May 1, 1928. 1,668,004

D. CARON

DOWEL MACHINE

Filed June 28, 1926

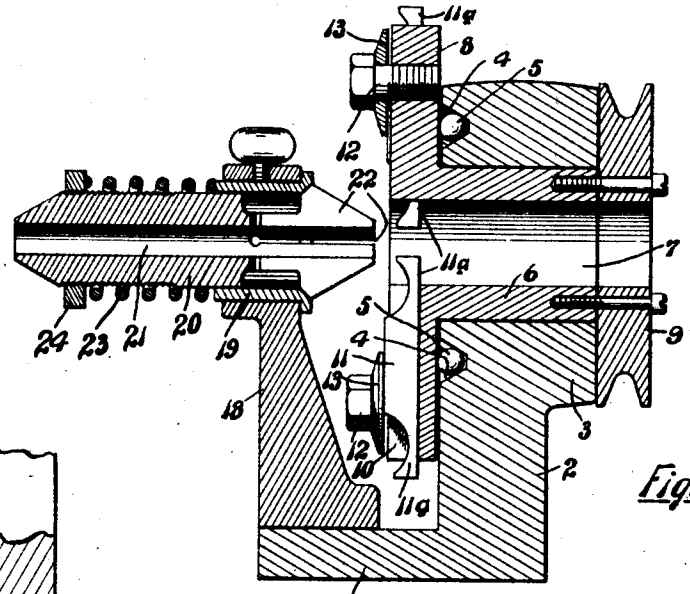


Fig. 1.

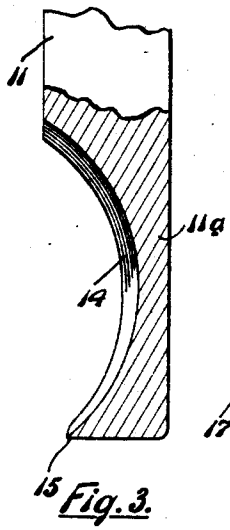


Fig. 3.

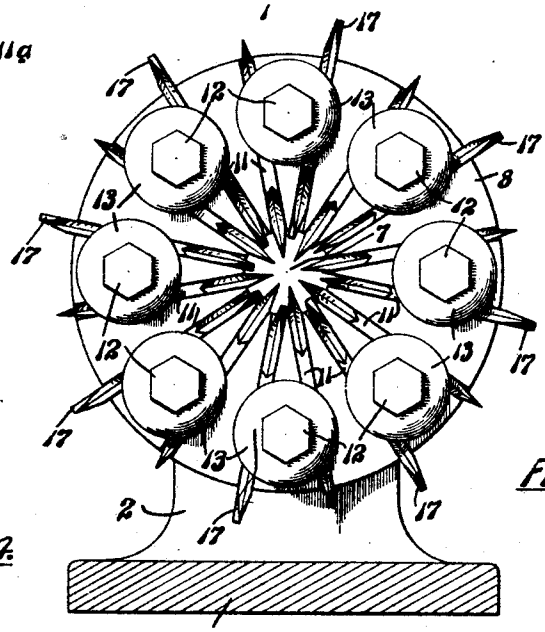


Fig. 2.

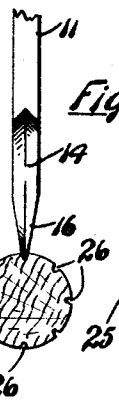


Fig. 4.

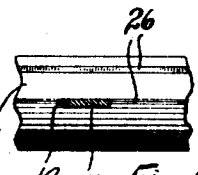


Fig. 5.



Fig. 6.

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UNITED STATES PATENT OFFICE.

DESIRE CARON, OF GRAND RAPIDS, MICHIGAN.

DOWEL MACHINE.

Application filed June 28, 1926. Serial No. 118,900.

This invention relates to a dowel machine and is more particularly concerned with a machine wherein grooves may be cut in the outer surface lengthwise of dowel rods and said grooves may be cut either parallel with the axis of the rod or spirally around and lengthwise of the rod. The machine which I have devised is capable of adjustment for either form of groove to be cut. The machine is compact, very efficient and serviceable and with it the required grooves may be very rapidly formed in dowel rods.

