H. N. ANDERSON.

DEVICE FOR CHUCKING BLANKS IN GEAR ROLLING MACHINES.

APPLICATION FILED JUNE 22, 1914.

1,267,735.

Patented May 28, 1918.

2 SHEETS—SHEET 1.

Fig. 1

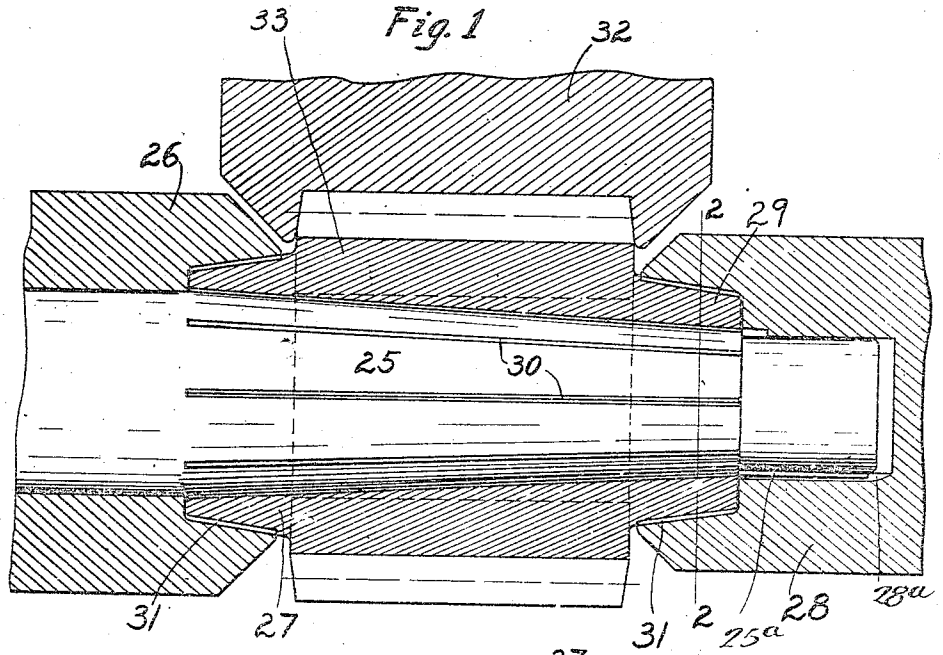


Fig. 2

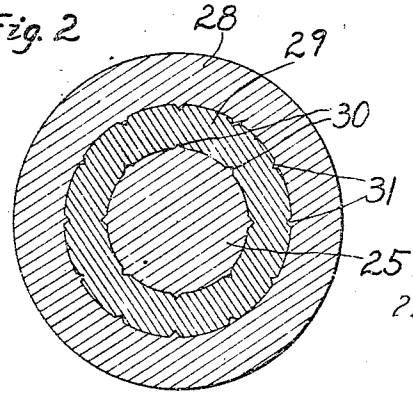


Fig. 3

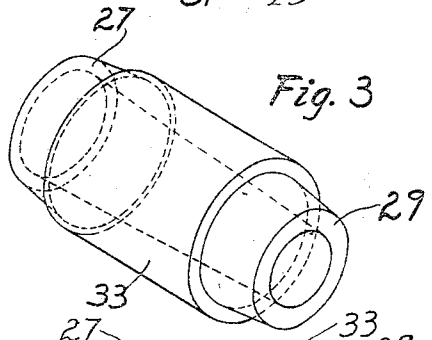
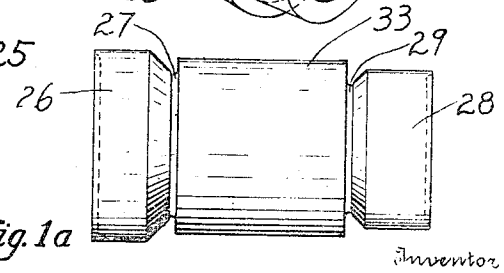


Fig. 1a



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2 SHEETS—SHEET 2.

