

No. 704,178.

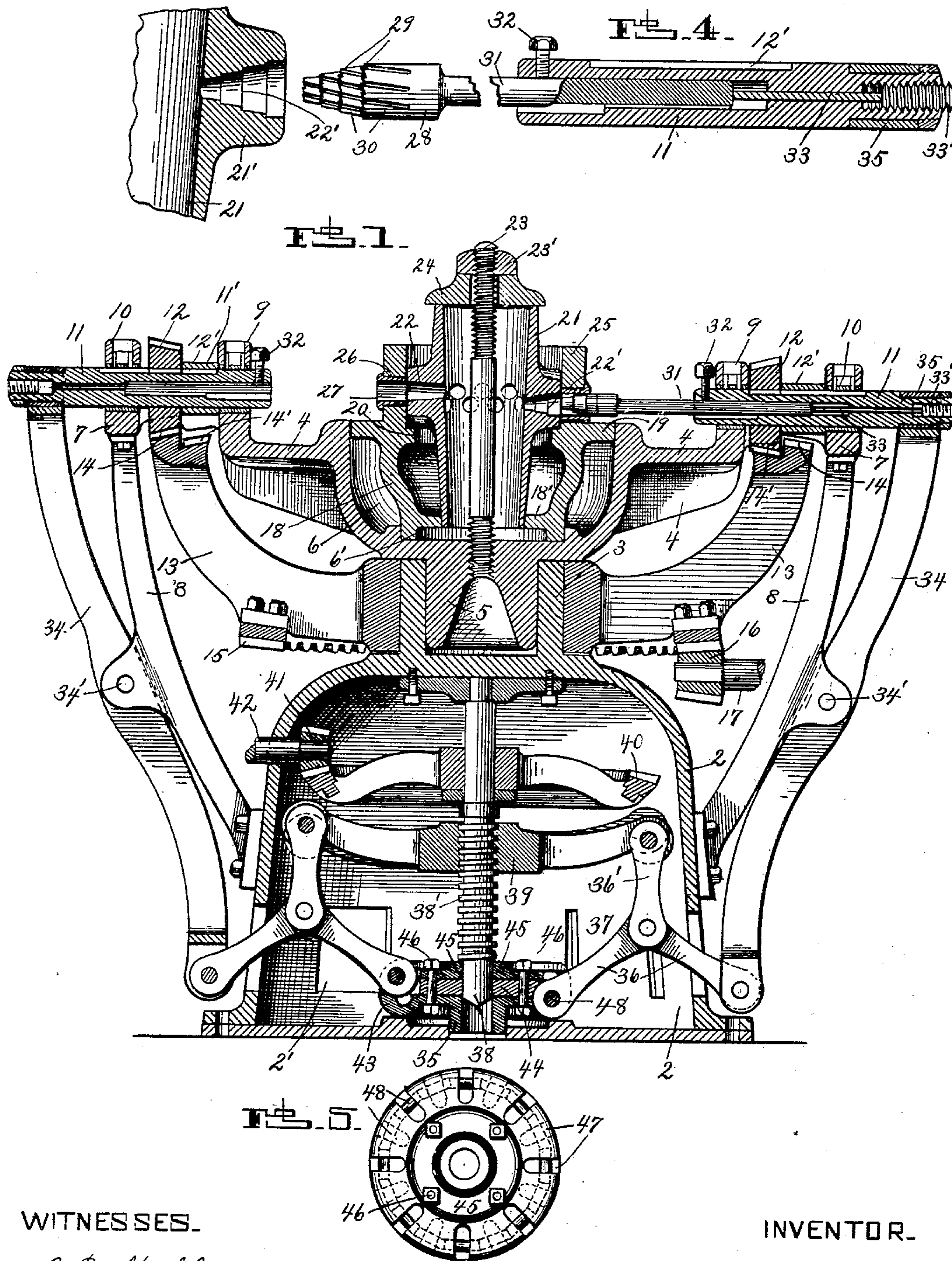
Patented July 8, 1902.

G. H. EVERSON.
METALLIC HUB DRILLING MACHINE.

(Application filed May 20, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES.

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INVENTOR.

