No. 704,476. Patented July 8, 1902.

F. DUDEK & R. DEMBOWSKI.

WOODWORKING MACHINE.

(Application filed Dec. 30, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

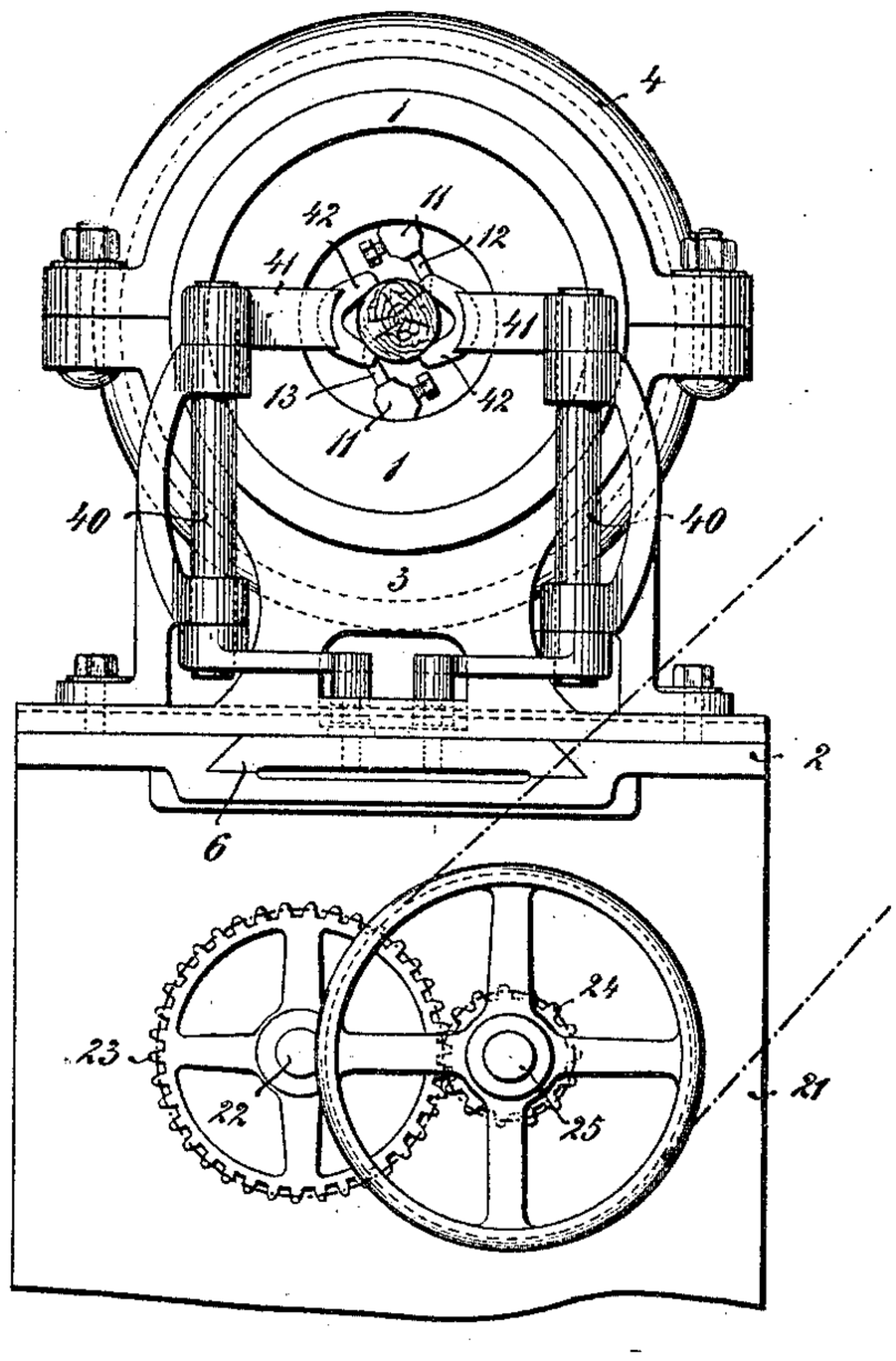

Fig. 6.

