

(No Model.)

3 Sheets—Sheet 1.

H. K. JONES.

METHOD OF AND MEANS FOR ROLLING SCREWS.

No. 470,805.

Patented Mar. 15, 1892.

Fig. 1.

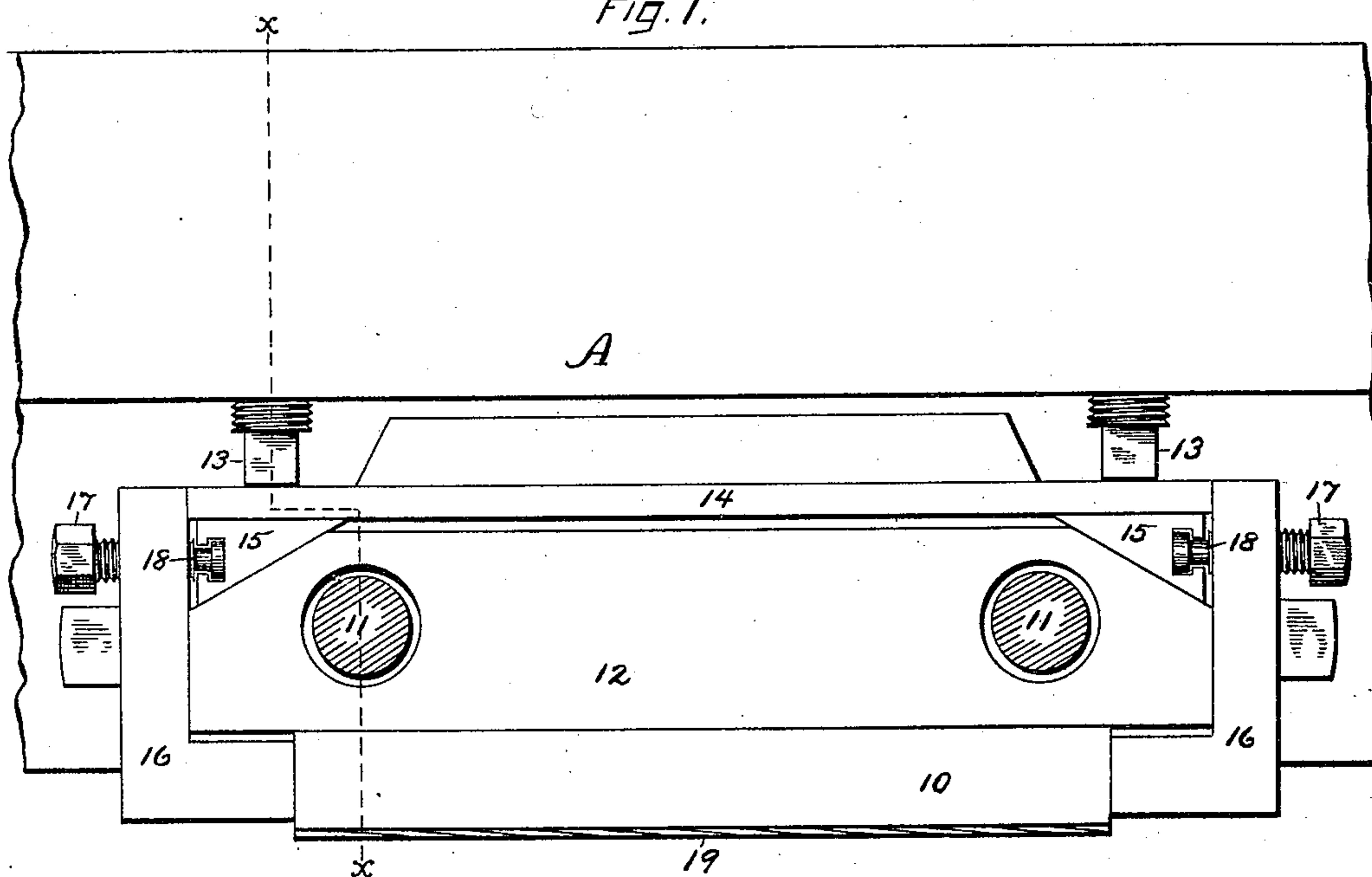
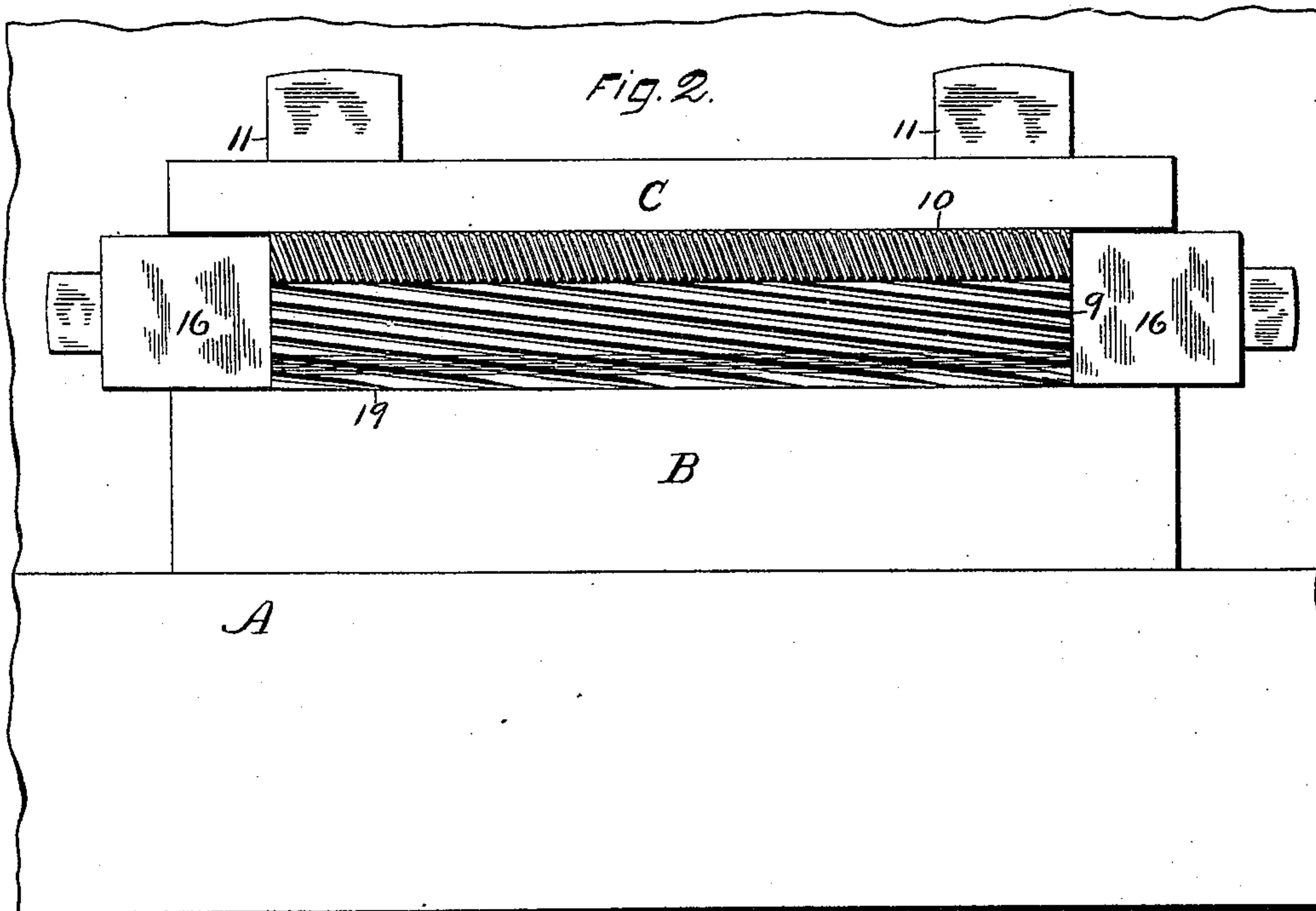


Fig. 2.



