June 6, 1933. J. A. ARENZ 1,912,879

MACHINE FOR ROLLING DOUBLE THREAD SINGLE POINT SCREWS

Filed Oct. 18, 1929 3 Sheets-Sheet 1

Fig. 1

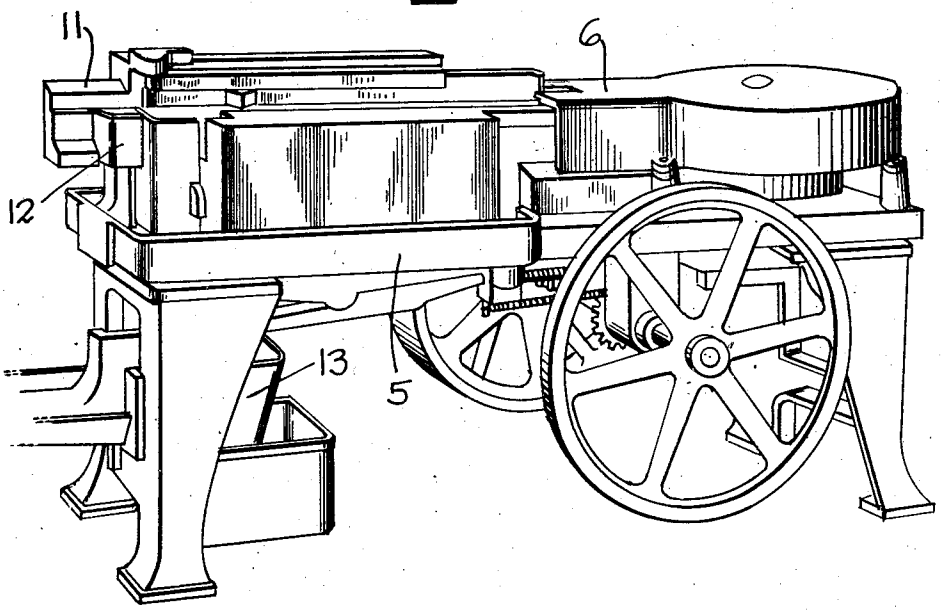
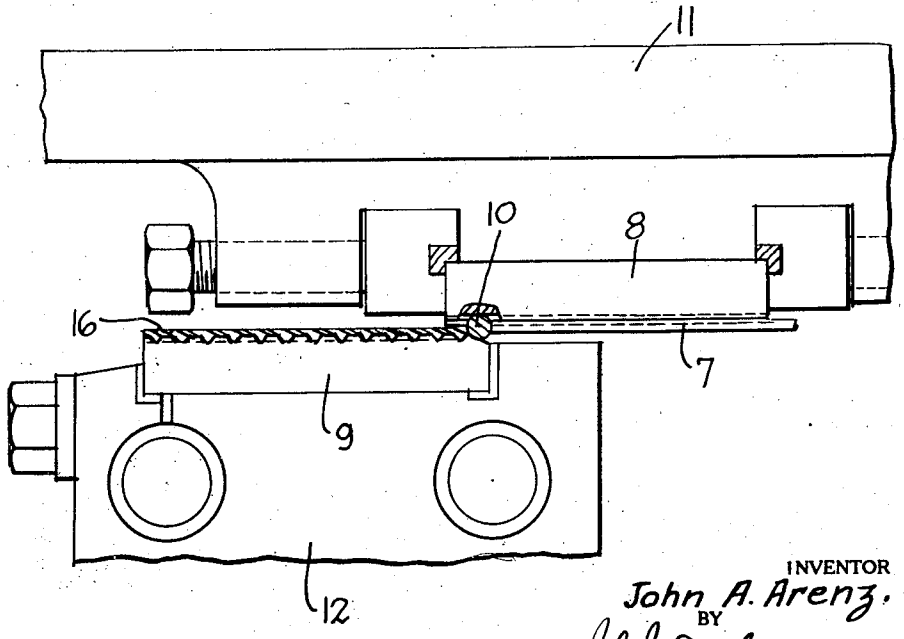