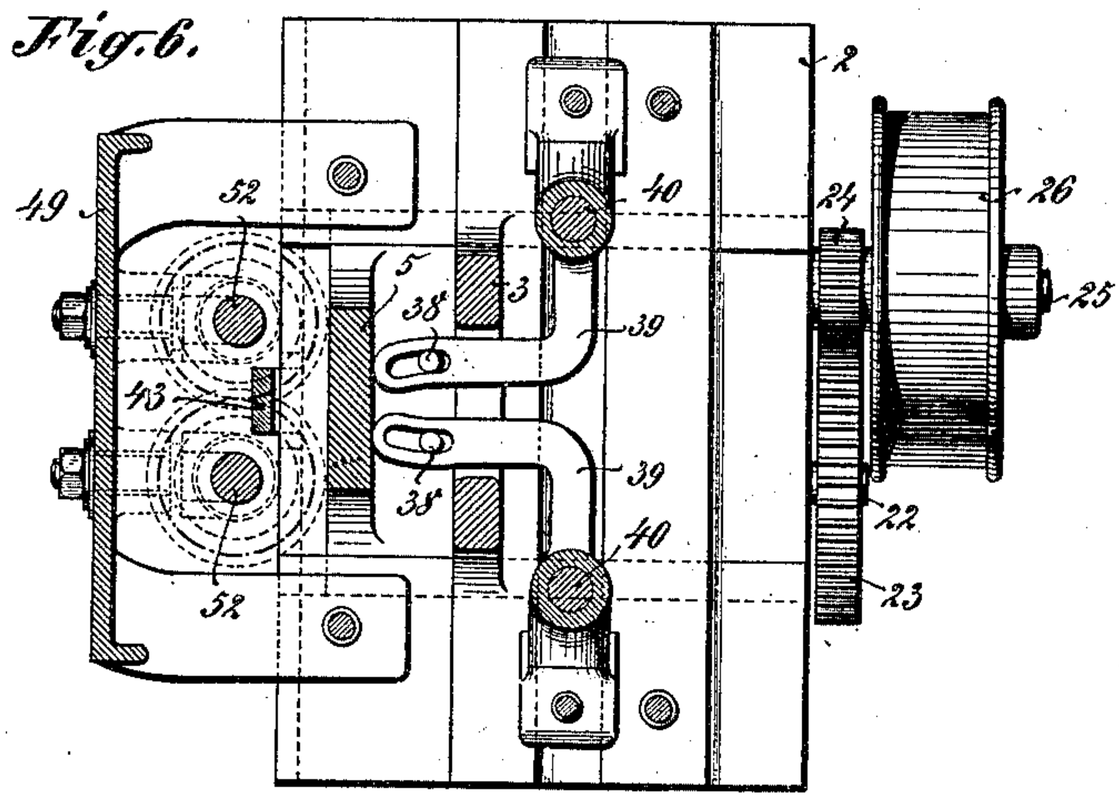

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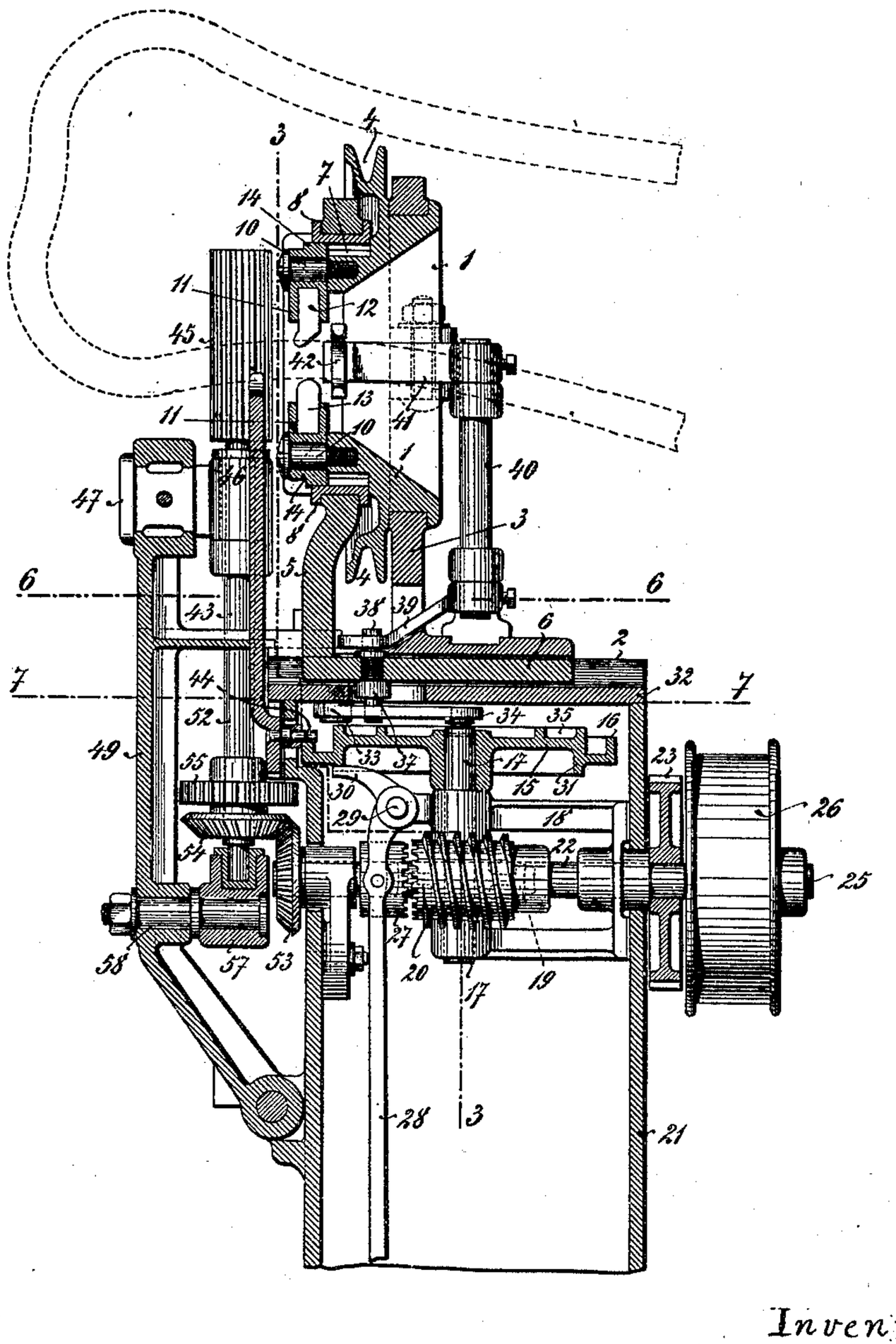
Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

Fig. 3.

