

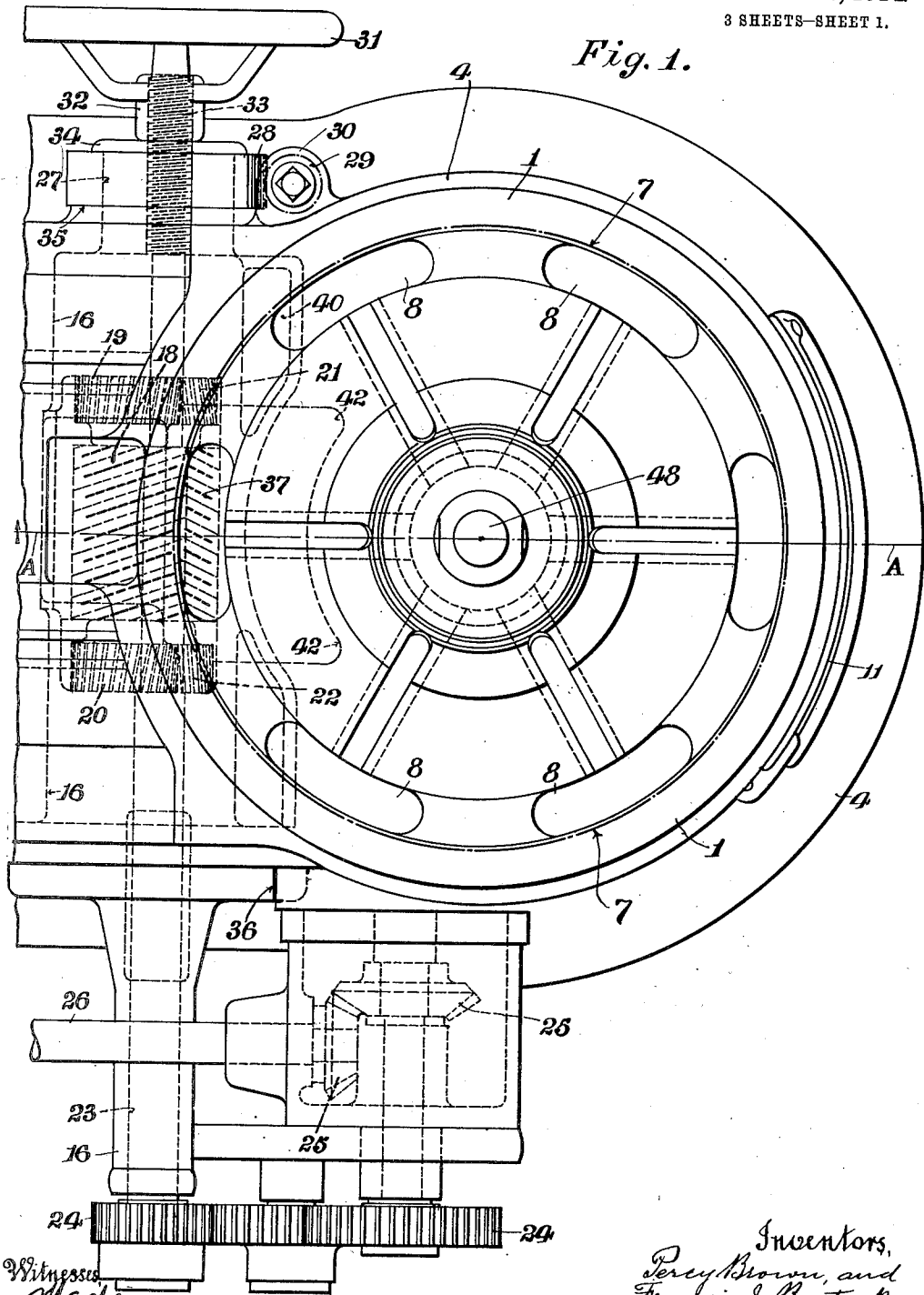
P. BROWN & F. J. BOSTOCK.
 WORK SUPPORT FOR MILLING MACHINES.
 APPLICATION FILED OCT. 8, 1913.