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(No Model.)

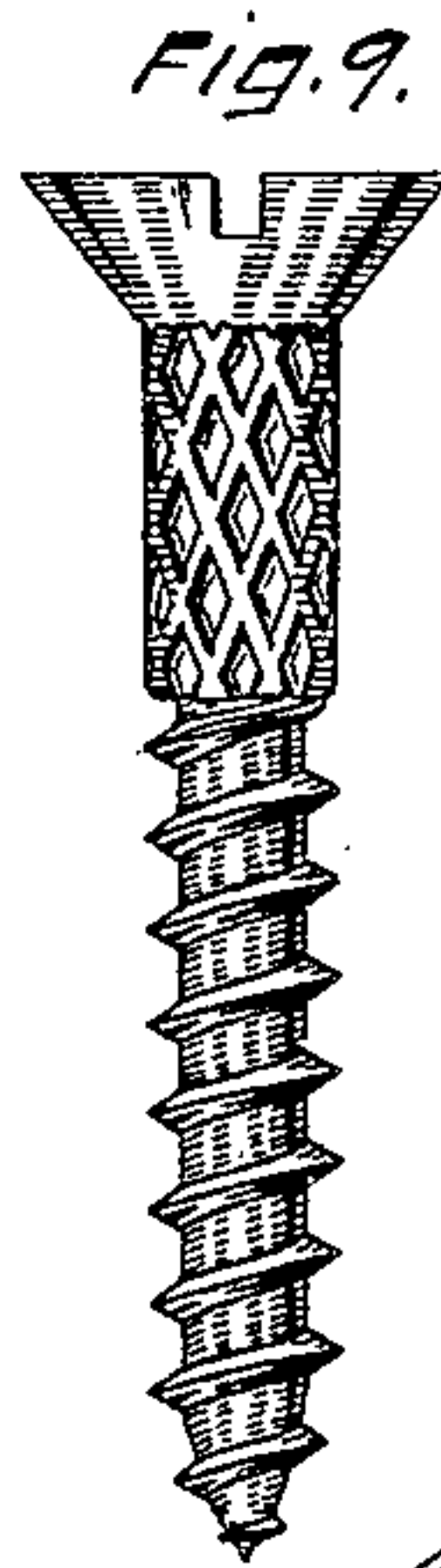
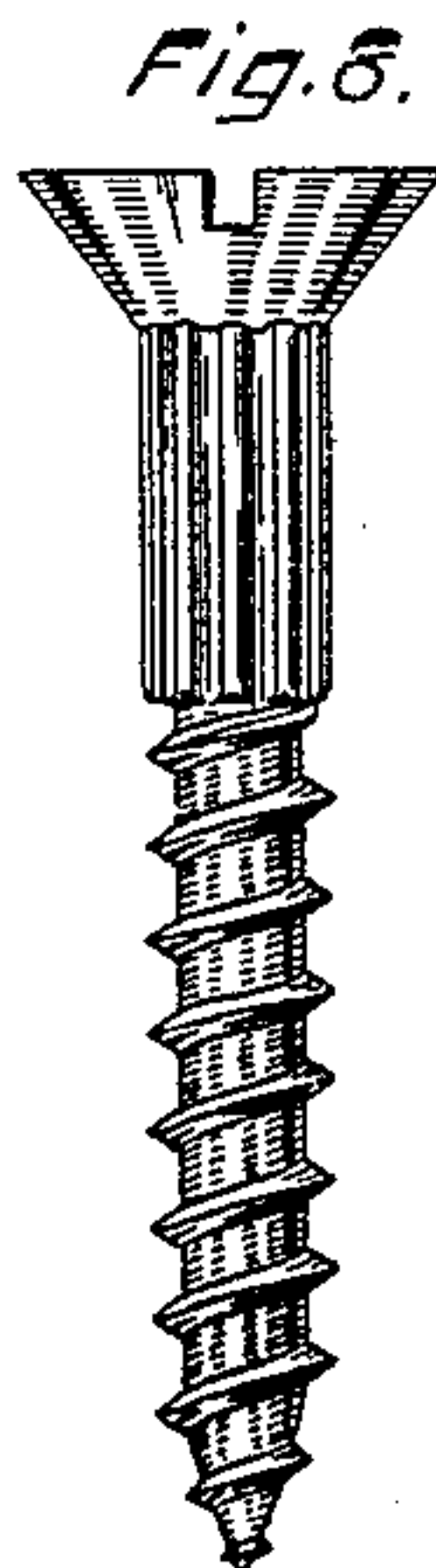