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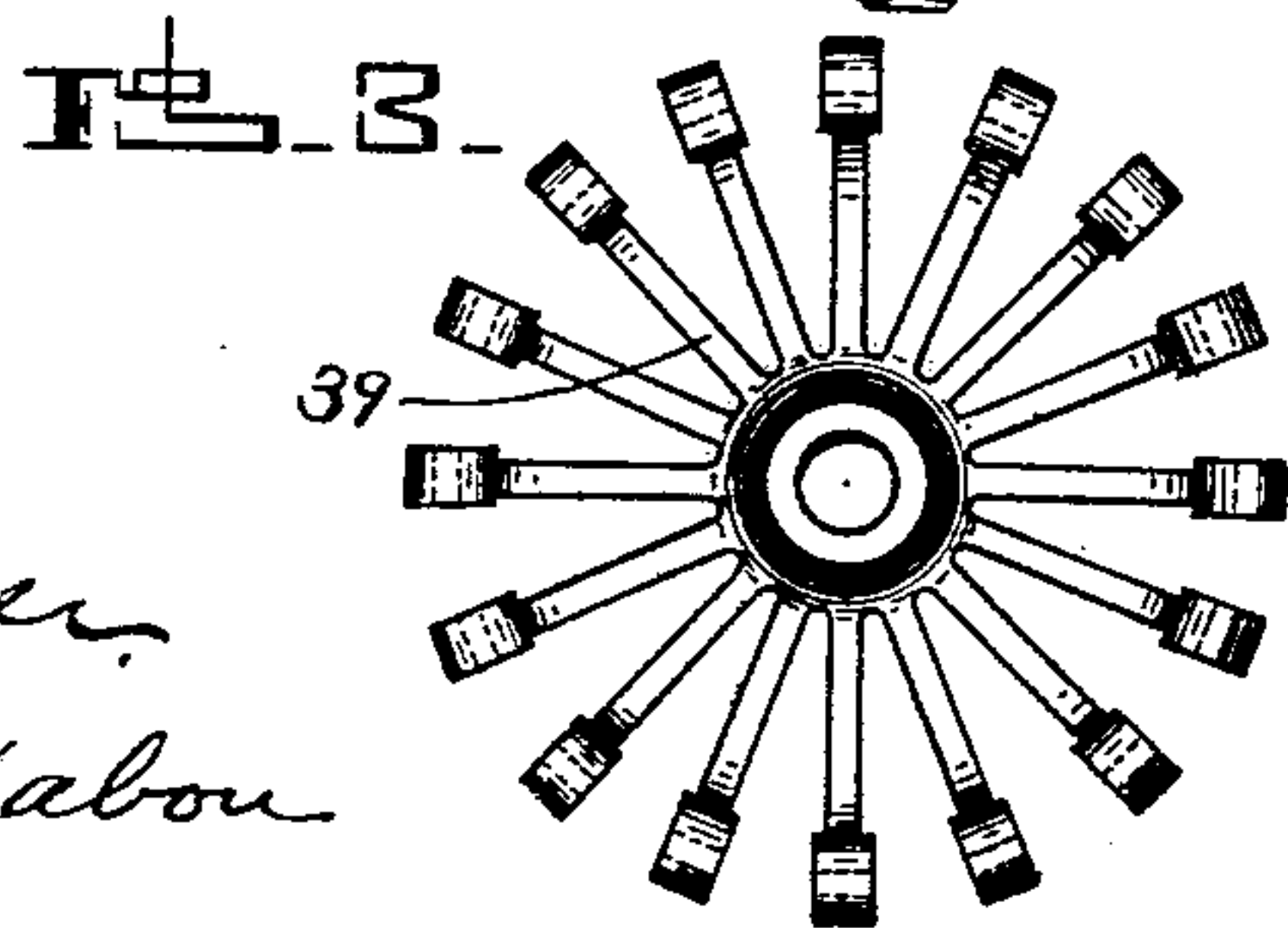
