A. T. BROWN.

GEAR GRINDING MACHINE.

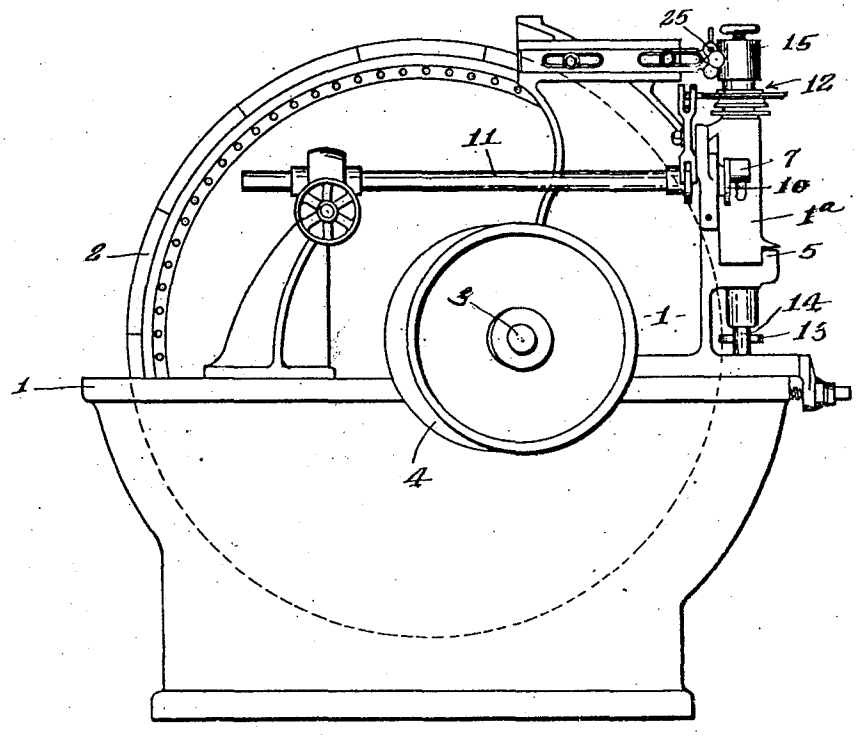
APPLICATION FILED JULY 5, 1918.

1,329,884.

Patented Feb. 3, 1920.

3 SHEETS—SHEET 1.

Fig. 1.



INVENTOR

Alexander T. Brown

BY

Parmenter & Bodell

ATTORNEYS

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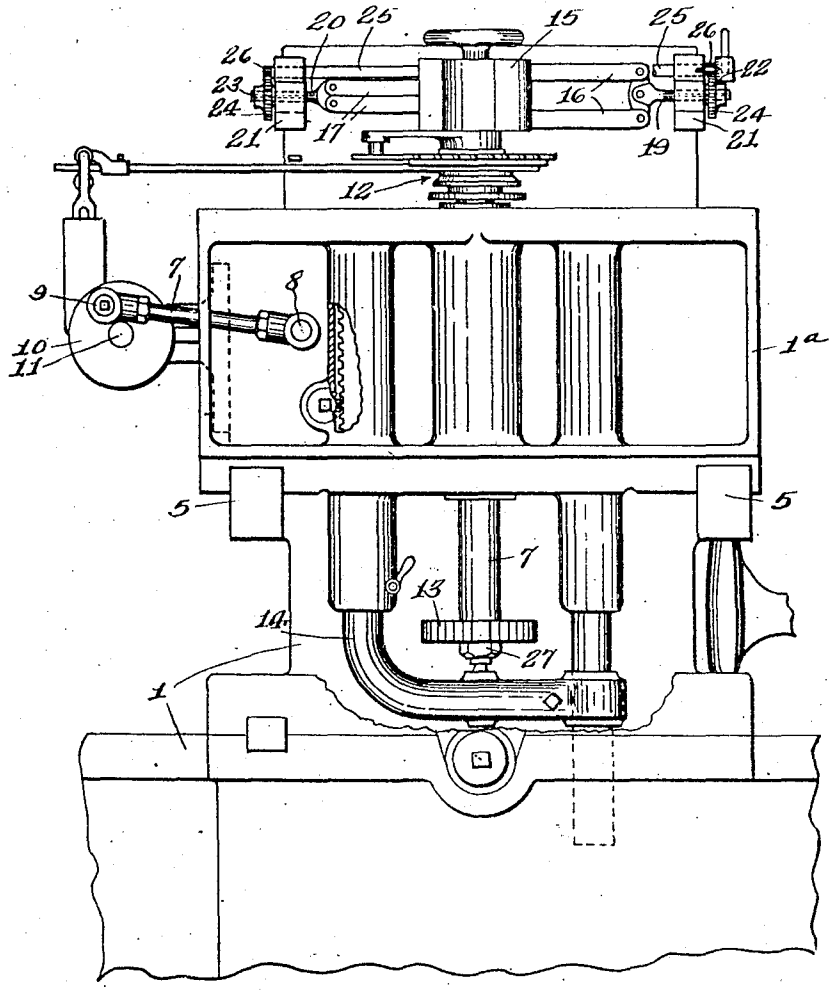
Fig. 2.