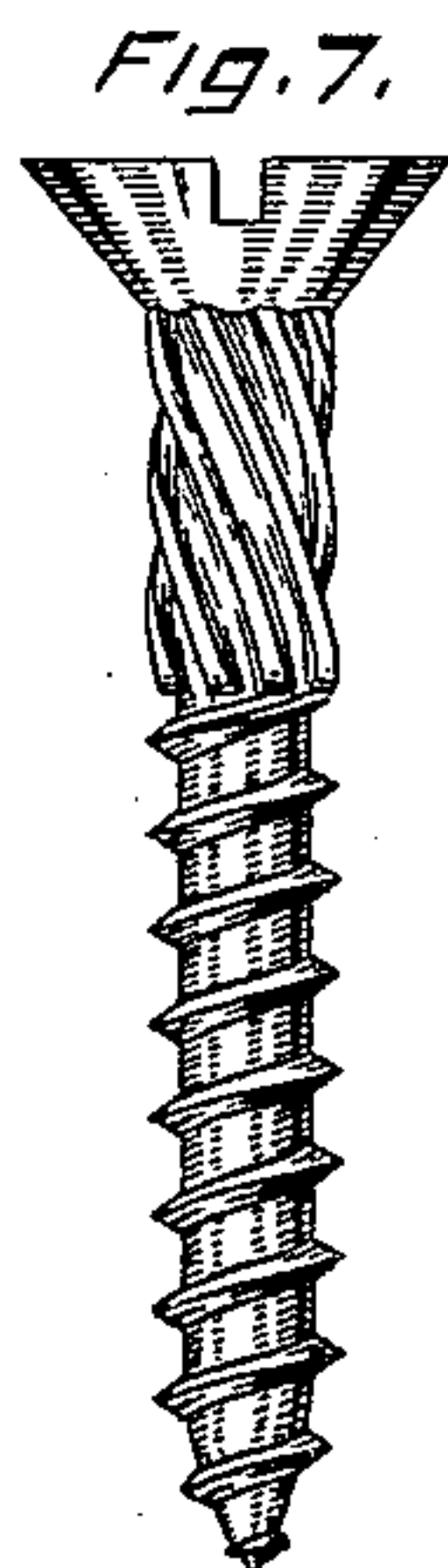
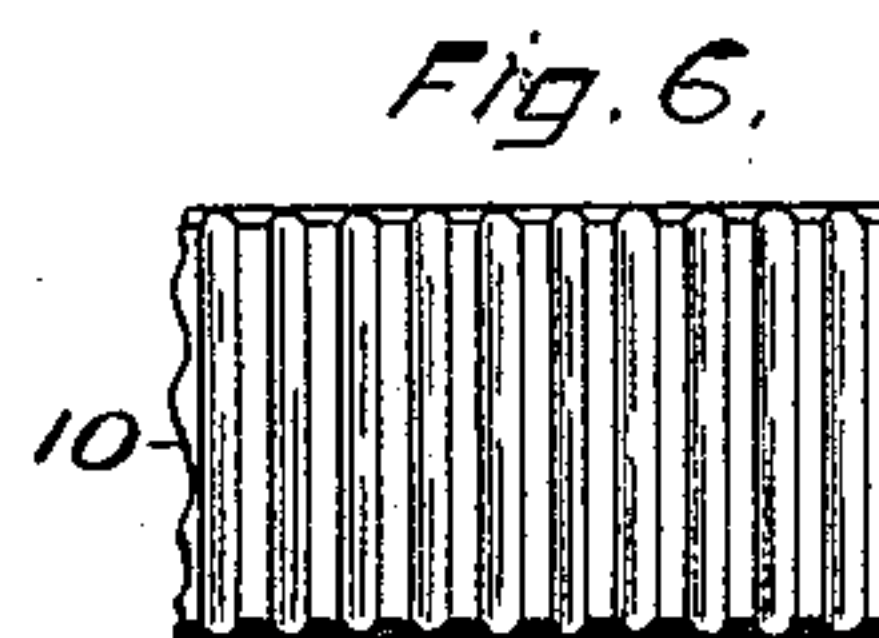
