No. 692,033. Patented Jan. 28, 1902.

E. RIVETT.

LATHE ATTACHMENT FOR CUTTING SPIRALS.

(Application filed Mar. 29, 1901.)

(No Model.)

Fig. 1.

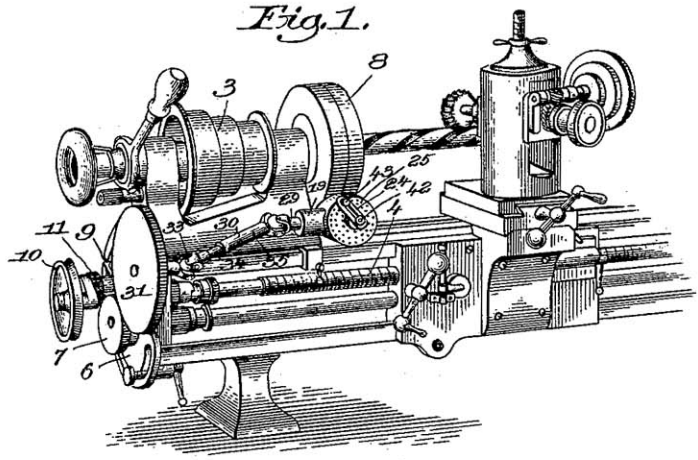

Fig. 2.

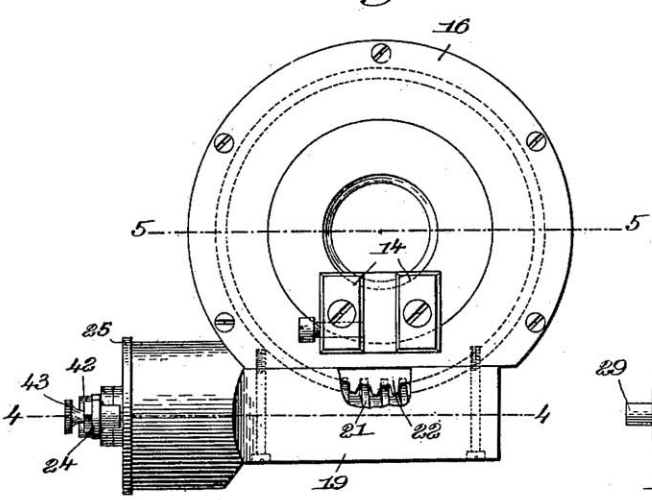

Fig. 3.

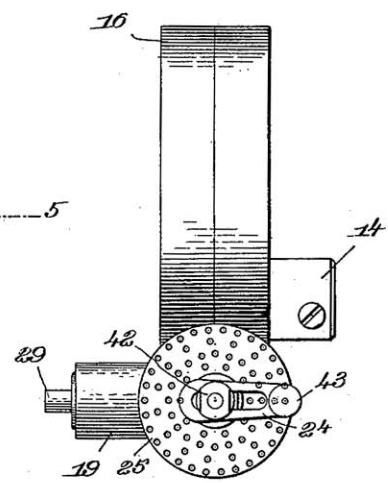

Fig. 4.

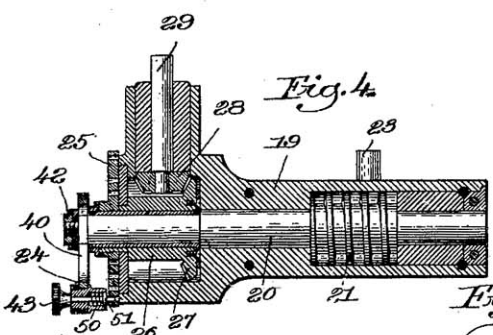

Fig. 5.

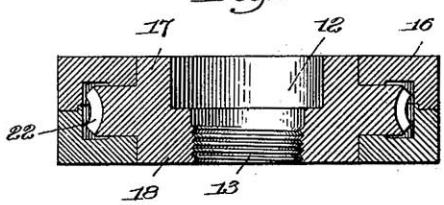

Fig. 6.

Witnesses:
Fred S. Grunhaf
Adolph B. Raisch.

Inventor.
Edward Rivett.
By Crosby Gregory
Attys.

UNITED STATES PATENT OFFICE.

EDWARD RIVETT, OF BOSTON, MASSACHUSETTS.

LATHE ATTACHMENT FOR CUTTING SPIRALS.

SPECIFICATION forming part of Letters Patent No. 692,033, dated January 28, 1902.

