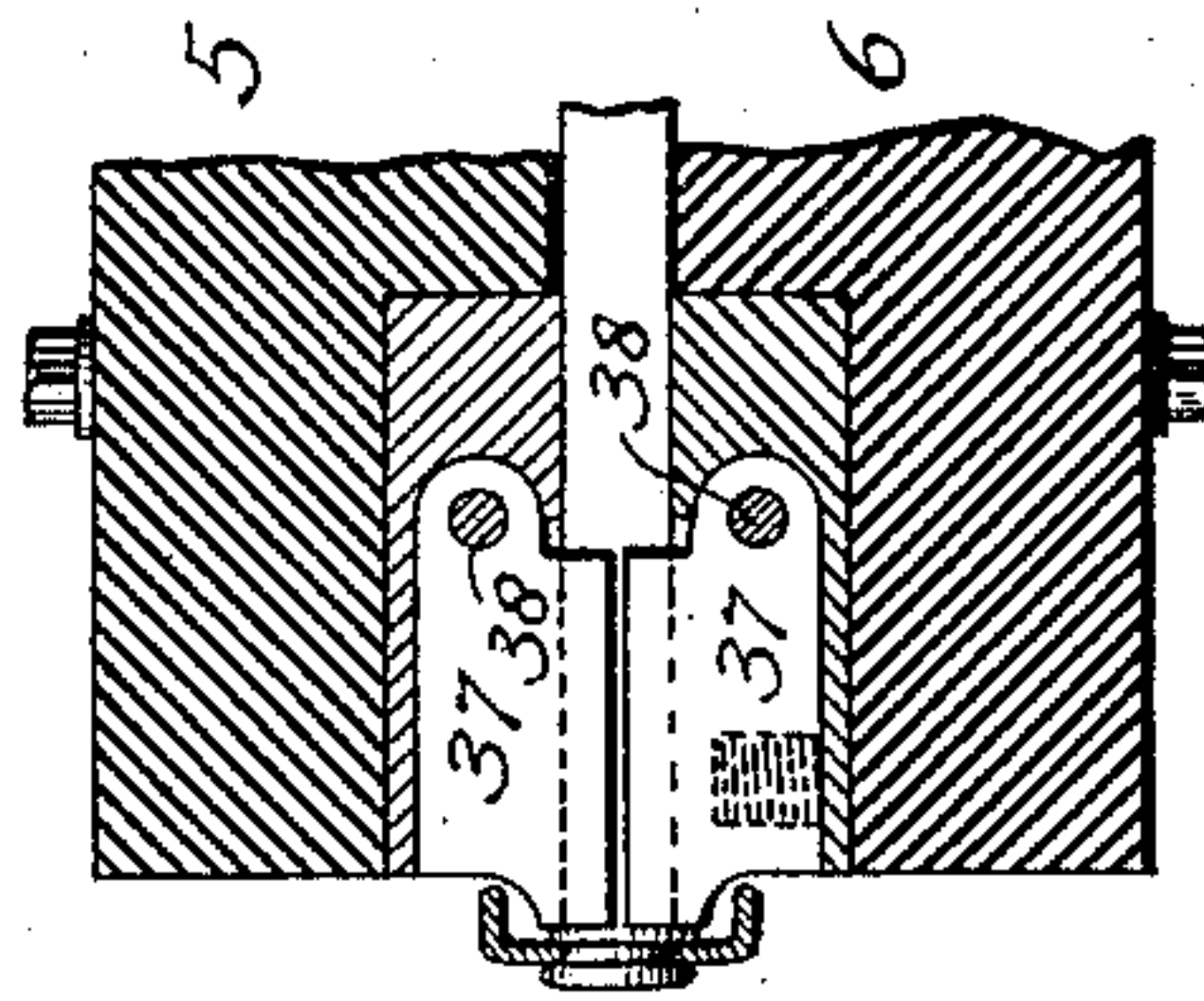


Fig. 5.



WITNESSES

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Fig. 4.