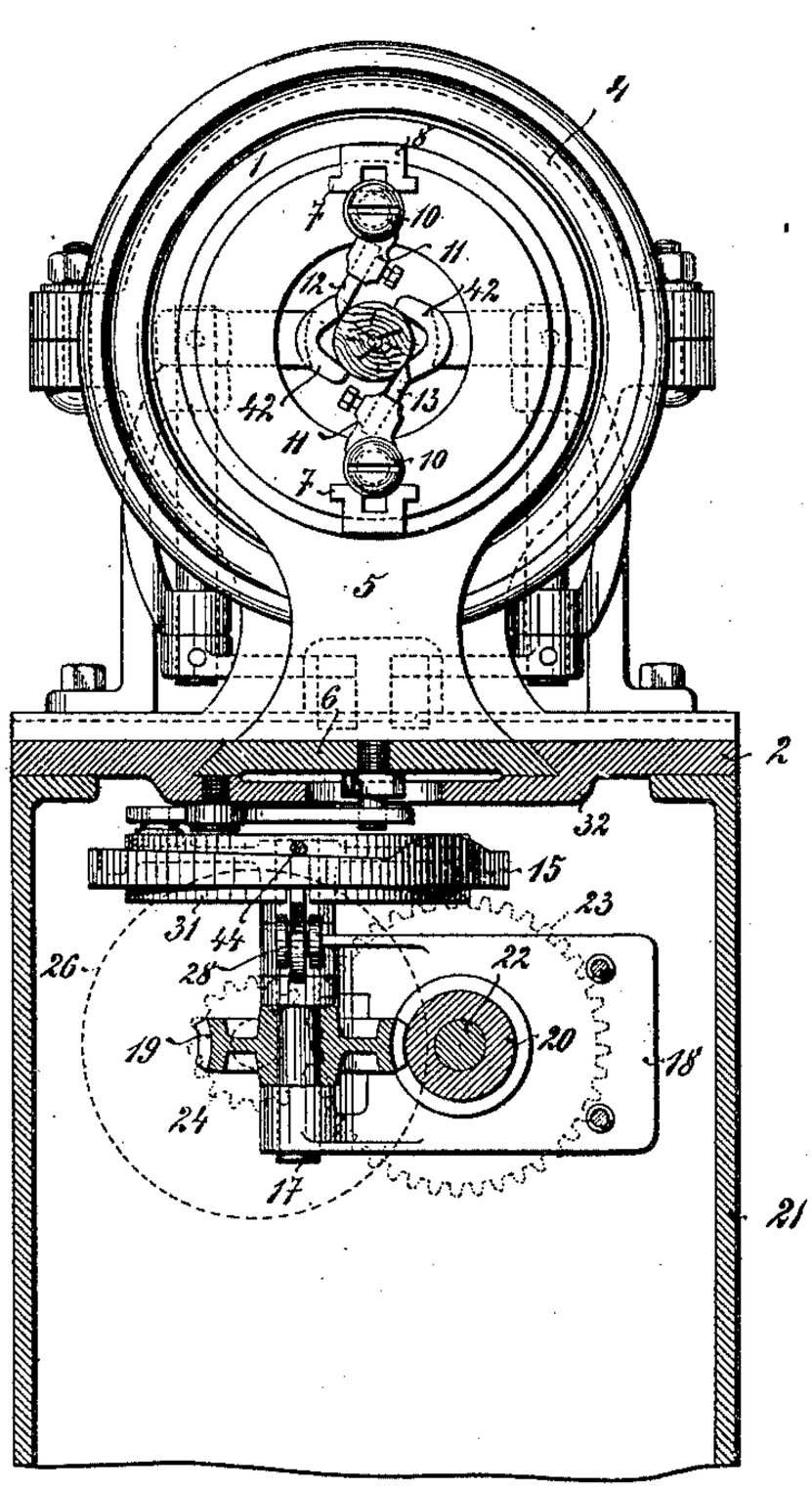
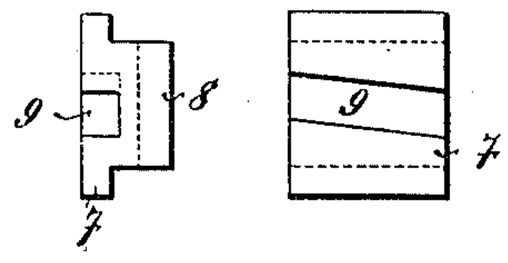


Fig. 4.



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(No Model.) 4 Sheets—Sheet 4.

Fig. 5.

