No. 738,471. PATENTED SEPT. 8, 1903.

G. NARDIN.

TURNING AND BORING APPARATUS.

APPLICATION FILED APR. 3, 1902.

NO MODEL

2 SHEETS—SHEET 1.

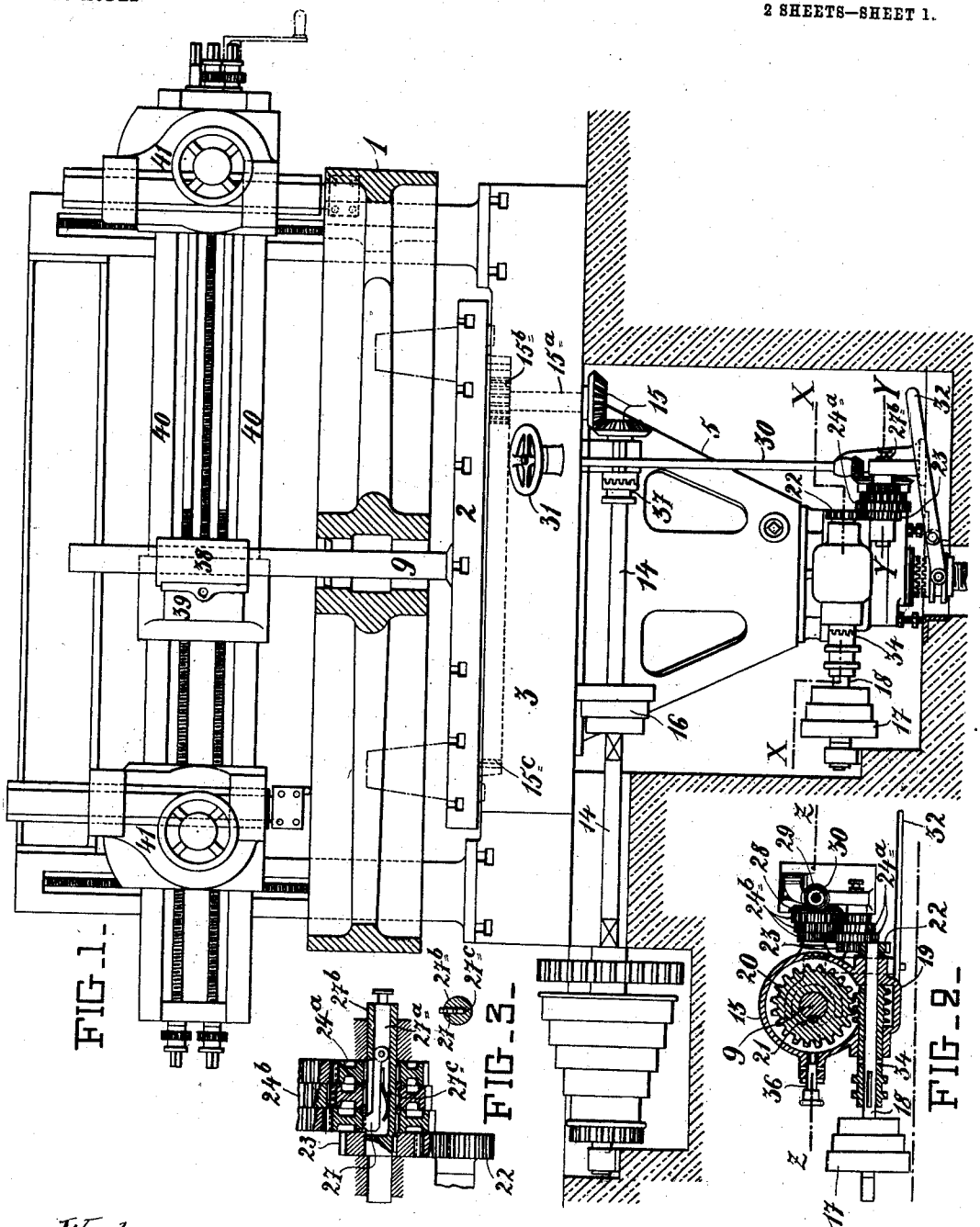


FIG. 1.