Fig. 4

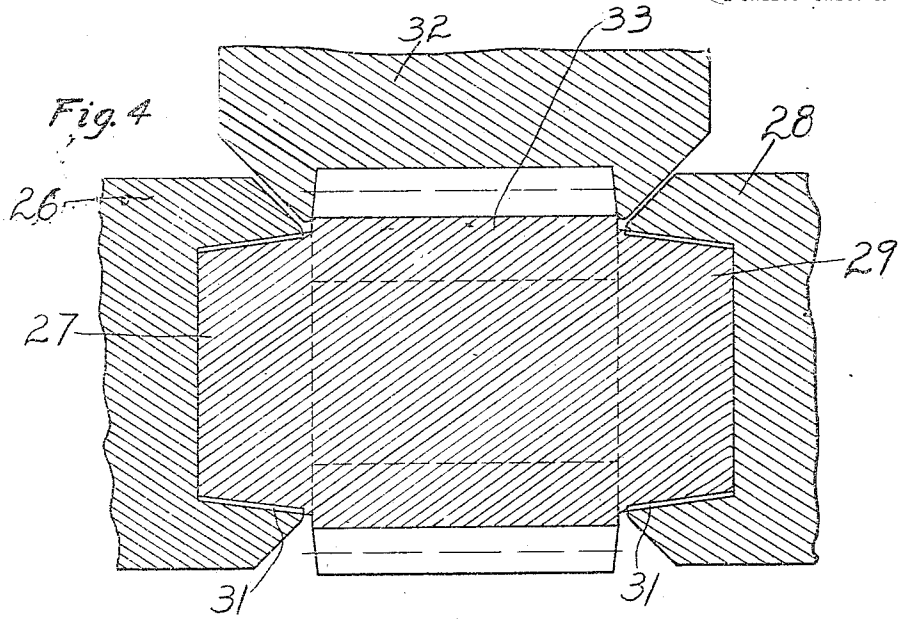
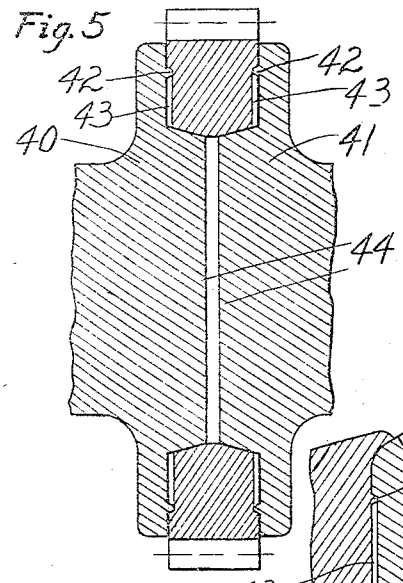


Fig. 5



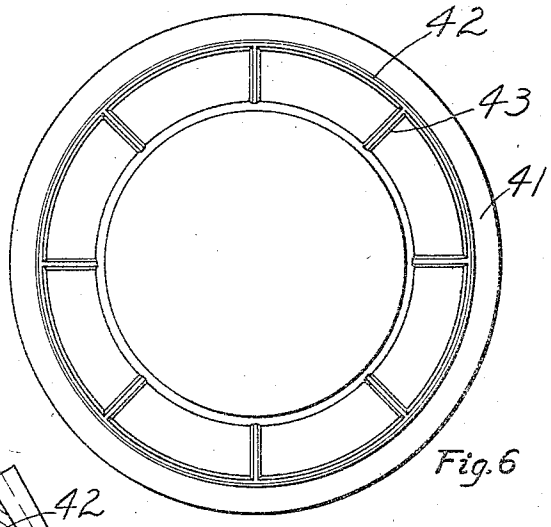


Fig. 6

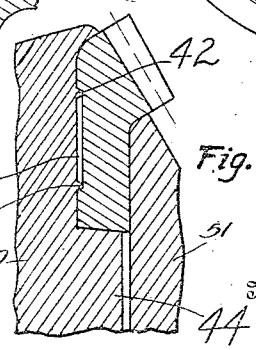


Fig. 7

Witnesses

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UNITED STATES PATENT OFFICE.

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DEVICE FOR CHUCKING BLANKS IN GEAR-ROLLING MACHINES.

1,267,735. Specification of Letters Patent. Patented May 28, 1918.

Application filed June 22, 1914. Serial No. 846,516.

To all whom it may concern:

Be it known that I, HAROLD N. ANDERSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Device for Chucking Blanks in Gear-Rolling Machines, of which the following is a specification.