Application filed March 29, 1901. Serial No. 53,520. (No model.)

To all whom it may concern:

Be it known that I, EDWARD RIVETT, a citizen of the United States, and a resident of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Lathe Attachments for Cutting Spirals, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

It is the object of my invention to provide a novel attachment for lathes which is designed to be used in connection with a suitable miller or other tool carried by the tool-carriage and by means of which any ordinary engine-lathe may be used for cutting spirals on a rod or shaft with perfect precision, my invention being especially useful in cutting the spiral flutes on a twist-drill or similar tool, though of course it will be evident that the invention is not limited to this use.

My novel attachment is to be substituted for the face-plate of an ordinary lathe, and it comprises a work-driving member which is screwed upon the live-spindle of the lathe in the place usually occupied by the face-plate, the said driving member having the function of a face-plate and operating to rotate or drive the work held in the lathe. Instead of obtaining the power for driving the driving member from the ordinary cone-pulley in the head-stock of the lathe the said driving member is connected by suitable gearing with the gearing upon the swing-plate which drives the usual lead-screw and feed-rod of the lathe, and an independent driving-pulley is also mounted upon said swing-plate, by means of which the gearing for rotating the lead-screw and feed-rod is operated. While my attachment is being employed on a lathe of course the usual driving-belt will be disconnected from the cone-pulley.

In the cutting of spirals having a very slight twist, as the flutes of twist-drills, the driving connections between the gearing for the lead-screw and the driving member will be so constructed that the rotation of the driving member, and consequently the work with relation to the advance of the tool-carriage, will be such as to cut a spiral of the proper pitch. Where two or more parallel spirals are to be cut upon the same rod, it is necessary after the completion of one spiral to turn the rod about its axis through a certain number of degrees without altering the position of the tool-carriage, and for this purpose I provide my connections between the gearing for the lead-screw and the driving member with an index-wheel, which has a fixed relation to the gearing for the lead-screw, and an index-pawl, which has a fixed relation with the driving member, the said index-pawl and index-wheel being normally locked together, so that the rotation of the gearing for the lead-screw will rotate the driving member when the index-pawl is disengaged from the index-wheel. The said index-pawl, and consequently the driving member and the work, may be rotated a predetermined distance with relation to the lead-screw, so as to bring the work into the proper position to have the second or next flute or spiral cut therein.

My driving member, which, as stated before, has the function of a face-plate and is screwed upon the live-spindle of the lathe, is journaled in a suitable casing or housing and has on its periphery a series of worm-teeth. The housing also contains a shaft having a worm thereon meshing with the worm-teeth on the driving member, the said shaft having fast thereto the index-pawl. The index-wheel is loosely mounted upon said shaft and is rigidly connected with a system of gearing leading to the gearing for operating the lead-screw.

In practice I intend my attachment to be used in connection with a milling device which will be mounted upon the usual tool-carriage of the lathe, which is given its traverse by the lead-screw, the said milling device carrying a cutter of the proper shape to mill the desired spiral grooves in the work. The cutter, it being understood, is driven from a suitable counter-shaft.

In the drawings, Figure 1 is a perspective view of the head end of a lathe with my attachment applied thereto. Fig. 2 is a front view of the attachment by itself, the position of the work relative thereto being shown. Fig. 3 is an end elevation of Fig. 2. Fig. 4 is a section on the line 4 4, Fig. 2. Fig. 5 is

a section on the line 5 5, Fig. 2; and Fig. 6 is an end view of the worm-shaft, hereinafter described.

Referring to Fig. 1, wherein is shown the head end of a lathe with my attachment applied thereto, 3 indicates the usual cone-pulley. 4 is the lead-screw, 5 the feed-rod, and 6 the swing-plate at the end of the lathe on which are usually supported the change-gears for driving the feed-rod and lead-screw at different speeds, and 7 is a gear mounted on said swing-plate 6 and forming a part of the usual gear mechanism which drives the said feed-rod and lead-screw. These parts are or may be of the construction usually found in ordinary engine-lathes.

My attachment (shown generally at 8) is to be substituted for the ordinary face-plate on the live-spindle of the lathe and serves to rotate the work at the desired speed, the said attachment having connections for driving the same which connect directly with the gear mechanism for rotating the lead-screw, and in the operation of the device the usual belt will be shipped from the cone-pulley 3, and the swing-plate 6 will be provided with a stub-shaft 9, carrying at one end a driving-pulley 10 and at the other end a gear 11, meshing with the gear 7. The driving-pulley 10 is driven from any suitable source of power and through the gear 7 rotates the lead-screw and feed-rod and through the driving connections to my attachment also rotates the work.