These grooves are for the purpose of conducting glue along the length of the rods, it being usual to insert the end of a dowel in an opening bored in a piece of wood which the dowel is to connect with another piece, the opening having a closed inner end. Glue having been placed in the opening when the rod is forced thereinto the glue traverses the grooves and suitably spreads itself along the length of the dowel where, if the surface of the dowel is smooth it is very hard for the glue to pass between it and the sides of the opening, there usually being a very close fit between the sides of the dowel and the sides of the opening. One feature of my invention resides in the production of these grooves by cutting the material directly from the dowel rod. Where grooves are pressed inwardly into the rod they are quite likely in the course of time to disappear due to the compressed wood assuming its former shape. This is particularly true when the dowels have been kept in storage for any length of time, but with my machine the grooves which are cut in the rod are permanent by reason of the fact that portions of the material are cut directly from the rod and there is no compression of the wood with the resultant likelihood of its assuming its former position.

The machine which I have invented is shown in the accompanying drawing, wherein—

Fig. 1 is a central vertical section through the machine.

Fig. 2 is an elevation thereof, the guide for the rod being removed.

Fig. 3 is a fragmentary enlarged vertical longitudinal section through the inner end of one of the cutting knives.

Fig. 4 is a fragmentary section and elevation illustrating the manner in which the cutter works to remove a groove from the rod.

Fig. 5 is a fragmentary elevation of a section of a dowel rod having straight longitudinal grooves therein, and

Fig. 6 is a similar view, the grooves formed being of spiral formation.

Like reference characters refer to like parts in the different figures of the drawing.

In the construction of the machine, a supporting casting is provided having a base 1 from which a standard 2 extends upwardly terminating at its upper end in an enlarged head 3 which is bored longitudinally therethrough for the mounting of a rotary cutter head, as will later be described. In one face of the head 3 an annular ball race in the form of a groove 4 is cut in which antifriction balls 5 are located.

The cutter head includes a central sleeve 6 with longitudinal openings 7 therethrough, at one end formed with an enlarged circular plate 8 which at one side bears against the balls 5, previously described. At the opposite end of the sleeve 6 a pulley 9 is attached by means of suitable screws thereby rotatably mounting the cutting head upon the support, as shown. The pulley serves as a means for retaining the sleeve 6 in the head or bearing 3 and if desired may be rotated by means of a belt passing around it to aid rotation of the sleeve and cutters.

In the face of the plate 8 a plurality of radial slots 10 are cut in each of which a cutting knife 11 is seated. The way in which the cutting knives are held is by means of set screws 12 and overlapping washers 13, a set screw 12 being threaded into the plate 8 between the adjacent knives 11 and the washer 13 extending over the outer edges of said two knives. In this way only one set screw and washer is required for two knives. The inner ends of the cutting knives converge toward the axis of the opening 7 through the sleeve 6. Each knife 11 at both its inner and outer ends is of the form shown in Fig. 3 being reduced in width as indicated at 11^a and given a concave shape at one side in which a V-shaped groove 14 is cut, the lower end of which comes to a point, as indicated at 15, in the tapered end 16 of the end of the cutting knife. Each alternate knife in the series around the plate 8 is twisted at each end at an angle to the body of the knife, as indicated at 17, the purpose of which will later appear.

In front of the plate 8 which carries the cutting knives, a guide for the dowel rod to

be fed through the machine is located. It comprises a supporting bracket 18 attached to the base 1, the upper end thereof carrying a bushing 19 through which the guide 20 for the dowel rod extends. The guide 20 has a longitudinal opening 21 through which the dowel rod is fed to the cutters, this opening being slightly larger than the dowel rod and the guide is slit at 22 at its end nearest the cutters whereby it is made yieldable. The end of the bushing 19 toward the cutters is outwardly tapered and a correspondingly tapered shoulder on the guide 20 engages this surface. A spring 23, bearing at one end against the bushing and at the other end against the collar 24 screwed onto the guide draws the said tapered surfaces tightly together and causes the opening 21 to be restricted at the slit end of the guide whereby it will bear tightly against the dowel rod.