My present invention relates to machines for rolling teeth on gear wheels, and one of its object is to provide means for chucking pinions of small diameter, particularly where they have a relatively broad face. Another object is to provide for chucking gears having relatively large bores; or ring gears. Another object is to insure that the blank does not slip in the chuck. Another object is to prevent gears having large bores from expanding under the action of the die. In U. S. Patent No. 1,001,799, issued to me August 29, 1911, I disclosed a machine in which teeth were formed on the blank by a rotary die, while in an application co-pending herewith, Serial No. 643,010, I have disclosed a machine in which the teeth are formed by rolling the blank against a toothed rack. In the patent referred to the blank was clamped between opposing disks, and one of the objects of the present improvement is to insure the rotation of a blank thus mounted without subjecting the bearings to excessive end thrust. These objects, and others which will appear later, are accomplished by means of the following mechanism in which:

Figure 1 shows a device for mounting a pinion having a large bore and broad face.

Fig. 1ᴬ shows a modified arrangement which will permit the arbor to be inserted in the blank before it is put in the machine.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the blank.

Fig. 4 shows a modification of Fig. 1, in which the arbor is omitted and the blank is not bored.

Fig. 5 shows the manner of mounting a ring spur gear.

Fig. 6 shows one of the disks used in Fig. 5.

Fig. 7 shows the manner of mounting a bevel ring gear.

Similar numerals refer to similar parts throughout the several views.

Figs. 1, 2 and 3 show an arrangement for mounting a pinion having a large bore and broad face. In this a tapered arbor 25 carries a member 26 having a tapered socket. The taper of the socket is opposite to that of the arbor and is adapted to receive a tapered hub 27 on the gear blank. The member 26 is rigidly secured to the arbor. Making the arbor and member 26 of separate pieces instead of one piece simplifies the work of constructing them. The outer end of the arbor is turned to cylindrical form and enters a suitable recess in the clamping member 28, said member having a tapered recess adapted to fit over the hub 29 on the other end of the blank. A feather 25ᵃ on the arbor enters a key way 28ᵃ in the clamping member and insures its rotation in unison with the arbor. It will be understood that the arbor and member 28 are suitably mounted and means provided for pressing the clamping members toward each other, but as means for doing these has been shown in the patent referred to no description is deemed necessary here. The arbor is provided with longitudinal ribs 30, and the walls of the sockets have ribs 31. In the patent referred to the disks between which the blank is clamped are pressed together with a hand wheel. The construction is such that pressure applied to hold the blank reacts on the bearings and consumes power. The advantage of providing the clamping members with driving ribs is that after sufficient force has been applied to sink the ribs into the blank the pressure may be relaxed slightly to relieve the bearings.

In Fig. 1, 32 indicates the die, which may be circular or rectilineal, and 33 represents the blank. The blank is provided with hubs 27 and 29, which may if desired be cut off after the teeth are finished. The hubs serve the double purpose of adding to the surface available for indentation by driving ribs, and resisting the tendency of the blank to expand under the action of the die. The hubs cannot expand when encompassed by the clamping members 26 and 28 and by virtue of their integrity with the blank they prevent its expansion. Under some circumstances the arbor may be dispensed with and the blank supported and driven entirely by the clamping members.

In the Patent, No. 1,001,799 above referred to, the blank is clamped between disks

(designated by numerals 24 and 27 in the drawings of said patent), one of which disks is carried by a longitudinally stationary and the other by a longitudinally movable shaft. It is understood that the clamping member 26, carrying the arbor 25, may take the place of one of these disks and that the clamping member 28 may take the place of the other disk. When a blank is to be inserted the movable shaft is drawn away from the other far enough to allow the blank to be placed on the arbor. If the blank has a broad face it is evident that the shaft will have to be moved a considerable distance. To avoid this the members 26 and 28 may be constructed as in Fig. 1A, and instead of taking the places of the disks be provided with recesses (shown in dotted lines) to receive the disks referred to. Fig. 1A shows a blank mounted between the members 26 and 28 thus arranged. It is to be understood that the arbor 25 is fixed in member 26, that it extends through the blank and into the member 28 and has a feather for compelling the members to rotate in unison, all as in Fig. 1. The assembly may be placed between the disks of the machine, the disks entering the recesses at the ends of the members 26 and 28. The faces of the disks have holes and if desired one of the members may be provided with dowels which will enter these holes and compel the member to rotate in unison with the disk, the feather in the arbor furnishing a positive drive for the other member. With this arrangement it is seen that pinions with broad faces may be mounted without excessive movement of the movable shaft.