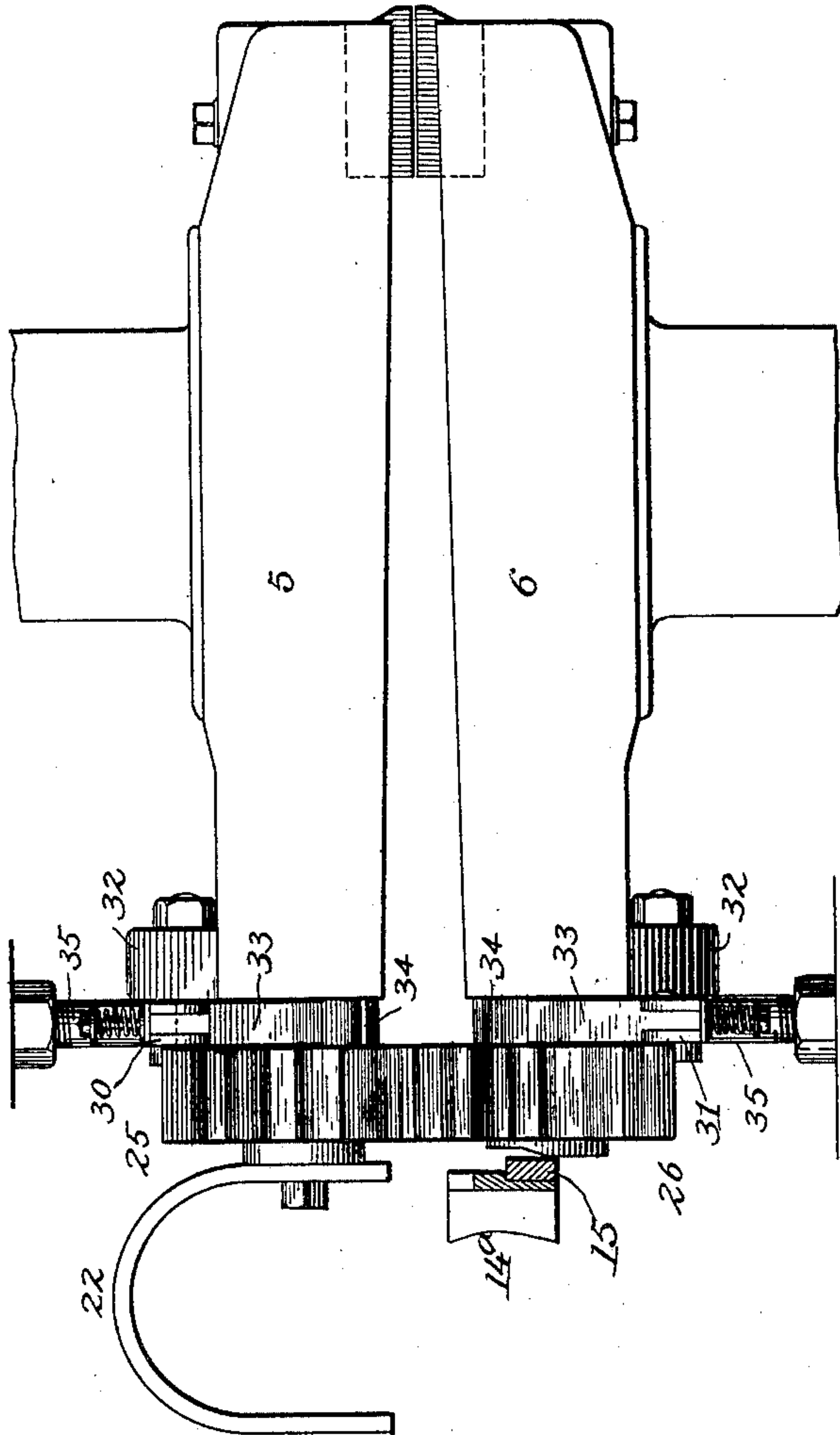