FIG. 3.

FIG. 2.

Witnesses.
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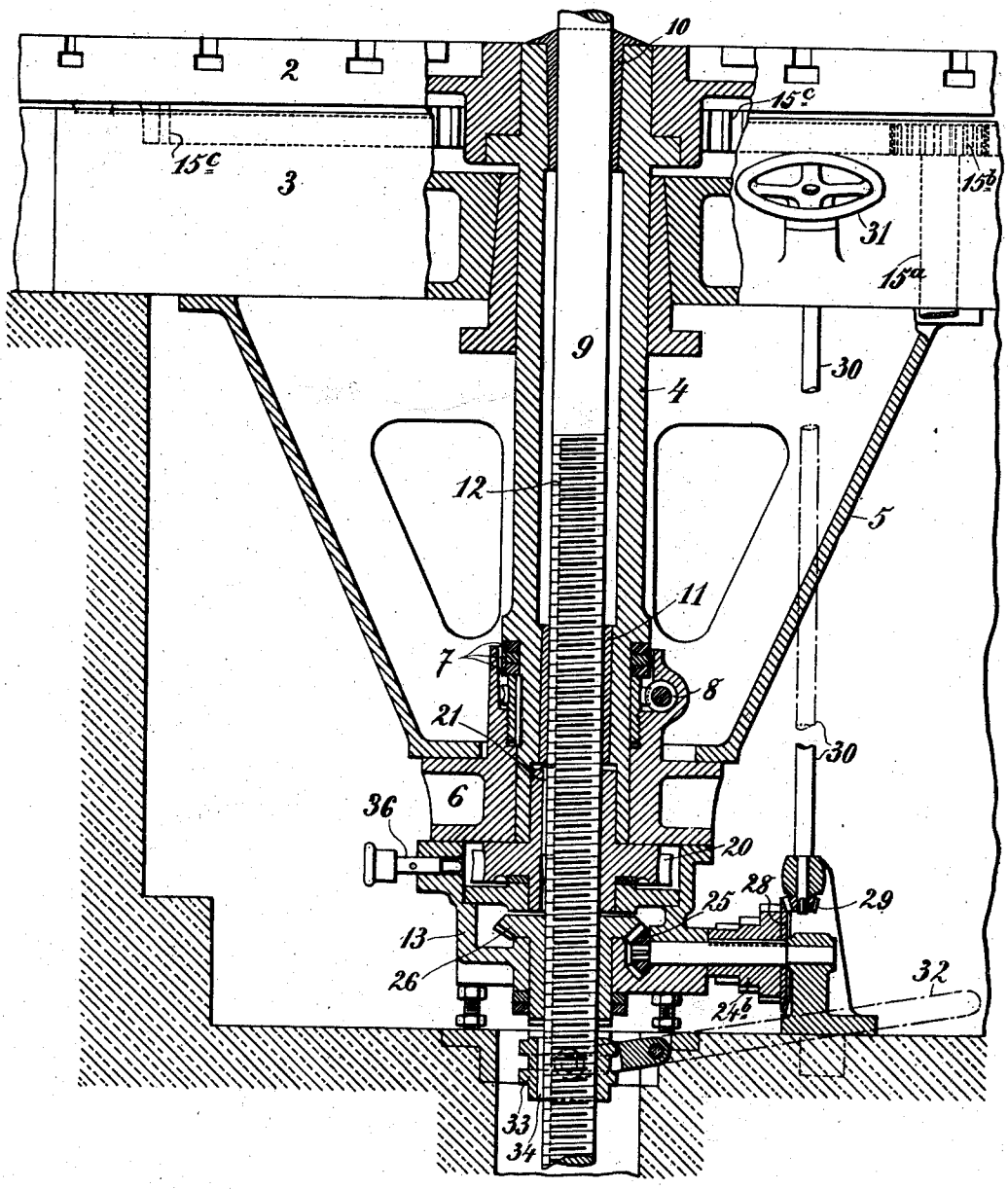
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TURNING AND BORING APPARATUS.