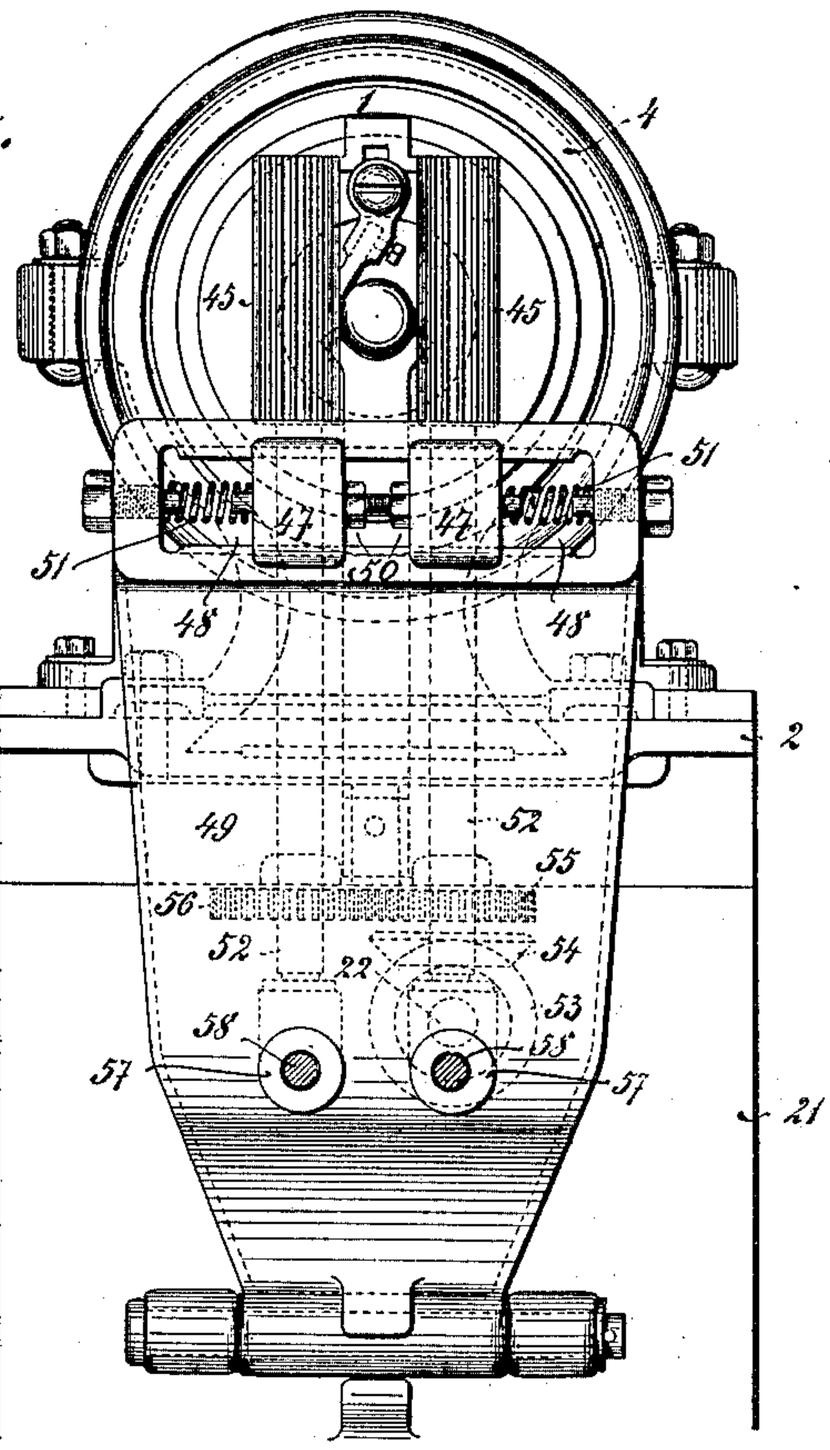