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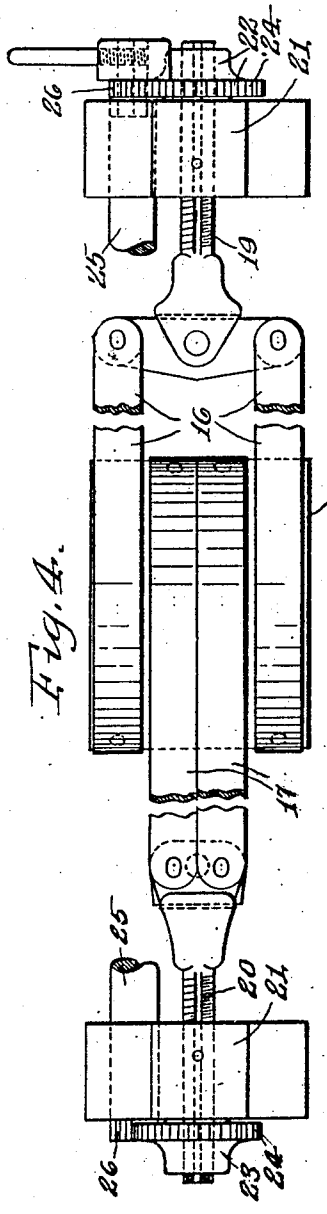

Fig. 4.

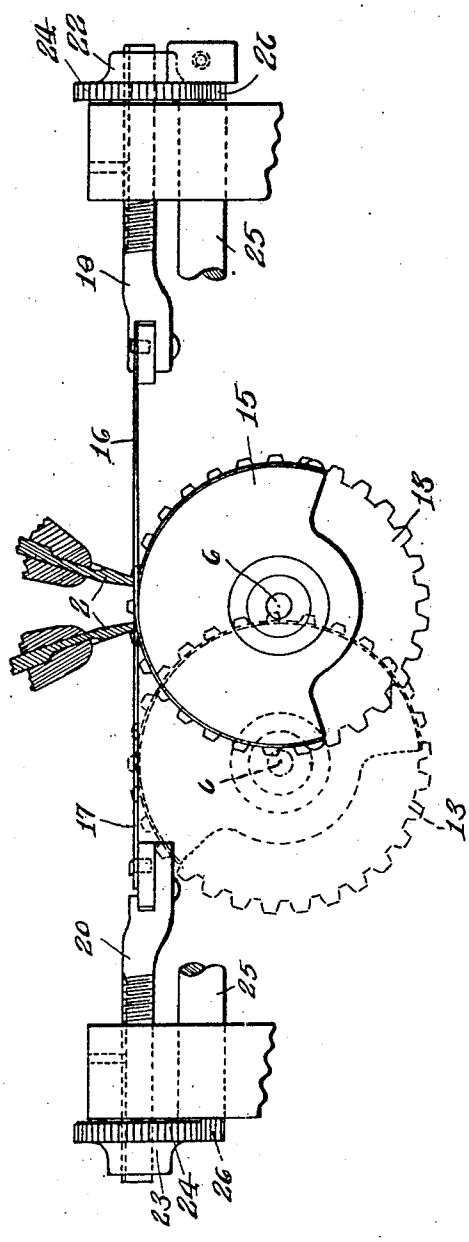

Fig. 5.

