

J. J. GRANT.
GEARING.

APPLICATION FILED NOV. 9, 1908. RENEWED JULY 11, 1912.

1,053,984.

Patented Feb. 25, 1918.

2 SHEETS—SHEET 1.

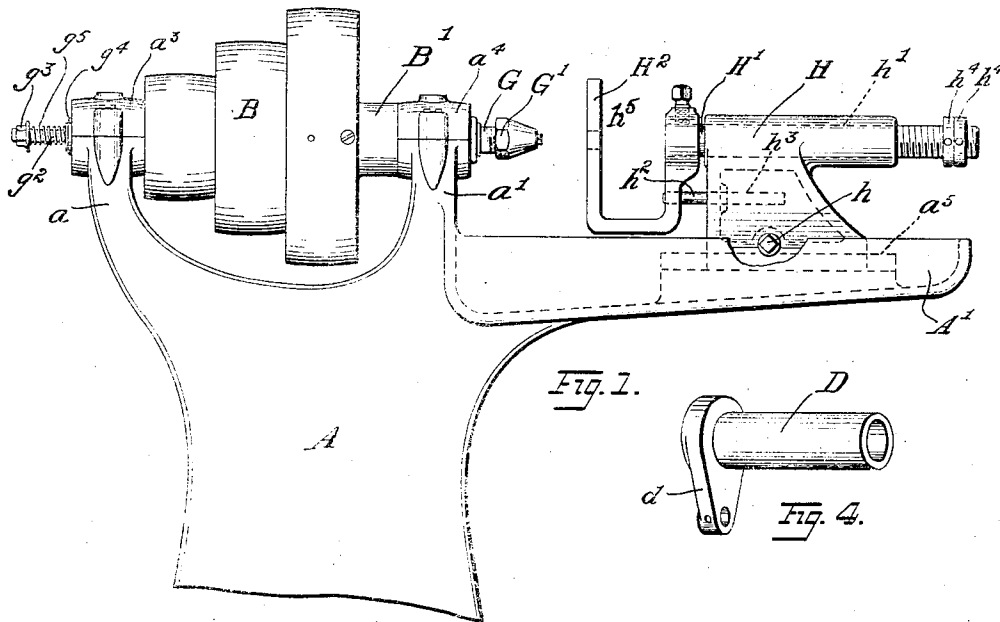


Fig. 1.

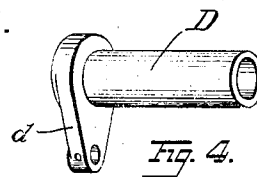


Fig. 4.

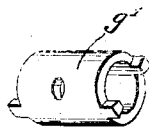


Fig. 5.

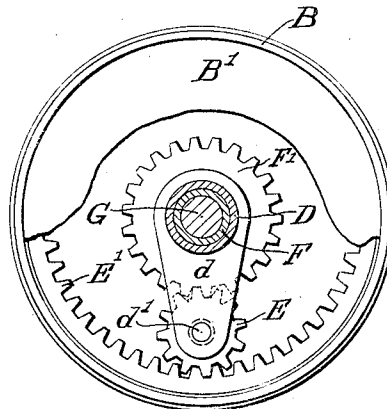


Fig. 5.



Fig. 7.

Witnesses

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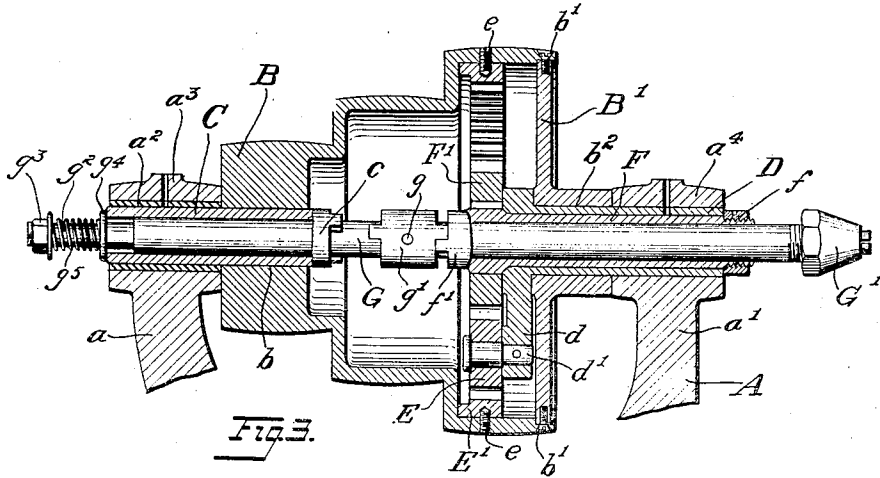
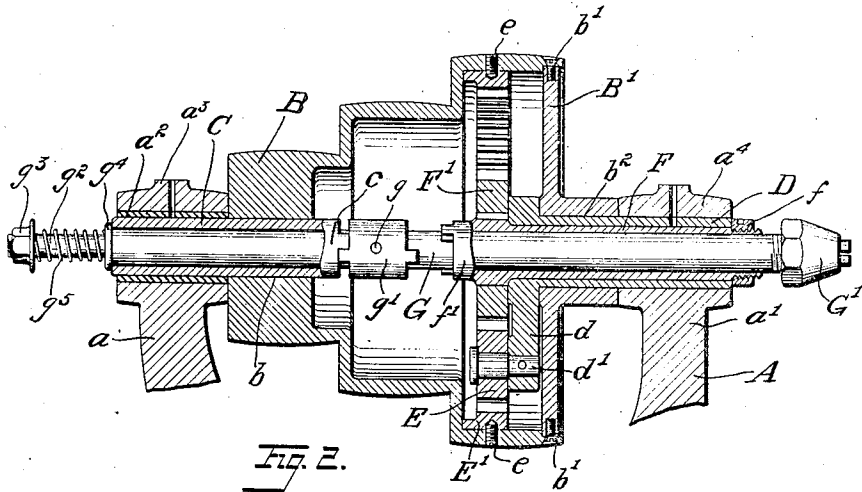
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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GEARING.