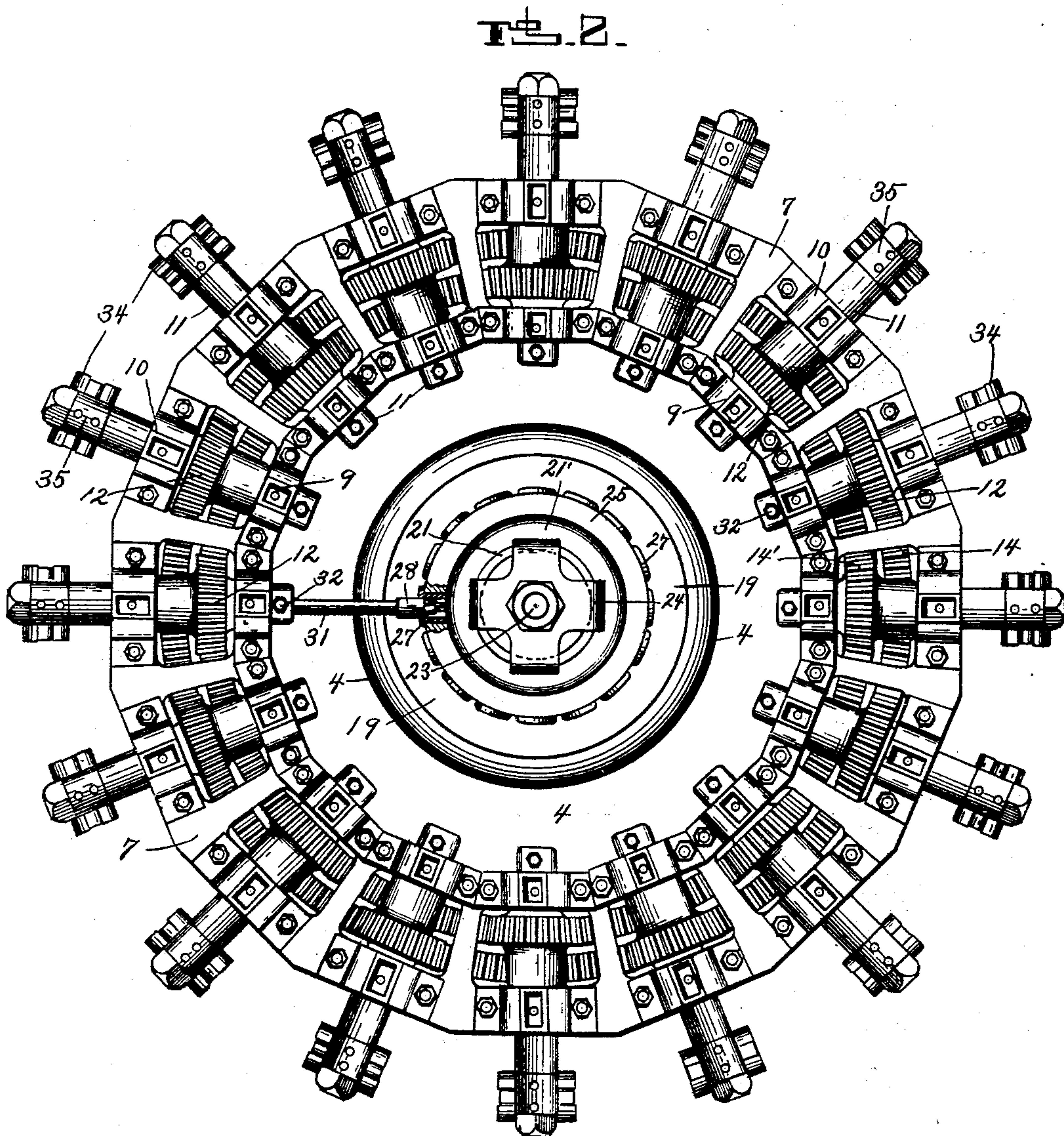
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UNITED STATES PATENT OFFICE.