APPLICATION FILED APR. 3, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

FIG. 4.



Witnesses.

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No. 738,471. Patented September 8, 1903.

UNITED STATES PATENT OFFICE.

GEORGES NARDIN, OF BASLE, SWITZERLAND, ASSIGNOR OF ONE-HALF TO FIRM OF WERKSTÄTTE FÜR MASCHINENBAU VORMALS DUCOMMUN, OF MULHOUSE, ALSACE.

TURNING AND BORING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 738,471, dated September 8, 1903.

Application filed April 3, 1902. Serial No. 101,255. (No model.)

To all whom it may concern:

Be it known that I, GEORGES NARDIN, a citizen of the French Republic, and a resident of Basle, Switzerland, have invented certain new and useful Improvements in Turning and Boring Apparatus for the Simultaneous Machining of the Rims and Bosses of Wheels and the Like, of which the following is a full, clear, and exact specification.

This invention relates to improvements in turning and boring apparatus for the machining or dressing of the rims and bosses of wheels and the like, and particularly to such apparatus wherein the boring-rod or drill-spindle which carries the tools for working upon the bosses of the work extends through the center of the face-plate and its central spindle, in which latter it is guided so that it passes without any further interference through the center of the work (wheel or the like) when the latter is mounted centrally.

What distinguishes the apparatus of my invention from those heretofore known is that the boring-rod is arranged so as to be driven from the lower end of the spindle head-stock and that the pressure resulting from the weight of the boring-rod and from its driving mechanism and also from the reactionary pressure on the tool is supported by the said head-stock.

In the accompanying drawings, Figure 1 shows a vertical turning and boring apparatus constructed according to my invention, a fly-wheel being represented as mounted thereon for having its rim and boss turned simultaneously. Figs. 2 and 3 are views of details of the driving mechanism, Fig. 2 being a section on line X X, and Fig. 3 a section on line Y Y, of Fig. 1. In Fig. 3 is included a small supplementary view showing the shaft 27^b in cross-section. Fig. 4 is a section, on an enlarged scale, of the lower part of my apparatus, the section being taken vertically at the center of the face-plate, line Z Z of Fig. 2.

A fly-wheel 1, Fig. 1, is shown as the work mounted upon the horizontal face or work plate 2.

3 is the bed-plate, which carries the face-plate 2, its hollow spindle 4, Fig. 4, and the bearing for the same. The support 5 carries the lower bearing 6 for the spindle 4. This lower bearing 6 is shown as a footstep-bearing with friction-rings 7 and a device 8 for facilitating the raising of the face or work plate 2 for the purpose of relieving the bearing when running at high speed. This is the ordinary construction. The boring-rod 9 is mounted in bushes 10 and 11 in the hollow spindle 4. It is screw-threaded for the necessary length and is provided with a keyway 12. The support 6 also carries at its under part the box 13 with the usual driving and disengaging mechanism. These devices are driven from the horizontal main shaft 14, Fig. 1, which actuates the work or face plate through the bevel-gear 15, the vertical shaft 15^a, the pinion 15^b, and the toothed ring 15^c on the face-plate 2, and is connected to a shaft 18 by means of the stepped pulleys 16 and 17. This shaft 18 carries a worm 19, (see Fig. 2,) which gears with a worm-wheel 20, mounted in the box 13 and provided with a key 21, engaging the keyway 12 of the boring-rod 9. By this arrangement a convenient movement for boring the boss can be communicated to the boring-rod during the necessary movement for the external turning. This is of great advantage. If the boring-rod were to be at rest while the face-plate, with the work mounted thereon, rotates, the boring of the boss would require nearly as much time as is required for the external turning. As the opening of the boss to be exactly adjusted on a shaft must have a quite smooth inner face, and as this requires a reiterated operation, the working of the boss will want more time than the turning of the rim. For this purpose the boring-rod is also allowed to turn. The axial feed of the boring-rod is effected by means of the toothed wheel 22, which is mounted upon the shaft 18, carrying the worm 19, and is connected by means of the intermediate wheel 23 and the two wheel groups 24^a 24^b, Fig. 2, to the bevel-pinion 25, Fig. 4, gearing with a bevel-wheel 26, formed on the sleeve-nut, with which the boring-rod 9 engages and secured in the under part of the