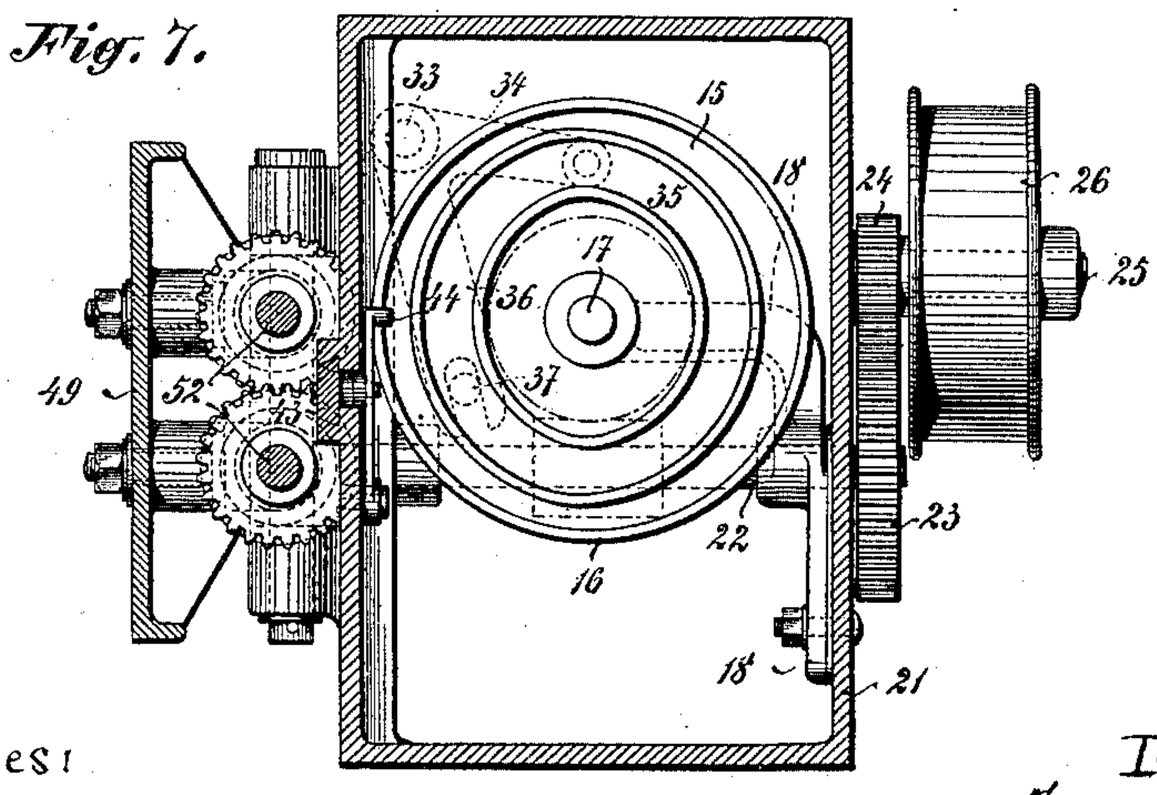