Fig. 2



INVENTOR
John A. Arenz.
BY
John J. Lynch ATTORNEY

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Filed Oct. 18, 1929 3 Sheets-Sheet 2

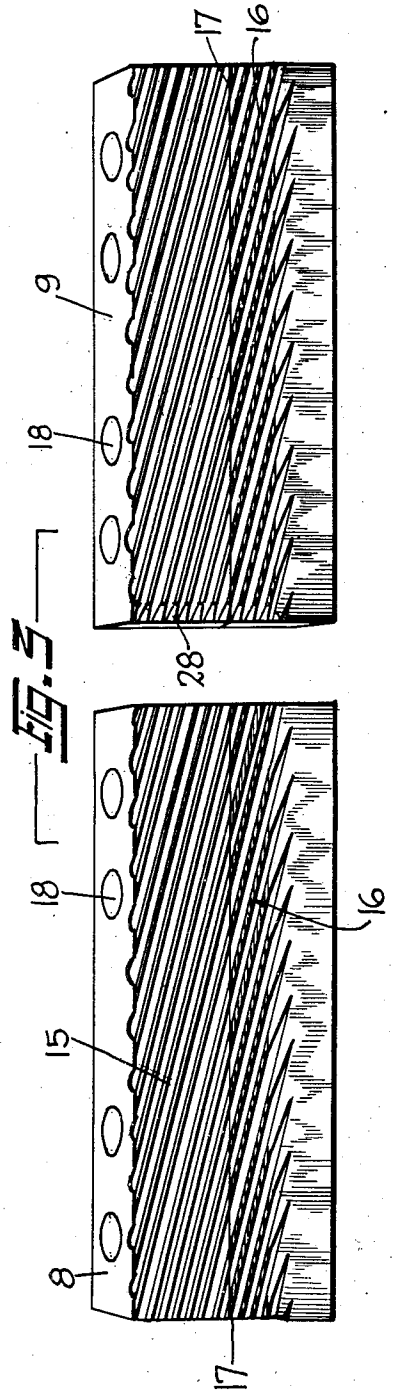


FIG. 3

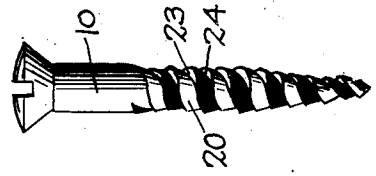


FIG. 6

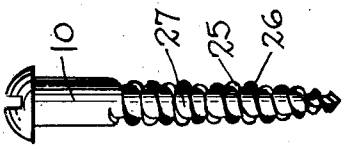


FIG. 5

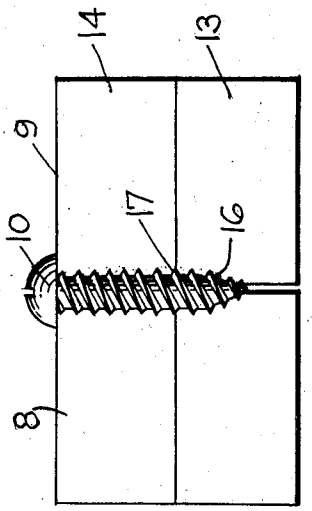


FIG. 4

INVENTOR
John A. Arenz.
BY
John J. Lynch ATTORNEY

June 6, 1933. J. A. ARENZ 1,912,879

MACHINE FOR ROLLING DOUBLE THREAD SINGLE POINT SCREWS

Filed Oct. 18, 1929 3 Sheets-Sheet 3

Fig. 7

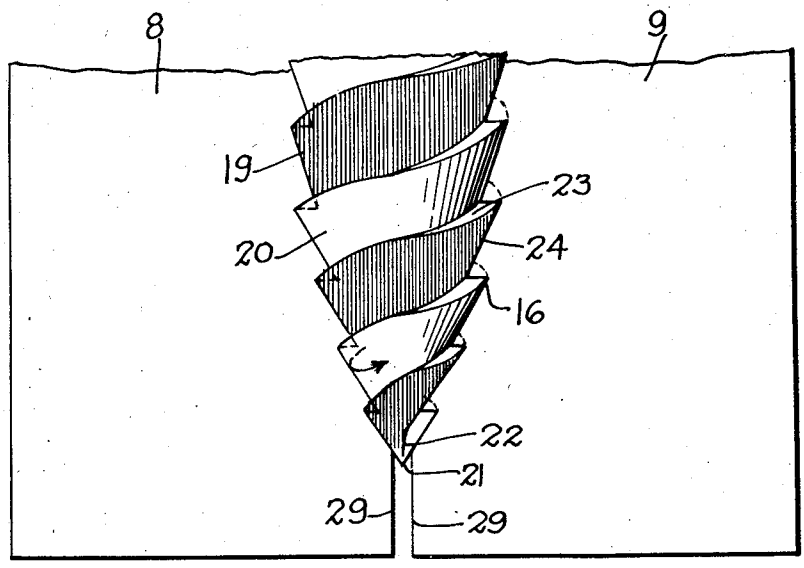
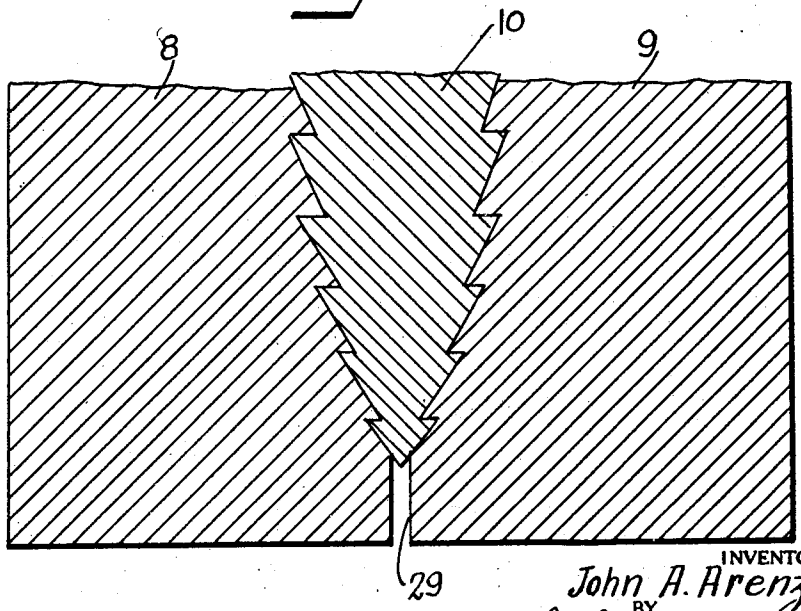


Fig. 8



INVENTOR
John A. Arenz.
BY
John J. Stypul ATTORNEY

Patented June 6, 1933 1,912,879

UNITED STATES PATENT OFFICE

JOHN A. ARENZ, OF MOUNT VERNON, NEW YORK, ASSIGNOR TO INTERNATIONAL SCREW CO., OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

MACHINE FOR ROLLING DOUBLE THREAD SINGLE POINT SCREWS

Application filed October 18, 1929, Serial No. 400,677, and in Canada April 18, 1929.

My invention relates to a method of and means for producing double thread, single point screws other than the method from which screws are ordinarily made and in which the screw blank is cut or milled to provide the threads.

One of the important objects of my invention is the production of a rolled, double thread screw, the threads of which terminate in a point in alignment with the longitudinal axis of the screw, thus producing a screw which is high in efficiency in respect to its holding power and which can also be produced much more cheaply and rapidly than the usual cut or milled type of screw.

Another and equally important object of my invention is the production of dies for the rolling of the double thread, each of the threads of which terminates in a single point at the tip of the screw, the rolling of which has heretofore not been carried out due to the difficulty encountered in the making of a die couple which would effectively carry out the work.