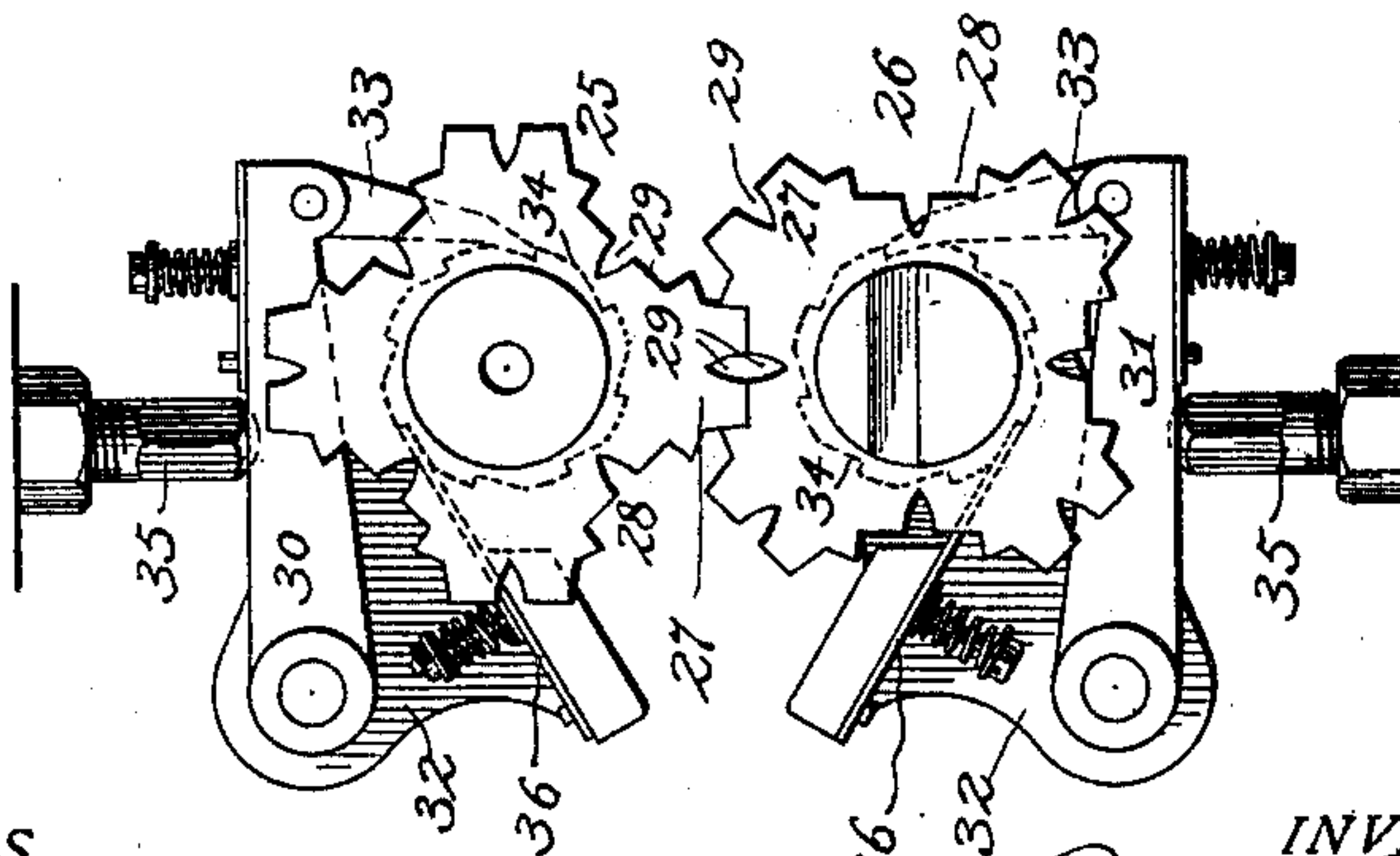