box 13 against axial movement. The wheels of the group 24^a always remain in the same position and are alternately put into and out of gear in the well-known manner by the shifting of a movable key 27. This key 27 (see Fig. 3) is articulated on a sliding piece 27^a, located in a longitudinal hole of the shaft 27, carrying the wheel group 24^a, mounted loosely on this shaft. By moving the sliding piece 27^a in the one or other direction the key 27 may be brought into engagement with the one or the other of the wheels 24^a, a flat spring 27^c pressing the key into a groove of the wheel. When the key 27 is brought into an intermediate position, where it is pushed back by an annular bridge-piece, the automatic drive is disconnected, and the boring-spindle 9 can then be actuated by hand through the medium of the bevel-gear 28 29, the spindle 30, and the hand-wheel 31.

The nut-wheel 26 is provided at its lower end with clutch-teeth. If the clutch-sleeve 33, which is provided with a key 34, engaging the groove 12 of the boring-rod 9, be engaged with the clutch-teeth of the nut-wheel 26 by means of the forked lever 32, after the automatic drive of the spindle-nut has been put out of gear by the movable key 27, the boring-rod may be rotated without axial feed—for example, for turning the ends of bosses and the like—as the nut-wheel 26 is coupled with the said boring-rod. If it be desired that the boring-rod shall move axially without rotating—for example, for cutting grooves—the clutch 34, which hitherto connected the shaft 18 with the worm 19, Fig. 2, will be disconnected, while a sliding toothed wedge or detent 36, supported in the side wall of the box 13, is pushed inward so as to engage the teeth of the worm-wheel 20 and lock it against rotation. Then the shaft 18 only drives the toothed pinion 22 for the feed motion, the boring-rod being prevented from rotating by the detent 36.

To fix the face-plate 2—as it will be necessary, for example, for cutting grooves—it is merely necessary to disengage a clutch 37, Fig. 1, mounted on the driving-shaft 14, so as to disconnect this latter from the boss of one wheel of the bevel-gear 15, thus enabling the said plate to be clamped or stopped in any suitable manner.

The boring-rod is guided at its upper end through a collar-plate 38, Fig. 1, which is movably fitted to a bracket-bar 39, secured to the cross-beam 40, carrying the tool-supports 41, and which serves merely for guiding the boring-rod. As will be obvious, the tool-carrier or cross-beam 40 in the improved arrangement in no way carries the weight of the boring-bar, as both the weight thereof and the forces transmitted to it and proceeding from the driving operation and from the reactionary pressure on the tool are completely supported by the head-stock of the machine.

What I claim is—

In an apparatus or machine for the purpose specified, the combination with a horizontal face-plate having a rotatively-mounted, upright, tubular central spindle, and a rotatable boring-rod which extends down through the middle of the face-plate and through the hollow of said spindle, said rod being supported rotatably and concentrically in said spindle, of means for rotating said spindle and boring-bar, a head-stock supporting the spindle below, a tool on the frame, and driving mechanism for said boring-rod, mounted on the lower end of said head-stock, the latter thus supporting the weight of the boring-rod and its driving mechanism and serving to resist the reactionary pressure on the tool.

In witness whereof I have hereunto signed my name, this 25th day of March, 1902, in the presence of two subscribing witnesses.

GEORGES NARDIN.

Witnesses:
GEO. GIFFORD,
AMAND RITTER.