1,053,984.

Specification of Letters Patent.

Patented Feb. 25, 1913.

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To all whom it may concern:

Be it known that I, JOHN J. GRANT, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Gearing, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to machines in which it is desired to obtain a movement of a tool holder in one direction at a given speed and a reverse movement of same at another speed as is, for instance, required in what is known as a hand tapping machine.

The object of said invention is to provide a structure in which such movement may be obtained by means of simple and efficient mechanism.

Said invention consists of means herein-after fully described and particularly set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, the disclosed means, however, constituting but one of various mechanical forms in which the principle of the invention may be applied.

In said annexed drawings:—Figure 1 is a front elevation of a hand tapping machine embodying my invention, the lower portion of the frame being broken away. Fig. 2 is an axial section of the head or driving portion of the machine, showing certain portions in elevation, on an enlarged scale. Fig. 3 is a view similar to that shown in Fig. 2, in which certain parts are shown to occupy positions varying from those shown in Fig. 2. Fig. 4 is a detail perspective view of one of the elements of the machine. Fig. 5 is a side elevation of the cone pulley, showing a portion broken away to disclose the interior mechanism. Figs. 6 and 7 are perspectives of detail portions of the device.

In the device illustrated as embodying my invention, A is the main frame of the machine and upon this frame are formed two standards a a' . Upon these standards is mounted a hollow cone pulley B, one end of which is formed with a bore b into which is secured by a driving fit a hollow trunnion C. The outer end of this trunnion is mount-

ed in a bearing a^2 formed in a standard a , part of such bearing being formed by a suitable cap a^3 , as will be understood. The opposite end of the pulley is formed by a circular plate B' which is secured in such end by means of suitable screws b' b' . This plate is formed with an outwardly projecting hollow boss forming a bearing b^2 , Figs. 2 and 3. Clamped in the standard a' by means of a removable cap a^4 is a fixed member D, provided with a longitudinal bore, which forms a journal for the bearing b^2 and the plate B', and therefore for the corresponding end of the cone pulley. This member projects into the interior of the cone pulley and is formed with a radial arm d , Fig. 4. Fixedly secured in the outer end of said radial arm is a journal pin d' upon whose inner end is mounted a pinion E, Figs. 2 and 3. This pinion meshes with an internal gear E' removably secured upon the interior of the pulley by means of screws e e . Rotatably mounted in the bore of the member D is a sleeve F, whose outer end is threaded and provided with a nut, f , Figs. 2 and 3. The inner end of this member F is formed with a gear F' which meshes with the gear E.

The bores of members C and F are co-axial with the cone pulley and therefore in alinement with each other, and rotatably mounted therein is a chuck driving spindle G. The inner end of the member C is provided with a clutch member c and the inner end of member F is provided with a similar clutch member f' . Fixedly secured, by means of a pin g , upon the spindle G intermediately of the two clutch members c and f' is a third clutch member g' , the distance between the members c and f' being such that member g' may occupy a neutral position intermediately thereof, wherein it engages neither the one nor the other. The one end of the spindle is provided with a chuck G' and the other end of said spindle is formed with a reduced portion g^2 , whose outer end is threaded and provided with a nut g^3 . Mounted upon its reduced portion is a washer g^4 and intermediately of this washer is a light spring g^5 . It will therefore be seen that the spindle is movable in either direction of its axis and that the spring g^5 will tend to maintain engagement between the clutch members g' and c .

Upon an extension A' of the frame is

mounted a carriage H which is adjustable toward and from the chuck upon a slide-way a^5 and capable of being fixed in any desired position thereon by means of a set screw h . Said carriage is formed with a longitudinal bore h' in which is slidably mounted a bar H'. To the inner end of this bar is secured a U-shaped work holder H², having an aperture h^5 passing through it, as shown in dotted lines, Fig. 1, oscillation of this work holder being prevented by means of a rod h^2 fixed thereto and projecting into and slidable in a suitable bore h^3 formed in the main or body portion of the carriage. The other end of the head is threaded, the outer diameter of the threads being substantially equal to the diameter of the bore h' , whereby a free sliding movement of the bar in the direction of its axis may be obtained. Upon this threaded portion are mounted two circular nuts h^4 h^4 , which may therefore be adjusted in various positions along said bar.