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

EMIL EINFELDT, OF DAVENPORT, IOWA, ASSIGNOR TO BETTENDORF METAL WHEEL COMPANY, A CORPORATION OF ILLINOIS.

MACHINE FOR MAKING METAL WHEELS.

SPECIFICATION forming part of Letters Patent No. 688,239, dated December 3, 1901.

Application filed September 23, 1901. Serial No. 76,216. (No model.)

To all whom it may concern:

Be it known that I, EMIL EINFELDT, of Davenport, county of Scott, and State of Iowa, have invented a new and useful Improvement
5 in Machines for Making Metal Wheels, of which the following is a specification.

This invention has reference to machines for securing spokes to the hub and rim of metal wheels; and the invention embodies various improvements, particularly in the type
10 of machine represented in Letters Patent of the United States No. 646,269, issued to me on the 27th day of March, 1900. The machine of this patent embodies clamping-jaws
15 movable to and from each other to firmly clasp the spoke near its opposite ends between them, a hub-holding device adapted to sustain the hub firmly in position, a heading-tool adapted to act on the end of the
20 spoke within the hub to form a head thereon, and a second heading-tool adapted to act on the opposite end of the spoke at the outer side of the rim to form a head on its outer end. This mechanism operated to fasten the
25 spokes in the hub at intervals in a single line extending around the hub, the spokes lying in a single plane at right angles to the longitudinal axis of the hub and connected at their outer ends with the rim at or near a central
30 line thereon. Wheels of this character are distinguished in the art from what are known as "staggered-spoke" wheels in the respect that the spokes of the latter radiate in two series or lines from the hub and join the rim
35 at or near the center.

The improvements forming the subject of the present invention are directed mainly to the adaptation of the machine for securing the spokes in the hub in two lines or series,
40 which is effected in one instance by so sustaining the hub that it may be moved with relation to the clamped spoke to present either hole of the two series in the proper relation to the spoke. In another instance the same
45 result is effected by sustaining the hub in a fixed position and presenting the spokes to the same that they may be secured in either of the two positions.

The invention consists also in providing
50 the clamping-jaws with clamping-surfaces of such form and construction that they will act within channeled rims.

The invention consists also in the details of construction and combination of parts hereinafter described and claimed. 55

In the accompanying drawings I have represented only such portions of the machine of the patent as will be necessary to an understanding of my invention, and reference may be had to this patent for a more detailed
60 description of the mechanism than is here given.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a wheel-making machine having my invention applied thereto. Fig. 2 is a horizontal longitudinal sectional plan view on the line *a a*. Fig. 3 is an end elevation of a modification of the invention represented in the preceding figures. Fig. 4 is a side elevation of the
65 same. Fig. 5 is an elevation of one end of the clamping-jaws, showing the same closed on the spoke and holding the spoke in the proper relation to a channeled rim. Fig. 6 is a side elevation of the jaws open, showing
70 how the clamping-ribs are withdrawn from within the channeled rim. Fig. 7 is an end view of the jaws opened.

Referring to Figs. 1 and 2, 1 represents a frame comprising a base-plate 2, an upper
80 cross-beam 3, and an intermediate bed-plate 4. 5 and 6 represent upper and lower clamping-jaws, respectively, movable to and from each other and adapted to clamp a spoke between them at a predetermined point and
85 operated in the present instance from an oscillating disk 7, operatively connected with the jaws and actuated by a pressure-cylinder 8. 9 represents a heading-tool mounted on the bed-plate and adapted to act on the outer
90 end of the spoke held between the jaws to upset the same and form a head at the outer side of the rim. This heading-tool is operated from a cylinder 10 through a rocking head 11, acting on a vibrating arm 12, which
95 in turn acts on the heading-tool. 13 represents a second heading-tool adapted to act on the spoke within the hub and form a head thereon. This tool is operated simultaneously with the operation of the other header
100 by means of a rod 14, operatively connected with the heading-tool and with the rocking head 11. All of these parts described may be of the form and construction represented