GEORGE H. EVERSON, OF PITTSBURG, PENNSYLVANIA.

METALLIC-HUB-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 704,178, dated July 8, 1902.

Application filed May 20, 1901. Serial No. 61,168. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. EVERSON, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Metallic-Hub-Drilling Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to machines for drilling and reaming metallic hubs for vehicle-wheels; and the primary object thereof is to provide a machine which will form all of the spoke-receiving holes simultaneously and of absolutely-uniform dimensions, so that all hubs of a given kind and size will be alike and capable of use interchangeably.

20 The invention embodies mechanism for rotating all of the drill-spindles simultaneously and at a common speed and also means for feeding or advancing the spindles uniformly.

The invention also includes means for adapting the machine to hubs of various sizes.

25 The invention consists in these and other features of construction and in the combination and arrangement of parts hereinafter fully described and claimed, and illustrated by the accompanying drawings, wherein—

30 Figure 1 is a vertical sectional view of my improved machine. Fig. 2 is a plan view. Figs. 3, 4, and 5 are detail views.

Referring to the drawings, 2 represents a dome-shaped bed-plate having at the top the annular bearing 3. Resting on this bearing is frame 4, having the central depending portion 5 fitting within the bearing, as shown. Frame 4 is formed with a central bowl-shaped depression 6 and the annular horizontally-projecting rim portion 7, the latter being sustained by posts or standards 8, rising from bed-plate 2. On the upper side of frame 4 are the two series of radially-arranged bearings 9 and 10, and rotatably mounted in aligning bearings and movable longitudinally therein are spindles 11. Mounted on each spindle between bearings 9 and 10 is a beveled pinion 12, having an elongated spline connection 12' therewith, whereby the spindle may be adjusted longitudinally through the pinion while the latter rotates therewith. Spacing sleeves or collars 11' hold pinions 12

in proper position on the spindles between bearings 9 and 10.

Rotatable on bearing 3 is the large wheel 13, having its upturned periphery formed with the two miter gear-surfaces 14 and 14', with which pinions 12 mesh. Gear 14' is in a slightly-lower plane than gear 14, and the spindles 11, carrying pinions 10, which mesh therewith, are in a lower plane than the remaining spindles. By this means the spoke-holes are formed in two different planes for the purpose of staggering the spokes. Secured to the bottom of wheel 13 is gear 15, and meshing therein is pinion 16 of power-shaft 17. By this means the spindles in two distinct planes are actuated simultaneously and at a common speed.

18 is a circular hub-holding device which is removably positioned in depression 6 of frame 4. The lower end of the holder fits within the annular flange 6' at the bottom of depression 6, and on the outer side of the holder is annular flange 19, which fits closely within the upper portion of depression 6 and accurately centers the holder. The holder is hollow, and formed in the inner wall thereof is shoulder 20, and adapted to rest on this shoulder is the exterior flange or enlargement 21' of hub 21. The lower portion of holder 18 being open and formed with annular inwardly-extending flange 18', the hub depends therein and is held centered by said flange. By means of this construction hubs of different lengths may be operated on in the same holder. After the hub is positioned within the holder a securing-bolt 23 is passed downward therethrough and threaded into a corresponding aperture in the bottom of depression 6. The upper portion of the bolt extends through head 24, which bears on the uppermost end of the hub and is clamped thereto by nut 23'. The upper portion 25 of holder 18 is formed with a succession of openings 26, arranged in staggered form to aline with bearings 9 and 10 and with the cored spoke-openings 22 of the hub. Bushings 27 are arranged in openings 26 and form guides for the drilling and reaming tools 28.

The operating end of each tool 28 is stepped and tapered, as shown, to form the drilling-surfaces 29 and the reaming-surfaces 30, and as these tools advance into the cored open-

ings 22 the shoulders 22' are formed therein and the openings are finished ready to receive tubular spokes having tapered and stepped inner ends like those shown in my application for patent on metallic wheels, filed April 19, 1901, Serial No. 56,575.

The shank 31 of each tool is confined in spindle 11 by a set-screw 32, and in setting the tool it may be projected as far as desired by means of a spacing-rod 33, arranged between the rear end of shank 31 and plug 33', threaded into the outer bed of spindle 11. With the plug provided with a considerable range of adjustment and by employing spacing-rods 33 of different lengths tool 28 may be adjusted with accuracy and held securely in its extended position.

For feeding the tools 28 forward while rotating the outer extremity of each spindle 11 is embraced by the forked upper end of vertical lever 34, a trunnion-bearing 35 being interposed between the lever and spindle, as shown. Levers 34 are arranged in a circular series around the machine and are fulcrumed between their ends at 34' to standards 8. Arranged in the center of the bottom of bed-plate 2 is the holder 35, and connected to this holder and to the lower extremities of levers 24 are the lower links 36 of the toggle-levers 37, plate 2 being slotted to pass the levers as shown. The bed-plate is also provided with one or more access-openings 2'. Rotatably mounted in holder 35 is the shaft 38, having a portion of its length threaded at 38', and movable vertically on this threaded portion is spider 39, to the arms of which are connected the vertical links 36' of the toggle-levers. Secured to the upper portion of shaft 38 is gear-wheel 40, and meshing therewith is pinion 41 on feed-regulating shaft 42. By this means shaft 38 is rotated and spider 49 caused to move either up or down, whereby all of the toggle-levers are actuated simultaneously, which in turn impart simultaneous movement to all of levers 34, thereby adjusting all of spindles 11 and tools 28 in unison.