In Fig. 5 I show an arrangement adapted to support ring gears having relatively narrow faces. In this structure the disks 40 and 41 have annular beads 42 which sink into the blank and prevent its expansion under the action of the die. The disks are also provided with radiating ribs 43 (see Fig. 6) to drive the blank, and may, if desired, have bosses 44 to serve the double purpose of supporting and centering the blank. In Fig. 7 the disks 50 and 51 are shaped to support a bevel ring gear and are also provided with annular beads 42 and radiating ribs 43.

Various minor departures may be made from, or additions made to the structures disclosed without departing from the substance or exceeding the scope of the appended claims.

Having shown and described the preferred embodiment of my invention what I claim is as follows:

1. In a device for chucking a blank in a gear rolling machine, a pair of clamping members between which to clamp the blank, and a driving element passing through a hole in the blank, whereby one member rotates the other.

2. In a device for chucking a blank in a gear rolling machine, a pair of clamping members between which to clamp the blank, said members having ribs to sink into the blank, and a driving element passing through a hole in the blank, whereby one member rotates the other.

3. A device for chucking a blank in a gear rolling machine, comprising a pair of clamping members between which to clamp the blank, said members being so constructed as to also prevent expansion of the blank under the action of the die, and a driving element passing through a hole in the blank, whereby one member rotates the other.

4. In a device for chucking a blank in a gear rolling machine, a pair of clamping members between which to clamp a blank, and an arbor fixed to one of the members, adapted to pass through the blank and by a feathered connection drive or be driven by the other member.

5. A device for chucking a blank in a gear rolling machine, comprising a pair of clamping members between which to clamp a blank, an arbor fixed to one of the members, adapted to pass through the blank and by a feathered connection drive or be driven by the other member, and projections on said members adapted to sink into the blank when it is clamped between them.

6. A device for chucking a blank in a gear rolling machine, comprising a pair of elements between which the blank is clamped, projections on the elements which sink into the blank, and a member farther removed from the axis of the blank than said projections to encompass a portion of the blank and prevent it expanding radially.

7. The combination of an arbor having longitudinal driving ribs, and a pair of clamping members mounted concentric to the axis of the arbor, said members also having driving ribs.

8. In a chucking device for gear rolling machines, a pair of clamping members having sockets adapted to fit over hubs on the blank, and ribs in said sockets adapted to sink into the hubs to prevent them turning in the sockets.

9. In a device for mounting a blank in a gear rolling machine, a pair of clamping members having sockets to fit over hubs on the blank, and a device to pass through a hole in the blank and connect the clamping members so they will rotate in unison.

10. In a device for mounting a blank in a gear rolling machine, a pair of clamping members having sockets to fit over hubs on the blank, and an arbor to pass through the blank.

11. In a device for mounting a blank in a gear rolling machine, a pair of clamping members having sockets to fit over hubs on the blank, and an arbor projecting from the

bottom of one socket adapted to pass through an axial bore in the blank and into an axial recess in the bottom of the other socket.

12. In a device for mounting a blank in a gear rolling machine, a pair of clamping members having sockets to fit over hubs on the blank, an arbor which is fixed with reference to one of said members adapted to pass through a central bore in the blank and into an axial recess in the bottom of the opposite recess, and means for causing the opposite clamping member to rotate in unison with the arbor.

13. A device for mounting a blank in a gear rolling machine, comprising a pair of clamping members having sockets to fit over hubs on the blank, an arbor which is fixed with reference to one of said members adapted to pass through a central bore in the blank and into an axial recess in the bottom of the opposite socket, means for causing the opposite clamping member to rotate in unison with the arbor, and longitudinal ribs on the arbor and in the sockets.

14. A device for mounting a blank in a gear rolling machine, comprising a pair of clamping members having tapered sockets to fit over hubs on the blank, a tapered arbor which is fixed with reference to one of said members adapted to pass through a central bore in the blank and into an axial recess in the bottom of the opposite socket, means for causing the opposite clamping member to rotate in unison with the arbor, and longitudinal ribs on the arbor and in the sockets.

15. A device for chucking a blank in a gear rolling machine comprising a pair of members between which the blank is clamped and an arbor connecting the two members, said arbor having longitudinal ribs.

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Witnesses:
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