A still further object of my invention is the provision of a screw thread upon a screw blank by the process of rolling it between matched dies so that the double thread thereon terminates at the point of the screw threaded portion of the screw in a penetrating point, the threads being carried down and terminating at the point of the screw and being turned at a greater angle than the usual pitch of the threads in their lower point, these points being formed at the opposite sides of the screw and tapered off at their outer side so that the screw penetrates the wood in a straight line by separating the fibers with a minimum cutting away of said fibers, the single pointed, double thread being not easily deflected from a straight line because of the balanced relations of the thread which extend down to the point of the screw.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings,

Figure 1 is a view in perspective of a machine for the rolling of screws to provide thereon a single pointed, double thread.

Figure 2 is an enlarged, fragmentary plan view of the thread rolling mechanism of the machine showing the dies and a screw blank in position to be operated upon.

Figure 3 is a view of the thread forming faces of the companion dies which roll the threads on the screw blank.

Figure 4 is an end view of the die showing the completed screw therebetween.

Figure 5 is a view in elevation of one form of screw upon which has been rolled a speed thread.

Figure 6 is a view similar to Figure 5 showing a different type of screw upon which has been rolled a drive thread.

Figure 7 is an enlarged, fragmentary view of the discharge end of the die showing how the double threaded, single pointed drive screw is produced by the action of the die, and

Figure 8 is a section in elevation taken through the dies and through the diameter of the screw of the type illustrated in Figure 7 showing the shape in cross section of the threads and the die grooves.

Referring to the drawings in detail, 5 indicates a machine embodying a screw blank producing mechanism 6, a screw seating means 7 and screw threading means 8 and 9, the latter means constituting die, the adjacent faces of which are grooved so that when one of the dies 8 move longitudinally of the other and when there is a screw blank 10 positioned between the dies, in this particular instance, a single pointed, double thread screw will be produced. The die 8, as illustrated in Figure 2 is carried in a movable section 11 on the machine while the die 9 is carried in the stationary portion 12, the machine being provided with a suitable thatch cross 13 into which the screw blanks drop after they have been completely threaded and after the movable die 8 has moved

beyond the end of the fixed die 9 to free the blank 10 and permit the finished product to drop into the hopper 13.

The machine, per se, forms no part of my invention and its operation and mechanism need not be described, it being sufficient to note that suitable mechanism is employed for advancing one die relatively to another. The machine has incorporated therein means for pointing the screw blank before it is fed to position as illustrated in Figure 2, adjacent the die by the feeding member 7 and its passage between the threading dies 8 and 9 provides it with a single point, double thread which terminates in two cutting edges at the extreme point of the screw blank, thereby producing a screw which will draw itself into the wood approximately 200% faster than ordinary screws in present day use. The threading dies 8 and 9 are provided on their matching faces with the angularly disposed threads or grooves, the incline of the grooves being twice as great as the incline necessary in the rolling of a single thread screw of the same diameter because the distance from the center of one double thread to another when followed around with a pencil, scratch-all or tracing device, is found to be twice the distance from center to center of a single thread when the latter is measured in the same manner.

In order that the dies may conform to the contour of the screw blank to effectively roll a thread thereon during passage of the blank between the dies, it has been found necessary to make the dies in two parts, a lower part 13 and an upper part 14, the threading grooves 15 of the upper part of the dies and the threading grooves 16 of the lower part of the dies, coinciding to form continuous grooves but in view of the fact that the depth of the grooves have to vary from the meeting point 17 of the lower and upper portion 13 and 14 of the dies, it has been found necessary to cut the grooves 16 in the lower portions 13 of the dies separately and then join the dies in any suitable manner, such as by machine screws, which are countersunk, the countersunk openings being visible and being indicated by the numeral 18 in Figure 3. The depth of the grooves 16 must vary from the normal depth of all of the grooves 15 in the upper parts 14 of the dies to a minimum depth as illustrated in Figure 8 and consequently in cutting these lower portions 13 of the dies, it has been necessary to set them at an angle to the cutter so that the cutter will provide the proper depth of groove from the point 17 of the dies to the terminating points of the grooves.