in the patent referred to and in themselves they form no part of the present invention. In applying my invention to this machine I provide a hub holder or support 14^a at the ends of the clamping-jaws opposite the tool 9, and I so sustain this hub-support that it is movable vertically, to the end that the hub held therein may occupy different relations to the point at which the jaws close on and hold the spokes, so that the latter may be secured in the hub in two lines or series. This hub-holder is in the form of a ring provided in its upper edge with notches to receive the bosses on the hub in which the spoke-holes are formed, and the ring is seated loosely in a socket in the plate 15, so that it may be turned therein to bring the bosses into position to receive the spokes. The plate 15 is mounted to slide horizontally to a limited extent on horizontal parallel bars 16, extending along the opposite sides of the clamping-jaws and pivoted at one end to the frame of machine on a horizontal transverse axis 16^a, the construction being such that the plate with the notched ring therein may rise and fall on the axes of these bars as a center. The horizontal motion of the plate on the bars is limited by stops 17 and 18, fixed to the bars at the opposite ends of the plate, spiral springs 19 being interposed between the plate and the stops and tending to hold the former evenly against the other stop. The purpose of this construction is to permit the hub to be moved slightly toward the spoke when the inner end of the spoke is upset, this upsetting action forcing the head against the hub and advancing the same slightly. Beyond the plate 15 the parallel bars are acted on from beneath by vertical spiral springs 20, which tend to urge the bars upward, but which permit them to be depressed. These springs encircle vertical rods 21, fixed at their lower ends to the base of the frame and terminating at their upper ends a short distance from the bars, the springs bearing at their lower ends against washers on the rods and at their upper ends against the under side of the bars.

The hub when in position in the notched supporting-ring is held firmly when the jaws close on the spoke by means of an inverted-U-shaped frame 22, fixed to the end of the upper jaw and formed in its ends with notches adapted to embrace the diametrically opposite bosses on the hub and hold the latter firmly in the supporting-ring. This frame will, as the hub is turned to bring a new boss into position, alternately engage the upper and lower bosses and will alternately depress the hub and permit the same to rise to the proper position with respect to the clamped spoke. In the operation of the mechanism described a hub having two series of spoke-bosses alternating with each other is seated in the notched ring with the lower bosses entering the notches, and a spoke previously shouldered near its ends is set in place be-

tween the clamping-jaws and its end inserted in one of the lower bosses. The jaws are now actuated and closing on the spoke they will clamp and hold the same at a predetermined point, the hub at the same time rising slightly under the influence of the vertical springs 20 until the boss in which the spoke extends is in line horizontally with the spoke, this relative position of the hub being determined by the engagement of the U-shaped clamping-frame with diametrically opposite bosses of the lower series. The heading-tool is now operated, and it acts to upset the end of the spoke within the hub, forcing the upset head tightly against the hub and causing the same to advance slightly, which action compresses the horizontal springs 19, bearing against the end of the plate. The clamping-jaws are now opened and the ring in which the hub is seated is turned to bring the next boss (an upper one) in position to receive its spoke. The spoke is then set between the jaws, as before, and its end inserted in the upper boss, after which the jaws are closed and engage and hold the spoke in the same position, the clamping-frame on the upper jaw this time engaging the diametrically opposite upper bosses and forcing the hub in its holder downward against the action of the vertical springs until the boss is at the proper point with relation to the clamped spoke. The heading-tool is now operated again to fasten the spoke in the hub, after which the jaws are again opened and the hub shifted in position to bring the next boss into position and these operations repeated until all the spokes have been secured in two alternate series, the hub alternately rising and falling as the lower and upper spokes are fastened in place. The depression of the hub and its holder against the influence of the vertical springs is assisted by the engagement of the clamped spoke in the hub, the relation of the parts being such that when the spoke carried by the jaws finally arrives at its predetermined clamped position the clamping-frame on the upper jaw will be in firm engagement with the hub-bosses and will hold the hub firmly in place. Hence the engaging spoke and the clamping-frame cooperate to present the hub to its proper position. In its rising movement to present the lower boss in position the springs act to urge the hub upward, and it is arrested at the proper position by the U-shaped frame coming in contact with the lower bosses.

The mechanism for actuating the jaws to close on the spokes is so arranged with relation to the hub-holding mechanism that when the jaws are opened the hub will be positively and automatically depressed and held down to a uniform position at or about the level of the lower jaw, so that the hub may be shifted and the spokes inserted without interference with the upper jaw. This is effected by extending the two bars 16 to opposite sides of the oscillating disk 7, at which point the bars are bent upward and bear against projecting

surfaces 23 on the sides of the disk, the arrangement being such that as the surfaces move downward when the disk is oscillated to open the jaws they will depress the bars, lower the hub-holder, and hold it there. When, on the other hand, the engaging surfaces move upward when the disk is operated in the opposite direction to close the jaws, the bars are freed and permitted to rise under the influence of the springs 20.