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UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE BROWN-LIPE GEAR COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

GEAR-GRINDING MACHINE.

1,329,884. Specification of Letters Patent. Patented Feb. 3, 1920.

Application filed July 5, 1918. Serial No. 243,416.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Gear-Grinding Machine, of which the following is a specification.

This invention relates to gear grinding or generating machines of the type in which the gear is rolled during the grinding or cutting operation, and it has for its object a particularly simple and efficient means for initially adjusting the gear rolling means to adjust the gear about its axis preliminary to the rolling and grinding operation.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation of one form of gear grinding machine provided with my invention.

Fig. 2 is an enlarged front elevation, partly broken away, of parts seen in Fig. 1.

Figs. 3 and 4 are respectively, fragmentary plan and elevational views of the means for rolling the gear and for adjusting the gear preliminary to the rolling thereof.

I have here shown this means as embodied in the type of gear grinding machine as disclosed in the application of Alexander T. Brown, Sr. No. 818,473, filed Feb. 13, 1914.

1 designates the frame of the machine, 2 the grinder, there being usually two grinders 2 each mounted on a shaft 3 arranged at an inclined angle to the shaft 3 on which the other grinder is mounted so that the grinders converge toward each other as shown in Fig. 3, each shaft 3 having a driving pulley 4 thereon.

The means for supporting and rolling the gear during the grinding operation comprises a carriage 1^a slidable in suitable ways 5 provided in the frame 1 in front of the grinders 2, a spindle 6 carried by the carriage 1^a and movable therewith, and means for rocking the spindle 6 during the reciprocating movement of the carriage 1^a. The carriage 1^a is reciprocated in any suitable manner as by a connecting rod 7 pivoted at one end at 8 thereto and at its other end to an eccentric pin 9 mounted on a disk 10 which in turn is mounted upon a shaft 11 actuated in any suitable manner.

12 designates a suitable indexing means for shifting the spindle 6 relatively to the rolling means to carry new teeth to the grinders as will be understood by those skilled in the art.

The carriage also includes a suitable means for holding the gear 13 on the spindle 6 as the arm 14 but as the operation of the carriage 1^a, indexing means 12, and arm 14 form no part of this invention, a detail description thereof is unnecessary.

The only feature to be considered in so far as the present invention is concerned, is that the spindle 6 rocks to roll the gear 13 relatively to the grinders 2 during the reciprocation of the carriage 1^a.

The means for rocking the spindle 6 in order to roll the gear, as here shown, includes a drum or cylinder 15 mounted coaxially with the spindle 6, straps 16 and 17 winding on the periphery of the drum 15 in opposite directions, and means connecting the outer ends of the straps to the frame 1. There are two straps 16 and two straps 17, but each pair of straps 16 or 17 acts as one strap.

Said connecting means are adjustable simultaneously to pay out one pair of straps 16 or 17 and correspondingly take up the other pair of straps 16 or 17, in order to slightly rotate the spindle 7 to bring the teeth of the gear 13 in juxtaposition to the grinders 2.

The connecting means as here shown includes threaded stems 19, 20 connected respectively to the straps 16 and 17 and movable endwisely in suitable guides formed in bearings or brackets 21 carried by the frame 1, and means for simultaneously moving one of said stems endwisely to pay out the straps connected thereto and moving the other connecting means endwisely to take up the strap connected thereto.

As here shown, the means for adjusting the stems 19, 20 comprises nuts 22, 23, threading respectively on the stems 19, 20, and having peripheral gear teeth 24 and an adjusting member 25 common to both nuts 22, 23 and being journaled in the bearings 21, the adjusting member having peripheral gear teeth 26 meshing respectively with the teeth of the nuts 22, 23.