1,100,522.

Patented June 16, 1914.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
 W. Allen
 H. E. Allen

Inventors,
 Percy Brown, and
 Francis J. Bostock,
 by Herbert W. Jenner.
 Attorney.

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3 SHEETS—SHEET 2.

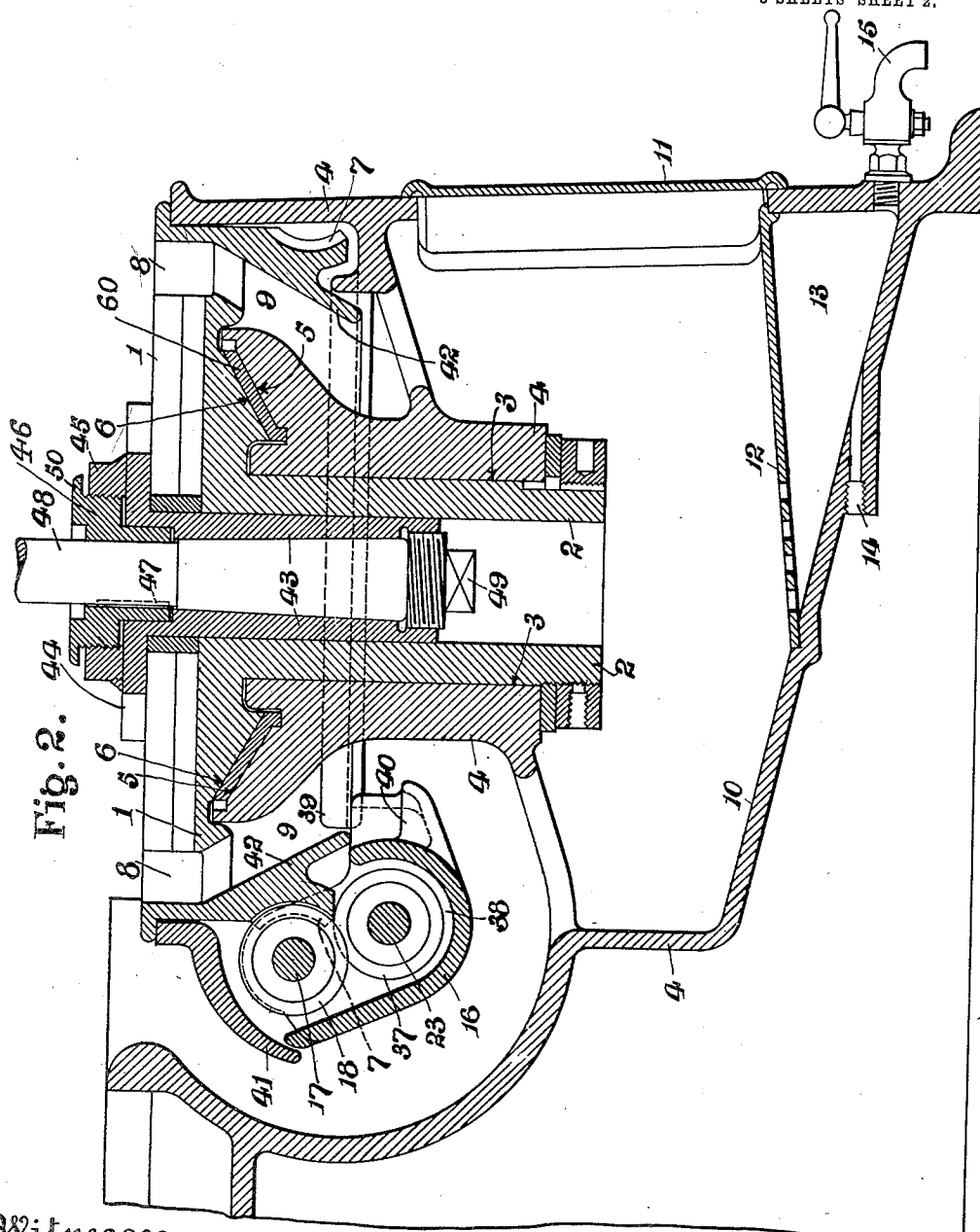


Fig. 2.