The above described device operates as follows:—Assuming the parts of the head to be in the position shown in Fig. 2 and that a suitable belt, not shown, is driving the cone pulley in a right hand direction, with reference to the tapping operation, it will be seen that the cone pulley is directly connected with the spindle and that the latter will therefore be driven in such right hand direction. Assuming now that the work is placed upon the back of the work holder H² in the usual manner, and that the tap is being driven into the work, such tap will draw the work holder H² and bar H' toward the chuck until the nuts h^4 h^4 strike the adjacent portion of the carriage H. The work holder is therefore arrested and the tap being still further driven into the work, draws the spindle in the direction of its axis and disengages the clutch member g' from the clutch member c . The said spindle is thereupon still further moved in the direction of its axis by hand so as to cause the said clutch member g' to engage the clutch member f' . This action breaks the direct connection of the spindle with the pulley and connects same indirectly through the medium of the gears E' and F'. The spindle will therefore be driven in the opposite direction at an increased speed, thereby withdrawing the tap from the work, as will be readily understood. As soon as such tap is withdrawn, the spring g^5 effects the reengagement of the clutch member g' with the member c . The bar H' is then given its original position by hand and the device is again ready for another operation.

It will be noted that the adjustability of the nuts h^4 h^4 and of the carriage H permits the parts to be arranged to meet varying conditions, as will be readily understood by those skilled in the art. It will also be

noted that by making the plate B' removable, the interior mechanism may be readily reached and gears of varying size readily substituted for each other therein, so as to produce varying reverse speeds, if so desired.

By means of the above described device a tapping mechanism is provided wherein the required direct and reverse motions of the tap are obtained and varying speeds also obtained by means of the cone pulley, all through the use of but a single belt. The use of a double belt, one direct driving and one crossed, which have heretofore been used in machines of this character, for obtaining the direct and reverse speeds is thereby eliminated. By providing the cone pulley the varying speeds are also obtained, as will be readily understood by those skilled in the art, without the necessity of changing the overhead shaft pulley.

What I claim therefore and desire to secure by Letters Patent is:—

1. In a machine of the character described, the combination of a frame; a hollow stepped cone-pulley having a hollow trunnion at one end and a bearing at the other; a hollow rotatable member mounted co-axially with said pulley and forming a journal for said bearing; a longitudinally movable spindle mounted in said trunnion and hollow rotatable member; means for effecting engagement between said spindle and said pulley or between said spindle and hollow rotatable member; gearing within said pulley placed intermediately of same and said rotatable member; said trunnion being mounted in a bearing on said frame; and a member fixed relatively to the frame, placed intermediately of said pulley bearing and rotatable member, and forming a journal for said bearing.

2. In a machine of the character described, the combination of a frame; a hollow stepped cone-pulley having a hollow trunnion at one end and a bearing at the other; a hollow rotatable member mounted co-axially with said pulley and provided with a gear; a longitudinally movable spindle mounted in said trunnion and hollow rotatable member; means for effecting engagement between said pulley and spindle or between said hollow member and spindle; a pinion mounted upon an axis fixed relatively to said frame and engaging said gear; an internal gear mounted in said pulley and engaging said pinion; and a member placed intermediately of said pulley bearing and said hollow rotatable member, and forming a journal for said bearing; said trunnion being mounted in a bearing on said frame.

3. In a machine of the character described, the combination of a frame; a hollow pulley having a hollow trunnion at one end and a bearing at the other; a sleeve fixed

relatively to said frame forming a journal for said bearing; a hollow rotatable member mounted in said sleeve and formed with a gear; a spindle mounted in said trunnion and hollow rotatable member; means for effecting engagement between said spindle and pulley or between said spindle and hollow rotatable member; a pinion mounted upon said hollow sleeve; and an internal gear mounted within said pulley and engaging said pinion; said trunnion being mounted in a bearing on said frame.

4. In a machine of the character described, the combination of a frame; a hollow pulley having a hollow trunnion at one end and a bearing at the other; a hollow sleeve fixed relatively to said frame and forming a journal for said bearing; a hol-

low rotatable member mounted in said sleeve and provided with a gear; a spindle mounted in said trunnion and hollow rotatable member; means for effecting engagement between said hollow member and spindle; a pinion mounted upon said hollow sleeve engaging said gear; a gear mounted within said pulley and engaging said pinion; said trunnion being mounted in a bearing on said frame; and a plate rotatably mounted on said sleeve and fixed to the end of the pulley to close same.

Signed by me, this 6th day of November, 1908,

JOHN J. GRANT.

Attested by—

WM. ROTHENBERG,
O. T. WEDEMAYER.