Referring to Fig. 5, 12 is the work-driving member, which has a central screw-threaded aperture 13 therein adapted to be screwed upon the live-spindle of the lathe in the place of the ordinary face-plate, and said driving member has projecting from its driving-face the lugs 14, between which the tail of the dog secured to the work rests, said driving member therefore having the function of the face-plate in rotating the work. It will be understood, of course, that the usual tail-stock (not shown) on the lathe is employed to hold the end of the work opposite to that supported by the live-spindle. The said driving member is preferably journaled in a suitable casing, as 16, the said driving member having the hubs 17 18, which are seated and rotate in apertures in opposite faces of the casing 16, as shown in Fig. 5, to thereby leave the driving-face of the driving member exposed. The casing, which is preferably made in two parts, (as shown,) is thus supported by the driving member and is provided with the foot portion 19, which when the attachment is in position extends across the bed of the lathe, as seen in Fig. 1, the said foot portion having journaled therein the worm-shaft 20, upon which is mounted the worm 21, the said worm meshing with the worm-teeth 22 on the periphery of the driving member 12. To hold the casing 16 stationary, the foot 19 thereof is provided with a projection 23, which is adapted to be seated in a suitable recess (not shown) in the head of the lathe. The end of the worm-shaft 20 has fast thereon the index-pawl 24, which coöperates with the index-wheel 25, as hereinafter described, the said index-wheel being keyed to a sleeve 26, loose upon the shaft 20, and to which is rigidly secured the beveled gear 27. A beveled gear 28, mounted upon the stub-shaft 29, also journaled in said foot, meshes with the beveled gear 27, and the said stub-shaft 29 is connected by a flexible shaft 30 (see Fig. 1) with a gear 31, suitably mounted upon the end of the lathe and meshing with the gear 7, before mentioned. The flexible shaft 30 will preferably have the universal joints 32 and 33, so that the gear-wheel 31 may be placed in any convenient position on the end of the lathe, and yet be connected to the stub-shaft 29, and also the said flexible shaft 30 will be provided, preferably, with the two telescopic members 34 35, so as to adapt the connection to various-sized lathes, the said telescopic sections 34 35 being keyed together so as to rotate in unison, but to allow of a sliding movement of one on the other, as usual in this class of devices.

From the above description it will be seen that the work-driving member is supported upon the live-spindle of the lathe and in turn supports the casing 16. The casing, therefore, and the parts carried thereby are carried entirely by the driving member.

The index-pawl before referred to comprises the slotted shank 40, which is mounted upon the flattened end of the shaft 20 and held thereon in any suitable way, as by nuts 42, and the said shank 40 carries at its end the spring-pressed index-pin 43, which is adapted to engage any one of the apertures in the index-wheel 25, as will be readily understood by those skilled in the art. A coil-spring 50, surrounding the shank of the pin and bearing against a collar 51 thereon, serves to normally maintain the said pin in engagement with the index-wheel.

It will be understood that the driving-pulley 10 is rotated by a suitable belt and that motion will be transmitted through the gear 7 to the lead-screw 4 to advance the tool lengthwise of the lathe. The gear 7, meshing with the gear 31, will through the connections 30, above described, rotate the beveled gear 27 and index-wheel 25, and since the index-pawl and index-wheel are locked together the rotary motion will be transmitted to the shaft 20, and thence by the worm mechanism to the driving member 12. The worm-gearing gives to the driving member a slow speed of rotation relative to the advance of the tool-carrier, so that a spiral of a very slight twist may be milled or cut in the work. The pitch of the spiral may be varied, of course, by varying the size of the gear upon the swing-plate 6. After one spiral has been cut, if it is desired to cut a second spiral parallel thereto, as in the case of a twist-drill, the operator will withdraw the pin 43 of the index-

pawl from the hole in the index-wheel and will turn the index-pawl through a predetermined distance to bring the work in correct position for the cutting of the second spiral therein without altering the position of the tool-carriage.

It will be understood, of course, that the index-wheel will be suitably marked, so that the distance that the index-pawl will have to be turned relative to the wheel to turn the driving member through any predetermined angle may be readily ascertained.

It will be seen from the above that I have provided an attachment which may be used on any ordinary engine-lathe and by means of which a spiral of any shape or degree of twist may be cut.