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 by Herbert W. Jenner.
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3 SHEETS—SHEET 3.

Fig. 3.

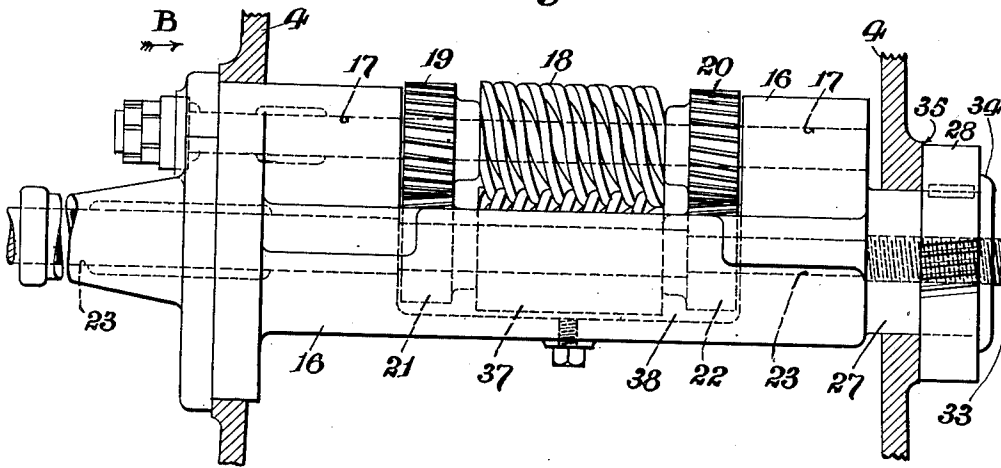
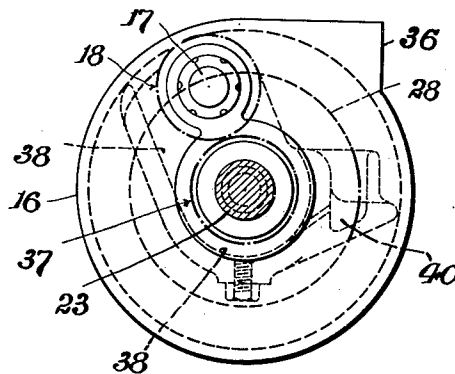


Fig. 4.



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 W. E. Allen

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 Attorney.

UNITED STATES PATENT OFFICE.

PERCY BROWN AND FRANCIS JOHN BOSTOCK, OF HUDDERSFIELD, ENGLAND.

WORK-SUPPORT FOR MILLING-MACHINES.

1,100,522.

Specification of Letters Patent.

Patented June 16, 1914.

Application filed October 8, 1913. Serial No. 794,043.

To all whom it may concern:

Be it known that we, PERCY BROWN and FRANCIS JOHN BOSTOCK, subjects of King George V of Great Britain, residing at Huddersfield, in the county of York, England, have invented certain new and useful Improvements in Work-Supports for Milling-Machines, of which the following is a specification.

10 This invention in worm wheel generators or like milling machines has for its object the provision of improved means whereby the table can be disconnected from its drive at will and rotated freely by hand in order
15 to test the truth of the work to be cut and also to admit of adjustment of the wheel blank relatively to the hobbing cutter to cause said cutter to operate on different teeth, said improvements also providing for
20 the lubrication of the parts.