Referring to Figs. 3 and 4, I have shown a modified form of apparatus for accomplishing the results just described, and instead of clamping the spoke and holding it at a predetermined point and moving the hub so that either the upper or lower spoke-boss will be in line with the clamped spoke I reverse these operations and sustain the hub at a fixed predetermined point and provide for clamping and holding the spokes in different positions vertically to correspond with the different vertical positions of the hub-bosses. In these figures it is seen that the hub-holder, as before, is in the form of a notched ring; but instead of being movable vertically it is supported rigidly on the central bed-plate of the frame. It is further seen that the clamping-jaws are provided with cooperating rotary dies 25 and 26, which may be adjusted in position to present the spokes in different positions with relation to the fixed hub. The dies are in the form of disks, journaled, respectively, on the ends of the two jaws on horizontal longitudinal axes one above the other and formed in their edges with alternate projections 27 and depressions 28, which when the dies are brought together on the closure of the jaws are adapted to interlock with each other, as shown in Fig. 3. Each depression and projection is formed with notches 29, which when in juxtaposition form an opening of the cross-sectional shape of the spoke and in which the spoke is held. As a result of this construction it is observed that by the rotation of the dies the clamping-openings formed when they are interlocked on the closure of the jaws will be alternately on opposite sides of a line midway between the axes of the dies, the result being that the spokes will be presented to the hub alternately above and below its center to correspond with the two series of bosses. The dies are moved step by step on their axes automatically when the jaws are opened to release the spokes by means of vibrating levers 30 and 31, one for each die, and as these levers and their operating mechanisms are identical a description of one will suffice. The vibrating lever is pivoted at its outer end on the end of a bracket 32, projecting laterally from the jaw in rear of its die, and the lever extends from this point in rear of the die and beyond the axis of the same, where it is provided with a pivoted driving-dog 33, which engages ratchet-teeth 34 on the rear of the die, the arrangement being such that as the lever is rocked on its axis the dog, engaging the ratchet-teeth, will turn the die on

its journal. These two levers are adapted when the jaws are opened to engage each a fixed projection 35 on the frame of the machine, so that when the jaws open the levers will be rocked and will rotate the dies one step and bring the next clamping-surfaces in their proper relations to cooperate on the spoke when the jaws are closed. In order to prevent the dies from turning backward and in order to hold them in position after being turned, I provide brake-springs 36, fixed at one end to the brackets and bearing at their opposite ends against the ratchet-teeth, as shown in Fig. 3. In the operation of this mechanism the hub with two series of bosses is set in the notched ring and a spoke is inserted in one of the lower bosses. The dies are in the position shown in Fig. 3, with the cooperating clamping-notches in such position that when they come together the spoke will be clamped and held in its lowest position in line with the lower boss. The jaws are now closed by their operating mechanism and the spoke firmly clamped between the dies opposite the lower boss, after which the heading-tool is operated, and acting on the spoke within the hub forms a head and secures it in position. The jaws are now opened, and as they separate the vibrating levers encounter the fixed projections on the frame and they advance the dies one step, bringing the next pair of clamp-notches in the proper positions to act on the spoke when the jaws are closed. The hub with the secured spoke is now shifted in its holder and the next boss (an upper one) presented to receive its spoke. The spoke is then inserted in the upper boss and the jaws closed, causing the cooperating notches to clamp the spoke and hold the same in a higher position than before in line with the upper boss, after which the heading-tool is again operated and the spoke is secured in place. The jaws are now again separated and the dies automatically turned, the hub again shifted in its holder, and another spoke inserted in the same, which operations are repeated as before, the spokes being clamped and held alternately opposite the upper and lower bosses.

While in the drawings I have shown the machine formed to fasten the spokes to the rim, this feature is not essential to the operation of the mechanism just described, for it is obvious that the rim could be fastened to the spokes in a separate machine by other means.