Fig. 7.



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UNITED STATES PATENT OFFICE.

FRANZ DUDEK, OF BIALA, AND RUDOLF DEMBOWSKI, OF BIELITZ, AUSTRIA-HUNGARY, ASSIGNORS OF ONE-HALF TO FIRM OF G. JOSEPHY'S ERBEN, OF BIELITZ, AUSTRIA-HUNGARY.

WOODWORKING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 704,476, dated July 8, 1902.

Application filed December 30, 1901. Serial No. 87,809. (No model.)

To all whom it may concern:

Be it known that we, FRANZ DUDEK, residing at No. 7 Spitalgasse, Biala, and RUDOLF DEMBOWSKI, residing at No. 8 Kudlichgasse, Bielitz, in the Empire of Austria-Hungary, subjects of the Emperor of Austria-Hungary, have invented new and useful Improvements Relating to Woodworking-Machines, of which the following is a specification.

This invention relates to a machine particularly suitable for milling, shaping, and simultaneously smoothing curved as well as straight wooden bars—such, for example, as those used in the manufacture of the so-called "Vienna" bent-wood chairs. The backs of these chairs are formed of a straight wood stick, which is first turned and shaped and then steamed and bent to the required shape, as is well known. During the operation of bending these previously-turned sticks often crack and lose their perfect circular section, particularly at the sharp bends. Heretofore it has been usual to smooth and finish the bent and shaped wood bars by hand by means of a smoothing-tool. The machine which forms the subject of this invention is designed to perform the work in a much shorter time, while, moreover, the wood sticks receive a correct circular cross-section throughout their whole length, which obviously is not possible with handwork.

The invention consists, chiefly, in so arranging cutters for milling and smoothing the wood sticks, as well as the guides in front and at the rear of the cutters for guiding the work, in such a manner that they may be definitely adjusted by a common removable cam-disk or its equivalent and independent of the form of the blank, so as to impart the exact form required to the latter. If wood sticks of a different form are required, it is only necessary to exchange the said cam-disk for another one adapted to impart the required form.

In order that our invention may be readily understood and carried into effect, we will describe the same fully, with reference to the accompanying drawings, in which—

Figure 1 is a rear elevation of a machine embodying this invention, and Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a vertical section taken on line 3 3 of Fig. 2. Fig. 4 is a detail hereinafter referred to. Fig. 5 is a front elevation of the machine. Fig. 6 is a horizontal section taken on the line 6 6 of Fig. 2, and Fig. 7 is a similar section taken on the line 7 7 of Fig. 2.

The dotted lines in Fig. 2 are presumed to represent the bent back of a chair which it is desired to turn and smooth in one operation.

The cutter-head 1, revolubly mounted in a standard 3, firmly screwed or otherwise secured to the machine-frame 2, is formed with a grooved pulley-rim 4 for a driving strap, cord, or the like. The front portion of the cutter-head projects into a second standard 5, adapted to slide horizontally, by means of dovetail-shaped base 6, in the machine-bed 2. The cutter-head 1 is formed with two diametrically disposed grooves, in each of which is fitted a guide-cheek 7, which, with a double flange 8, engages around the standard 5, said guide-cheek 7 being formed with an inclined slot or groove 9, as clearly shown in Fig. 4. By reason of this arrangement the guide-cheeks 7 revolve with the cutter-head 1 and are also obliged to participate in the displacement of the standard 5.