The invention will be described with reference to the accompanying drawings in which:—

25 Figure 1 is a plan view of the work supporting and driving portion of a worm wheel generating machine embodying our improvements; Fig. 2 is a sectional elevation taken as on the line A—A, Fig. 1; Fig. 3 is a front view of the table driving device, disconnected, and Fig. 4 is an end view of Fig. 3, looking in the direction of the arrow B, said figure.

30 Referring to the drawings, the table 1 has a depending cylindrical portion 2 which is mounted in a long parallel bearing 3 in suitable surrounding frame-work 4. Near its upper end the frame is provided with a conical bearing 5 on which rests a corresponding conical portion 6 on the table. These
40 parallel and conical bearings support the table rigidly, the downward thrust during cutting being taken by the conical bearing 5. A liner plate 60 is interposed between the bearings 5 and 6, but this may be dispensed
45 with.

Formed integral with the table 1 or, it may be, attached to said table is a worm wheel 7 whose diameter is approximately twice the diameter of the largest wheel that
50 can be cut on the machine, whereby great ac-

curacy is insured when the machine is cutting at its maximum capacity.

In the upper portion of the table are formed a series of slots or openings 8 which admit of the cuttings from the work falling
55 or being forced through them through a cavity or space 9 formed between the table and the central part of the framework, into a chamber or receiver 10 in the lower part of the framework, from which they can be
60 removed from time to time through an opening closed by a door 11. A false bottom 12 allows the lubricant, supplied during the cutting operation, to drain from the cuttings
65 into a well 13 from which it can be returned through an outlet 14 to the pump well for re-use, or the said lubricant may be drawn off, as desired, by a drain cock 15. The false bottom 12 is of any approved material, and it has perforations or openings (not
70 shown) for the passage of oil into the well.

According to our invention, we support in suitable bearings in the framework at each side of the machine, a cradle 16 in which is journaled a spindle 17 (Fig. 3)
75 having fast thereon a worm 18 adapted to mesh with and drive the worm wheel 7 on the table. Also fast on the spindle 17 are spiral wheels 19 and 20 which respectively mesh with spiral wheels 21 and 22 fast on a
80 shaft 23 extending within the lower part of the cradle. This shaft 23 is driven by change gearing 24 and bevel wheels, 25, 25, from the main driving shaft 26 of the machine.

85 Fast on the boss 27 of the cradle is a partially toothed wheel or toothed segment 28 with the teeth of which meshes a worm 29 fast on a spindle supported in a suitable vertical bearing 30 on the frame.

90 By rotation of the worm 29, the spindle of which is provided with a suitable handle or handwheel, the cradle 16 can be rocked or turned about its pivotal center, which is that of the shaft 23 and by reason of the eccentric
95 disposition of the spindle 17 carrying the worm 18, the said worm will be disengaged from the worm wheel 7 on the table and the latter thus be left free to be rotated by hand.

In order to lock the mechanism, when the cradle has been turned or rocked to cause the worm 18 to mesh with the worm wheel 7, we provide a handwheel 31 whose boss 32 works on a screw 33 carried by the cradle, rotation of the handwheel in one direction forcing a locking collar 34 against the worm or segment wheel 28 and pressing the opposite face of said wheel against a facing 35 on the framework. A projection 36 on the cradle is adapted to abut against a part of the framework to limit the movement of the cradle in one direction. The use of the locking collar 34 prevents all oscillation of the cradle when the worm 18 is driving the worm wheel 7, and as it relieves the worm wheel 28 and the worm 29 of pressure, they can be made with the usual clearance between their teeth.

The means above set forth for enabling the work table to be disengaged are of considerable advantage, and enable the operator to freely revolve the table whenever desired, to test the truth of the work being cut, or to adjust the work relatively to the cutter in order to present fresh or uncut spaces in the work opposite the teeth of the cutter.