In my patent referred to the adjacent faces at the ends of the clamping-jaws where they engage the spoke at the inner side of the rim are provided with fixed grooved ribs, which when brought together form an opening in which the spoke is clamped, and in this patent the machine operated on a flat rim, the ends of the fixed grooved ribs extending closely up against the rim to give it firm support at this point. In my present invention, as shown in Figs. 5, 6, and 7, I provide for

operating on channeled rims and I substitute for the fixed clamping-ribs, which by reason of the flanges on the edges of the rim could not enter the channel, pivoted ribs 37, so formed and arranged that they will project into the channel of the rim between its flanges and will clamp the spoke close up against the rim. These ribs may be of the same form as those of the patent, but instead of being fixed they are each pivoted to its jaw on a horizontal transverse axis 38 in such manner that they may swing inwardly when the jaws are opened to the position shown in Fig. 6, in which position they will not interfere with the edges of the flanges when the jaws are closed on the spoke, but as they engage the spoke they will be rocked on their axes and swing outwardly, their ends extending well into the channel in the rim close up against the same, as shown in Fig. 5. On the separation of the jaws the ribs will again swing inwardly, so that the jaws may be separated to the full extent without interference of the ribs with the flanges on the rim.

Having thus described my invention, what I claim is—

1. In a machine for securing spokes in hubs, means for presenting the spoke and hub in different relations in the line of the axis of the hub.

2. In combination with a spoke-clamping device, a hub-holder and means for moving one with relation to the other to present the spoke and hub in different relative positions in the line of the axis of the hub; whereby the spokes may be secured to the hub in two lines or series.

3. In combination with means for holding the spoke at a predetermined point, means for presenting the hub in different relations to the spoke in the line of the axis of the hub.

4. In combination with clamping-jaws adapted to hold the spoke at a predetermined unchanging point, a hub-holding device movable relatively to the jaws in the line of the axis of the hub.

5. In combination with the clamping-jaws adapted to clamp and hold the spoke, a hub-holding device movable with relation to the clamped spoke in the direction of the axis of the hub.

6. In combination with clamping-jaws movable to and from each other, a hub-holder yieldable in the direction of the motion of the jaws.

7. In combination with clamping-jaws

adapted to act on the spoke, a hub-holder movable with relation to the jaws in the line of the axis of the hub, and a spring acting on the hub-holder.

8. In combination with clamping-jaws movable relatively to clamp the spoke, a hub-holder yieldable with relation to the spoke in the line of the axis of the hub, and a hub-clamping device carried by one of the jaws and adapted to engage the hub.

9. In combination with clamping-jaws movable to and from each other, horizontal bars extending at the side of the jaws and pivoted at one end to the frame, a hub-holder sustained by the bars, and a spring acting on the bars and tending to urge them upward.

10. In combination with clamping-jaws movable to and from each other, mechanism for operating the same, a vertically-movable hub-holder, and means for lowering the same when the jaws are opened.

11. In combination with clamping-jaws movable vertically to and from each other, operating mechanism for the same, a hub-holder movable vertically, and means controlled by the jaw-operating mechanism for depressing the hub-holder when the jaws are opened.

12. In a machine for making metal wheels, spoke-clamping surfaces movable to and from the spoke and longitudinally of the same; whereby the clamping-surfaces are adapted to extend within channeled rims.

13. In combination with movable jaws, clamping-surfaces at the ends of the same movable longitudinally with relation to the jaws; whereby the clamping-surfaces are adapted to extend in channeled rims and act on the spoke therein.

14. In combination with two jaws movable to and from each other, grooved clamping-ribs pivoted at their inner ends to the jaws on transverse axes and extending beyond the ends of the jaws when the latter are closed on the spoke so as to project in channeled rims, and adapted to swing inwardly when the jaws are opened, so as to free the flanges on the rim.

In testimony whereof I hereunto set my hand, this 17th day of June, 1901, in the presence of two attesting witnesses.

EMIL EINFELDT.

Witnesses:

NATH FRENCH,
MAY L. DODGE.