Into the front of the cutter-head 1 are screwed two diametrically-arranged screw-bolts 10, which carry two revoluble holders 11, fitted with knives or cutters 12 and 13, respectively, and engaging, by means of a projection 14, into the inclined slot 9 of the guide-cheeks 7. If the standard 5 is moved in one or the other direction, the guide-cheeks 7 participate in the motion. The inclined slots 9 of the same come over the projections 14 of the holders 11, loosely mounted on the bolts 10, so that the said holders, with the cutters 12 and 13, are either concentrically approached to or removed from the wood stick. The displacement of the standard 5 and at the same time the adjustment of the knife-holders 11 is effected in a definite manner through the intervention of a disk 15, formed with a suitable cam-groove 35, and obviously it will be easily possible to exchange the cam-disk or its equivalent, and thus enable any desired form of wood stick to be milled and

smoothed at the same time. The milling is advantageously effected by the cutter 12 with its projecting cutting edge, while the smoothing is effected by the knife or cutter 13.

The cam-disk 15 is fixed to a vertical shaft 17, journaled in arms 18 of a casting fixed to the inner wall of the machine-frame. Upon the shaft 17 is keyed, between the arms 18, a worm-wheel 19 in gear with a worm 20, loosely mounted upon a horizontal shaft 22, arranged in the interior of the box-casing 21 of the machine. The shaft 22 is driven by spur-wheels 23 24 from the shaft 25, which latter receives its motion from a belt-pulley 26. The arrangement is such that the cam-disk 15 makes one complete revolution during the time the wood stick passes for its entire length through the cutter-head. The worm 20 is on its front face formed with coupling-teeth and is adapted to move endwise on the shaft 22 and participates in the rotary motion thereof by a key-and-groove arrangement in connection with a sleeve 27, the clutch-teeth of which latter can be brought into engagement with the teeth of the worm. The engagement and disengagement of the clutch members is effected by means of a lever 28, pivoted at 29 to a fixed arm. The cam-disk 15 is automatically stopped after a complete revolution by a short arm 30, provided on the lever 28 and ordinarily held by a spring, (not shown,) with its free end against the lower projecting edge 31 of the cam-disk 15, until at the end of a revolution of the latter it engages into a notch therein.

To the top plate 32 of the machine-casing is pivoted at 33 a bell-crank lever, the arm 34 of which is furnished with a stud and roller, which latter engages in the cam-groove 35 of the disk 15, while the other arm 36 of such lever is formed with a slotted end engaging a bolt 37, which enters from below and projects into the base 6 of the movable standard 5 and slides in a slot formed in the top plate 32 of the machine-casing 21. Thus by revolving the cam-disk 15 the bell-crank lever 34 36 displaces the standard 5, and thereby effects the adjustment of the cutters, as above described. Upon the base-plate 6 of the standard 5 are furthermore provided two pins 38, Fig. 6, which engage in appropriately-formed slots in two levers 39, fixed to the lower end of the two vertical rotary shafts 40, arranged behind the cutter-head 1. At the upper end of the said shafts are firmly secured horizontal arms 41 with jaws 42, which take around the wood stick, and, as will be readily seen from the arrangement shown and described, the approachment or withdrawal of the said guide-arms 41 concentrically to the wood stick is so adjusted as to correspond with the position of the cutters as produced by the action of the cam-disk 15, whereby the jaws 42 are always in contact with the finished portion of the wood stick, and thus form a safe guide therefor.

The guiding of the wood stick in front of the cutter-head 1 is effected by a vertical bar 43, formed at its upper end with a round recess corresponding to the cross-section of the wood stick and fitted at its lower extremity with a horizontal stud 44, arranged to slide upon a flange 16 of the cam-disk 15. The said flange 16 is so formed as to move the bar 43 up and down in such a manner as to cause the round and curved wood stick to be guided exactly in the center of the cutter-head 1.