It will be particularly noted that the terminating points of the grooves are in a plane and consequently in alignment, whereby the double threads are rolled to a single piercing point at the tip end of the screw blank. In the particular instance as illustrated in Figure 7, the alternate threads are shaded and indicated by the numeral 19 while the other thread is indicated by the numeral 20, the grooves of the die being inclined at their proper angle permit travel of the screw blank longitudinally of the dies and in the same horizontal plane, the threads being completely formed on the blank by the cooperation of the threads on the mat mating spaces of the die. Should the dies be placed in contact with each other, it would be found that the high point or thread forming ridges on the dies would be opposite each other or rather, in the same plane, but the opposite ones in the same plane during the rolling of the threads would be rolling different threads, that is, as illustrated in Figure 7, the thread of the dies that was rolling thread 19 on the screw blank would be opposite the thread on the die 9 which was rolling the thread 20 of the screw blank. During this rolling operation, the screw revolves freely in the direction indicated by the arrow in Figure 7, as the die 8 travels relatively to the die 9 and as the grooves 16 of the dies get shallower, the double threads of the screw are drawn to a point 21 and each of the threads provide a cutting face 22 which marks the termination of the threads.

It will be noted in the form of screw illustrated in Figures 6 and 7 that the dies rolling thread, the shelf 23 of which is substantially in a horizontal plane relatively to the longitudinal or vertical axis of the screw. while the thread mate 24 may be inclined at any angle desired. The angle between the face 23 and the face 24 in screws rolled between dies being such that when the screw enters the wood or other material into which it may be forced, it will be noted that immediately the shelf portion 23 will work its way into the fibers of the wood or other material and driving of the screw will only consist in revolving it because the face 23 will drive the screw into the wood and the single point 21 will work its way into the fibers in a straight line and the double thread will drive the screw into the material faster than is possible with a single screw thread and with a result that the screw will be completed embedded in the fibers of the wood or material and it has been found after exhaustive tests that its holding power is substantially 200% greater than ordinary threaded screws.

In the screw blank illustrated in Figure 5, a thread 25 has been formed together with a companion thread 26 providing a double thread speed screw, the threads of which are formed on the shank 27 of the screw blank, the threads, of course, being formed by a die having different shaped grooves cut in the faces thereof.

It will be noted that the entrance end of the die 9 is tapered as at 28 or bevelled so

that the feed rod 7 can project the screw blank 10 between the dies 8 and 9 preparatory to the rolling operation.

It will also be understood that in rolling these threads, there is a slight elongation in the thread due to the flow of the metal in a longitudinal direction and this flow of the metal is utilized in my improved method to form the penetrating point on the screw between the flattened portion 29 of the dies 8 and 9. These dies must be spaced accurately in order to form the proper point and also to form the proper thread on the screw, the pressure of the dies on the screw blank being sufficient to displace the metal as described.

It is evident from the foregoing description that the operation of the device produces a double threaded, single pointed screw, which, in my opinion has never been heretofore produced by the rolling process, inasmuch as the problems incident to the production of such a screw by the rolling process has never been overcome.

While I have described more or less precisely, the details of my construction, I do not wish to be understood as limiting myself thereto as I contemplate changing the form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of my invention.

What I claim is:—

A pair of relatively movable screw thread rolling dies having the opposing faces thereof substantially parallel to a given point and converging toward each other beyond said point, each of the dies being made in separate pieces in the parallel and converging portions thereof, means for securing the pieces together, said dies being cut to provide oppositely aligned grooves on the opposing parallel and converging faces thereof, the grooves of the opposite dies being substantially in a horizontal plane at any point in the cross section of the dies, said grooves decreasing in depth in said converging faces whereby a double thread may be rolled on a blank positioned between the dies, the lower ends of the dies being spaced apart far enough to permit the metal of the screw blank to be crowded therein whereby the threads rolled on the blank terminate in a single piercing point between the dies.

In testimony whereof, I have signed my name to this specification this 17th day of October, 1929.

JOHN A. ARENZ.