The worm 18 meshes with a worm 37, mounted on the shaft 23 and running in an oil bath 38 formed in the cradle 16, the said worm 37 automatically conveying lubricant from the bath 38 and applying it to the tooth surface of the driving worm. An annular channel 39 formed on the inner walls of the framework beneath the worm wheel 7, as shown at Fig. 2, receives any lubricant which may drop from said worm wheel and conveys it back to pockets 40, 40, in the cradle 16 from which it finds its way back through suitable openings into the bath 38.

Suitable shields or guards 41 and 42 prevent the entry into the oil bath and annular channel 39 of any metal cuttings or foreign bodies.

A sleeve 43, extending down within the depending portion 2 of the table and provided at its upper end with a flange 44 adapted to be bolted to the table, receives at its upper end a micrometer screw adjusting nut 45 and bush 46 the latter being provided with a keyway to slide on a key 47 carried by the work spindle 48, the latter being made conical at its lower end and being secured in a correspondingly shaped opening in the sleeve by a screwed plug 49. The blank to be cut is secured on the spindle 48 and rests upon the top of the bush 46, whose adjustment relatively to the sleeve 43 enables the vertical height of the blank to be adjusted to position it accurately with respect to the cutter.

Our improvements enable the table to be run at such a speed that the maximum ad-

vantage of a high speed cutter can be utilized.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. The combination, with a supporting frame, a revoluble work table mounted in the frame, and a worm wheel secured to the work table; of a cradle pivoted in the frame, a driving shaft journaled on the axis of the cradle, a worm shaft journaled eccentric of the axis of the cradle, a worm secured to the worm shaft and operating to revolve the worm wheel, driving devices operatively connecting the worm shaft with the driving shaft, and means for oscillating the cradle to place the worm into and out of engagement with the worm wheel.

2. The combination, with a supporting frame, a revoluble work table mounted in the frame, and a worm wheel secured to the work table; of a cradle pivoted in the frame, a driving shaft journaled on the axis of the cradle, a worm shaft journaled eccentric of the axis of the cradle, a worm secured to the worm shaft and operating to revolve the worm wheel, driving devices operatively connecting the worm shaft with the driving shaft, disengageable locking mechanism for securing the cradle rigidly to the frame, and means for oscillating the cradle, when unlocked from the frame, to place the worm into and out of engagement with the worm wheel.

3. The combination, with a supporting frame, a revoluble work table mounted in the frame, and a worm wheel secured to the work table; of a cradle pivoted in the frame and forming a receptacle for lubricant, a driving shaft journaled on the axis of the cradle, a worm shaft journaled eccentric of the axis of the cradle, a worm secured on the worm shaft and operating to revolve the worm wheel, driving devices operatively connecting the worm shaft with the driving shaft, a worm mounted loosely on the driving shaft and engaging with the aforesaid worm and operating to convey lubricant to it from the said receptacle, and means for oscillating the cradle to place the worm which drives the worm wheel into and out of engagement with it.

4. In a worm wheel generating or like machine, the combination with a revolubly supported work table, and a worm wheel formed integral with or attached to the table, of a driving worm mounted on a spindle supported eccentrically in a pivotally movable cradle, said spindle carrying gear wheels meshing with gear wheels on a shaft extending longitudinally of the cradle, means to drive said shaft to rotate the driving worm, means to turn the cradle about its pivotal axis to place the driving worm

into or out of engagement with the worm
wheel on the table, a worm dipping into an
oil bath in the cradle and adapted to mesh
with the driving worm and automatically
5 convey lubricant thereto, an annular chan-
nel to return to the oil bath any lubricant
which may drip from the worm wheel, a
shield or cover on the revoluble table to
prevent metal cuttings falling into said
10 channel, and means to lock the cradle in po-

sition, all substantially as herein shown and
set forth.

In testimony whereof we affix our signa-
tures in the presence of two witnesses.

PERCY BROWN.

FRANCIS JOHN BOSTOCK.

Witnesses:

T. E. WHITELEY,

C. E. HINCHLIFF.