The wood stick is fed forward by means of grooved feed-rollers 45, arranged in a vertical position in front of the cutter-head 1 and revolving in bearings 46, which latter are formed with a horizontal projection 47, movably fitted in a slot 48 of the frame part 49 and adapted to be so adjusted by screw-nuts 50 as to bear with a certain pressure against the wood stick. The springs 51 have a constant tendency to force the rollers 45 toward each other and permit them to move apart, so as to give way to irregularities in the cross-section of the wood. One of the vertical shafts 52, with the feed-rollers 45 at its upper part, is driven by means of the bevel-gear 53 54 and horizontal shaft 22, and its motion is transmitted by the spur-wheel 55 to the spur-wheel 56 upon the other shaft 52 with feed-roller 45. In order to permit of a mutual motion of the feed-rollers 45 toward or away from each other within small limits, it is advantageous to mount the cup-bearings 57 of the vertical shafts 52 upon pivots or studs 58, fixed in the machine casing or frame 49.

If it is desired to produce straight but fashioned wood rods or sticks on the machine, it is necessary to so fix the guide-bar 43 that the fashioned edge or flange 16 of the cam-disk 15 no longer acts on the said bar. If, however, only straight wood rods or sticks of uniform diameter are to be milled and smoothed on the machine, the cam-groove disk 15 is stopped by disengaging the clutch, and the cutters 12 and 13 and the guide-bar 43 in front of the cutter-head, as well as the guide-arms 41 42 at the rear thereof, are rendered rigid in any convenient manner.

What we claim, and desire to secure by Letters Patent of the United States, is—

1. A machine for milling and smoothing bent or straight round wood rods or sticks for bent-wood chairs and the like comprising cutters disposed in a rotating cutter-head for milling and smoothing the blank, guide-bar in front of the cutter-head, and guiding-arms at the rear of the same for guiding the blank, an exchangeable disk with cams for controlling the movements of the cutters toward or away from the blank and for controlling the movements of the guiding organs of the blank and means actuated by the cam-disk for displacing the cutters and the guiding organs of the blank, essentially as and for the purpose stated.

2. In a machine for milling and smoothing bent or straight round wood rods or sticks for bent-wood chairs and the like comprising

a rotating cutter-head, guide-bar, guiding-arms, an exchangeable cam-disk for controlling the movements of the cutters and the guiding organs, the combination of the cam-groove 35 with a rotary bell-crank lever one end of which engages in the said cam-groove and the other end a bolt rigidly connected to a standard whereby a to-and-fro movement is imparted to the said standard, essentially as and for the purpose stated.

3. In a machine for milling and smoothing bent or straight round wood rods or sticks for bent-wood chairs and the like, comprising a rotating cutter-head, guide-bar, guiding-arms and exchangeable cam-disk, the combination of the cam-groove with rotary bell-crank lever, a standard to which a to-and-fro movement is imparted by the said bell-crank lever, guide-cheeks fixed in the standard and being provided with inclined slots, cutter-holders rotatable on bolts in the cutter-head and projections of the cutter-holders engaging in the said slots of the guide-cheeks, essentially as and for the purpose stated.

4. In a machine for milling and smoothing bent or straight round wood rods or sticks for bent-wood chairs and the like, comprising a rotating cutter-head, guide-bar, guiding-arms and exchangeable cam-disk, the combination of the cam-groove with a rotary bell-crank lever, standard, guide-cheeks fixed in the standard, rotary cutter-holders, projections of the cutter-holders engaging in slots provided in the guide-cheeks, studs arranged on said standard, vertical rotary shafts with angle-piece fixed thereon and provided with slots in which the said studs engage and guiding-arms carried by the said rotary shafts which guiding-arms hold the work-piece, essentially as and for the purpose stated.

5. In a machine for milling and smoothing bent or straight round wood rods or sticks for bent-wood chairs and the like, comprising a rotating cutter-head, guide-bar, guiding-arms, exchangeable cam-disk, means for imparting to the cutters a displacement toward and away from the blank, means for displacing the guiding-arms, the combination with the flange of the cam-disk provided with a cam, of a guide-bar disposed in the front of the cutter-head and sliding on said cam the guide-bar being provided with a recess in which the blank is held, essentially as and for the purpose stated.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

FRANZ DUDEK.
RUDOLF DEMBOWSKI.

Witnesses:
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ALVESTO S. HOGUE.