As the adjacent tools and spindles are in different horizontal planes for the purpose of forming the staggered spoke-openings, it is necessary to so arrange the mechanism that all of levers 34 have exactly the same movement and throw, and for this reason the fulcrum-points 34 of adjacent levers are arranged in different planes, as are also the toggle-lever connections with the lower ends of levers 34, with holder 35, and with spider 39, all as clearly shown in Fig. 1. By this means all of the tools are fed uniformly and without the slightest variation. Feed-shaft 42 projects from the machine and may be actuated in any suitable manner.

Holder 35 consists of a base-section 43, a central section 44, and a top section 45, all of which are secured together by bolts 46. This composite head or holder is slotted radially at 47 to receive the extremities of toggle-links 36, the latter being secured on pivot-

pins 48, which traverse slots 47 and are confined in depressions formed in adjacent faces of the united sections of the holder, all as clearly shown in Figs. 1 and 5.

Hub-holder 18 may be readily removed and one of different size substituted, so that the machine is adapted to drill hubs of many different sizes. While the machine here shown is provided with sixteen spindles, which will be the number of spokes arranged in staggered form in a wheel of ordinary size, it will be understood that a greater or less number of spindles may be provided. It will also be understood that spoke-holes of ordinary form may be drilled with my improved machine and that, if desired, the stagger features may be omitted by arranging all of the spindles in a common plane.

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

1. The combination of radially-disposed drill-spindles arranged in different planes, levers operatively connected to the spindles and fulcrumed in correspondingly-different planes, lever-actuating mechanism, and connections arranged in different planes between said actuating mechanism and the levers, the difference in plane of said connections corresponding to the difference in plane of the lever-fulcrums and of the drill-spindles, substantially as shown and described.

2. The combination of a circular series of horizontal spindles, a circular series of vertical levers operatively connected to the spindles for moving them longitudinally, a vertically-movable spider, a toggle-lever connection between each lever and spider, and means for adjusting the spider vertically, substantially as shown and described.

3. In a hub-drilling machine, the combination of drilling mechanism, and a hollow hub-holder adapted to embrace and rigidly confine the hub while being drilled, substantially as shown and described.

4. The combination of a frame formed with a central depression, a hollow hub-embracing hub-holder removably centered in the depression, and hub-drilling mechanism, substantially as shown and described.

5. The combination of a frame, a hollow hub-holder thereon formed with an internal hub-supporting flange, tool-apertures in the holder, and hub-drilling mechanism, substantially as shown and described.

6. The combination of a frame, a hollow hub-holder having a radial series of tool-guiding passages, and a radially-arranged series of tools operative through said passages, substantially as shown and described.

7. The combination of a frame, a hollow hub-holder having a radial series of tool-guiding passages, means for sustaining a hub within the holder with the points to be drilled in line with said tool-passages, and tools operative through said passages, substantially as shown and described.

8. In a hub-drilling machine, the combination of drilling mechanism, and a removable hollow hub-holder adapted to embrace and rigidly secure the hub while being drilled, 5 substantially as shown and described.

9. In a hub-drilling machine, the combination of drilling mechanism, a hub-holder, and a hub-holder receiver adapted to confine holders for hubs of different sizes, substantially as shown and described. 10

10. In a drilling-machine, the combination of a horizontal series of radially-arranged drill-spindles, a corresponding series of ver-

tical levers operatively connected at their upper ends to the spindles and fulcrumed 15 between their ends, a vertically-movable device arranged centrally between the lower ends of said levers, and toggle mechanism connecting said device and lever ends, substantially as shown and described. 20

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

GEORGE H. EVERSON.

Witnesses:

J. M. NESBIT,

ALEX. S. MABON.