I wish it understood that various changes may be made in the details of the structure of my device without departing from the spirit of my invention, which consists in providing an attachment to be substituted for the ordinary face-plate of a lathe which comprises a driving member with gearing connecting the same with the gear mechanism for rotating the feed-rod and lead-screw of the lathe, together with means for adjusting the relation between the driving member and the lead-screw.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An attachment for lathes comprising a driving member, a casing supported thereby, and means inclosed in the casing to drive said driving member, the driving-face of said driving member being exposed through the casing whereby the work may be operatively connected thereto.

2. An attachment for lathes comprising a rotary driving member having oppositely-disposed hubs, one of said hubs constituting a driving-face, a casing supported on said hubs to leave said driving-face exposed, and means supported by the casing to rotate said driving member.

3. An attachment for lathes comprising a work-driving member adapted to be screwed on the live-spindle of a lathe, and having gear-teeth on its periphery, a casing supported by said driving member, the driving-face of said driving member being exposed through the casing, a gear in said casing and meshing with the gear-teeth on the driving member, and means for operating said gear.

4. An attachment for lathes, comprising a driving member having gear-teeth on its periphery, and adapted to be screwed on the live-spindle of the lathe, a casing supported by the driving member and inclosing the periphery thereof, to leave the driving-face of said driving member exposed, a worm journaled in said casing and meshing with the gear-teeth on the driving member, and driving connections for rotating said worm, said driving connections including two members normally locked together, and means for adjusting one of said members relatively to the other.

5. An attachment for lathes comprising a driving member adapted to be screwed on the live-spindle of a lathe, said driving member having worm-teeth on its periphery, a casing supported by said driving member and surrounding the periphery thereof to leave the driving-face of said driving member exposed, a worm in said casing, and detachable driving connections between said worm and gearing for the lead-screw of the lathe, said driving connections including two members normally locked together, and means for adjusting one of said members relatively to the other.

6. An attachment for lathes comprising a work-driving member, adapted to be screwed on the live-spindle of a lathe, and having gear-teeth on its periphery, a stationary casing supported by said driving member, to leave the driving-face of the latter exposed, a gear in said casing and meshing with said gear-teeth, and driving connections between said gear and the gearing for the lead-screw of the lathe, said driving connections including two members normally locked together, and means for adjusting one of said members relatively to the other, whereby the relation between the lead-screw and the driving member may be adjusted.

7. An attachment for lathes, comprising a work-driving member adapted to be screwed upon the live-spindle of a lathe, said driving member having worm-teeth on its periphery, a housing or casing inclosing and supported by said driving member, a worm-shaft supported entirely in said housing and carrying a worm engaging said worm-teeth, an index-pawl fast on the said worm-shaft, an index-wheel loose thereon and coöperating with the index-pawl, and means connected with the gearing for the lead-screw for rotating said index-wheel.

8. An attachment for lathes comprising a work-driving member adapted to be screwed on the live-spindle of a lathe, said driving member having gear-teeth on its periphery, a casing supported on said driving member, a worm-shaft supported entirely in the casing and having a worm thereon meshing with the teeth on the driving member, a gear loose on said worm-shaft and an index-wheel rigid with said gear, an index-pawl fast on the shaft and coöperating with the index-wheel, and driving connections in operative relation with the last-named gear and adapted to be driven from the gearing of the lead-screw of the lay.

9. An attachment for lathes comprising a work-driving member adapted to be screwed on the live-spindle of a lathe, said driving member having hubs thereon, and worm-teeth on its periphery, a stationary casing supported on the hubs of the driving member and inclosing the periphery thereof, the ends of the hubs projecting through the casing, a worm

in said casing, and detachable driving connections between the worm and the gearing for the lead-screw of the lathe.

10. An attachment for lathes comprising a driving member adapted to be screwed to the live-spindle of the lathe, said driving member having worm-teeth on its periphery and hubs on opposite sides thereof, a casing inclosing said driving member and supported on the hubs thereof, a worm-shaft in said casing having a worm thereon meshing with the worm-teeth on the driving member, a bevel-gear loose on said worm-shaft and having an index-wheel secured thereto, an index-pawl fast to said worm-shaft coöperating with the index-wheel, and means independent of the cone-pulley of the lathe to drive said bevel-gear.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD RIVETT.

Witnesses:
LOUIS C. SMITH,
GEO. W. GREGORY.