In operation, when the gear 12 is placed on the spindle, it is seldom that it comes in proper position relatively to the grinding surfaces of the grinders 2 and heretofore in order to bring the gears in juxtaposition to the grinders, 2, the gears have been shifted bodily about the axis of the shaft 2, this operation necessitating various manipulations including loosening of the nut 27 which holds the gear on the spindle 6 and other operations making this nut accessible.

By my invention, each gear is placed with its teeth in juxtaposition to the grinders by merely turning the adjusting member 25 one way or the other to cause one set of straps 16 or 17 to pay out and the other set of straps to take up thus slightly rotating the drum 15 and the shaft 6.

What I claim is:

1. A gear grinding machine comprising a grinder, means for supporting and rolling the gear during the grinding operation comprising a pair of oppositely disposed elements, and means for adjusting said supporting and rolling means about its axis comprising adjusting mechanism coacting with said elements simultaneously to adjust said elements to the same extent, substantially as and for the purpose described.

2. A gear grinding machine comprising a grinder, means for supporting and rolling the gear during the grinding operation comprising a pair of oppositely disposed straps, and adjusting means operable to simultaneously pay out one strap and take up the other correspondingly, substantially as and for the purpose specified.

3. A gear grinding machine comprising a frame, a grinder, means for supporting and rolling the gear during the grinding operation comprising a carriage, a spindle on the carriage on which the gear is mounted, means for rotating the spindle during the movement of the carriage, including a drum mounted on the spindle, straps winding on the drum in opposite directions, means coupling the outer ends of the strap and the frame, and means for operating the coupling means to simultaneously pay out one strap and take up the other, substantially as and for the purpose set forth.

4. A gear grinding machine comprising a grinder, means for supporting and rolling the gear during the grinding operation comprising a drum, straps winding on the drum in opposite directions, and stationary means connected to the outer ends of the straps, and adjustable for paying out one strap and correspondingly taking up the other, substantially as and for the purpose described.

5. A gear grinding machine comprising a grinder, means for supporting and rolling the gear during the grinding operation comprising a drum, straps winding on the drum in opposite directions, and stationary means connected to the outer ends of the straps, and adjustable for paying out one strap and correspondingly taking up the other, said means comprising endwisely adjustable stems connected to the outer ends of the straps respectively, and means common to both stems for moving the same endwisely in the same direction, substantially as and for the purpose specified.

6. A gear grinding machine comprising a grinder, means for supporting and rolling the gear during the grinding operation comprising a drum, straps winding on the drum in opposite directions, and stationary means connected to the outer ends of the straps, and adjustable for paying out one strap and correspondingly taking up the other, said means comprising endwisely adjustable threaded stems connected to the outer ends of the straps respectively, toothed members threading on the stems, and means common to both toothed members for turning the same on the stems and thereby moving the stems endwisely, substantially as and for the purpose set forth.

7. A gear grinding machine comprising a drum, a grinder, means for supporting and rolling the gear during the grinding operation comprising a carriage reciprocally movable on the frame to carry the gear crosswise of the grinder, a spindle carried by and movable with the carriage, means for rocking the spindle during the movement of the carriage comprising a drum mounted on the spindle, straps winding on the drum in opposite directions, and means connecting the outer ends of the straps to the frame, and means for simultaneously adjusting the connecting means at the outer ends of the straps to pay out one strap and correspondingly take up the other, substantially as and for the purpose described.

8. A gear grinding machine comprising a drum, a grinder, means for supporting and rolling the gear during the grinding operation comprising a carriage reciprocally movable on the frame to carry the gear crosswise of the grinder, a spindle carried by and movable with the carriage, means for rocking the spindle during the movement of the carriage comprising a drum mounted on the spindle, straps winding on the drum in opposite directions, and means connecting the outer ends of the straps to the frame, the connecting means comprising endwisely movable threaded stems slidable in the frame, nuts threading on the stems, and means common to both the nuts for turning the same to move the stems, substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name, at Syracuse, in the county of Onondaga, and State of New York, this 22nd day of June, 1918.

ALEXANDER T. BROWN.