By this construction the rod passed through the guide is firmly gripped on all sides and caused to pass evenly into the cutters. The rods are not always of uniform diameter or have rough spots on their surfaces and as these parts of the rod pass through the guide, they will, upon engagement with the restricted part of the opening, cause the guide to move toward the cutters in the bushing 19 compressing the spring 23 and releasing the pressure of the inclined surfaces and permit the split portions of the guide to spring outwardly enough to let the enlarged rough part of the dowel pass through. The spring 23 will return the guide to its normal position as soon as the rough spot of the dowel has passed and always cause the yieldable portion of the guide to bear firmly against the dowel rod.

By reason of the construction only the alternate knives may be set inwardly far enough to act upon the rod as it passes through the guide opening 21 to said knives. Such a rod, as shown at 25, when forced through and coming into contact with the knives 11 having the straight cutting ends 11^a, has straight grooves 26 cut therein parallel to the axis of the rod. These grooves are cut by reason of the cutting point at 15 and the adjacent edges of the metal left by the groove 14 engaging with the wood and removing a V-shaped groove from the wood. If, on the other hand, it is desired to have spiral grooves shown at 26^a in Fig. 6, in the dowel 25^a, the alternate knives with the cutting ends 17 disposed at an angle to the plane of the body of the knife are set inwardly to the proper position whereupon when the dowel rod is fed through the machine the angle of the knives will cause the cutter head carrying the knives to turn about a horizontal axis automatically so that the grooves 26^a cut therein will be cut spirally and longitudinally of the rod, as shown in Fig. 6.

Each end of a knife is identical with the other, it being evident that the knives may be reversed in position should they become dulled at one end, before taking the same from the machine for sharpening. The removal of the wood from the rod insures that the grooves 26 or 26^a shall be permanently formed in the dowel rod 25 and there is no possibility of the grooves disappearing by reason of compressed wood assuming its earlier shape. The construction is very durable, efficient, compact in structure and capable of fully withstanding the service for which it is designed. It is, of course, apparent that by feeding a rod, having either grooves of the type shown at 26 or 26^a, through a succeeding machine with knives differently set the rod can be given grooves either spirally or straight crossing each other as is at times desired for a better spreading of the glue when the dowels are used.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. A machine of the class described, comprising a support, a cutter head rotatably mounted on said support and having a longitudinal opening therethrough, said cutter head at one end including a circular plate formed with a plurality of radial grooves in its outer face, a cutting knife seated in each groove, a plurality of set screws threaded into said plate, one of said set screws being located between alternate knives, and a washer through which the set screw passes extending over the edges of each of two adjacent knives.

2. A machine of the class described, comprising a support, a cutting head rotatably mounted thereon having an opening therethrough, the axis of which is co-incident with the axis of rotation of the head, said head at one end being formed with an enlarged circular plate having radial grooves in its outer face, a plurality of cutting knives adjustably located in said grooves, and means for holding the knives in any position to which adjusted, alternate knives having cutting means at their inner ends located in a plane parallel to the length of the grooves in which seated, and the other knives having cutting means at their inner ends located at an angle to said planes.

3. A machine of the class described, comprising a support, means on the support to form grooves in a dowel rod as it is passed through the machine, a guide having a longitudinal opening through which a dowel rod may be passed mounted on said support,

one end of said guide being slotted and made yieldable thereby, a tapered surface on said support, a correspondingly tapered surface on the guide near the slotted end thereof, and spring means to draw the two tapered surfaces together and restrict the opening in the guide.

4. A machine of the class described, comprising a support, means on the support to form grooves in a dowel rod as it is passed through the machine, a guide having a longitudinal opening through which a dowel rod may be passed mounted on said support, one end of said guide being slotted and made yieldable thereby, a tapered surface on said support, a correspondingly tapered surface on the guide near the slotted end thereof, spring means to draw the two tapered surfaces together and restrict the opening in the guide, and means for adjusting the tension of said spring means.

In testimony whereof I affix my signature.

DESIRE CARON.