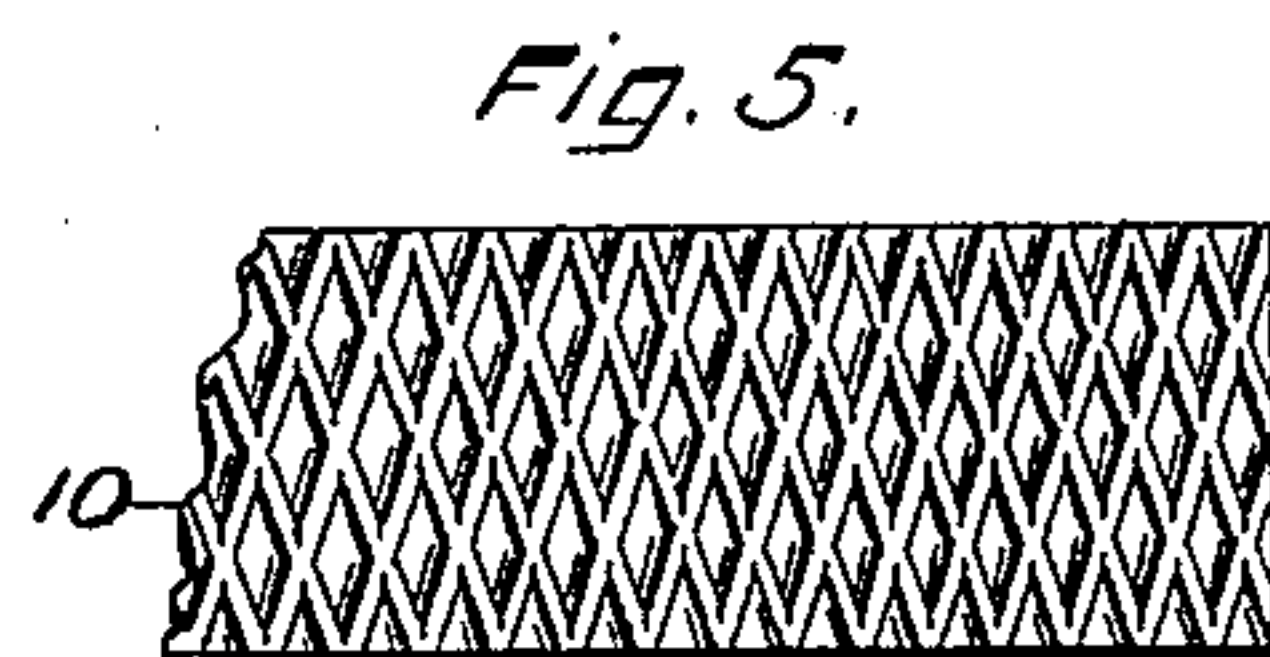
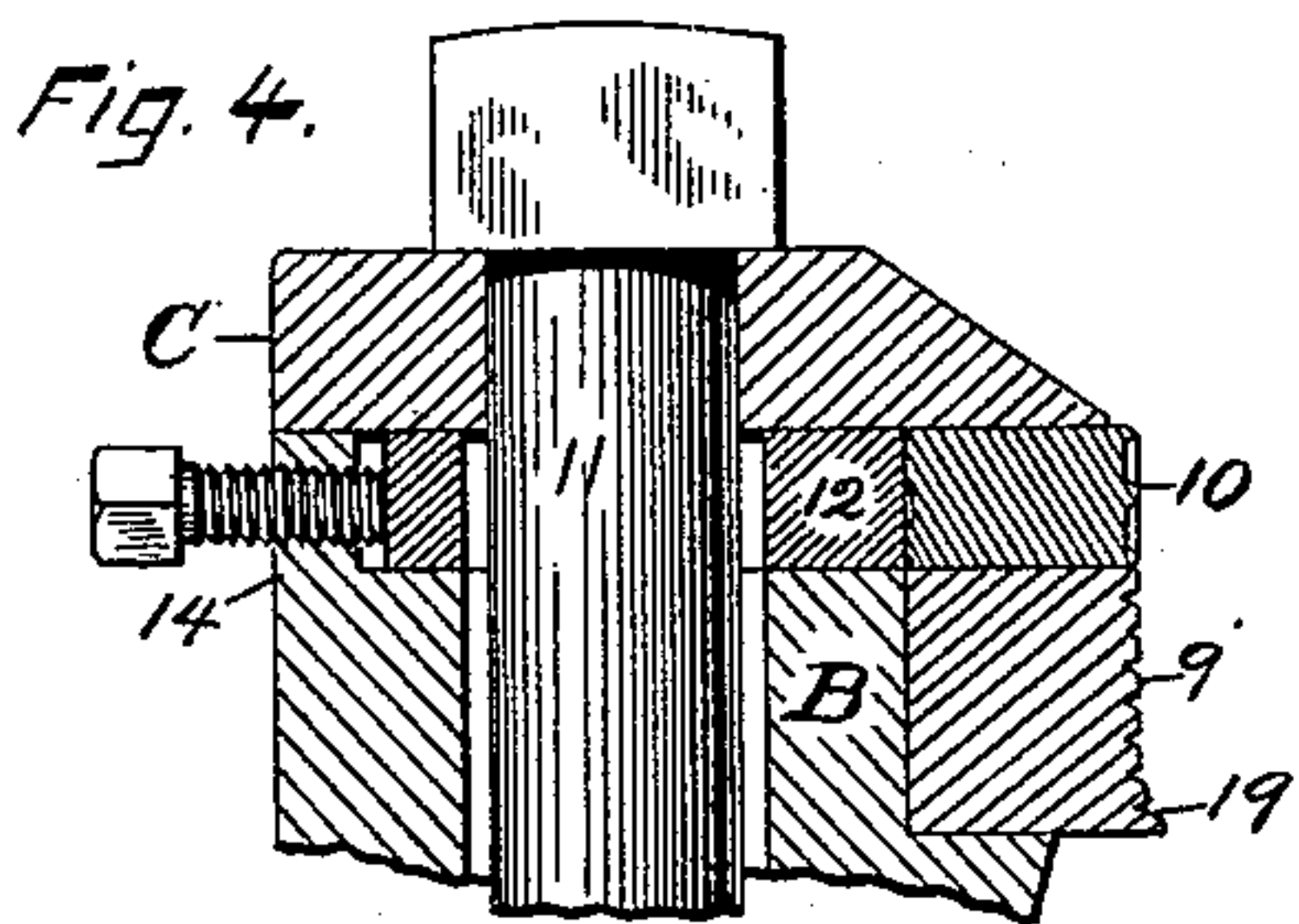
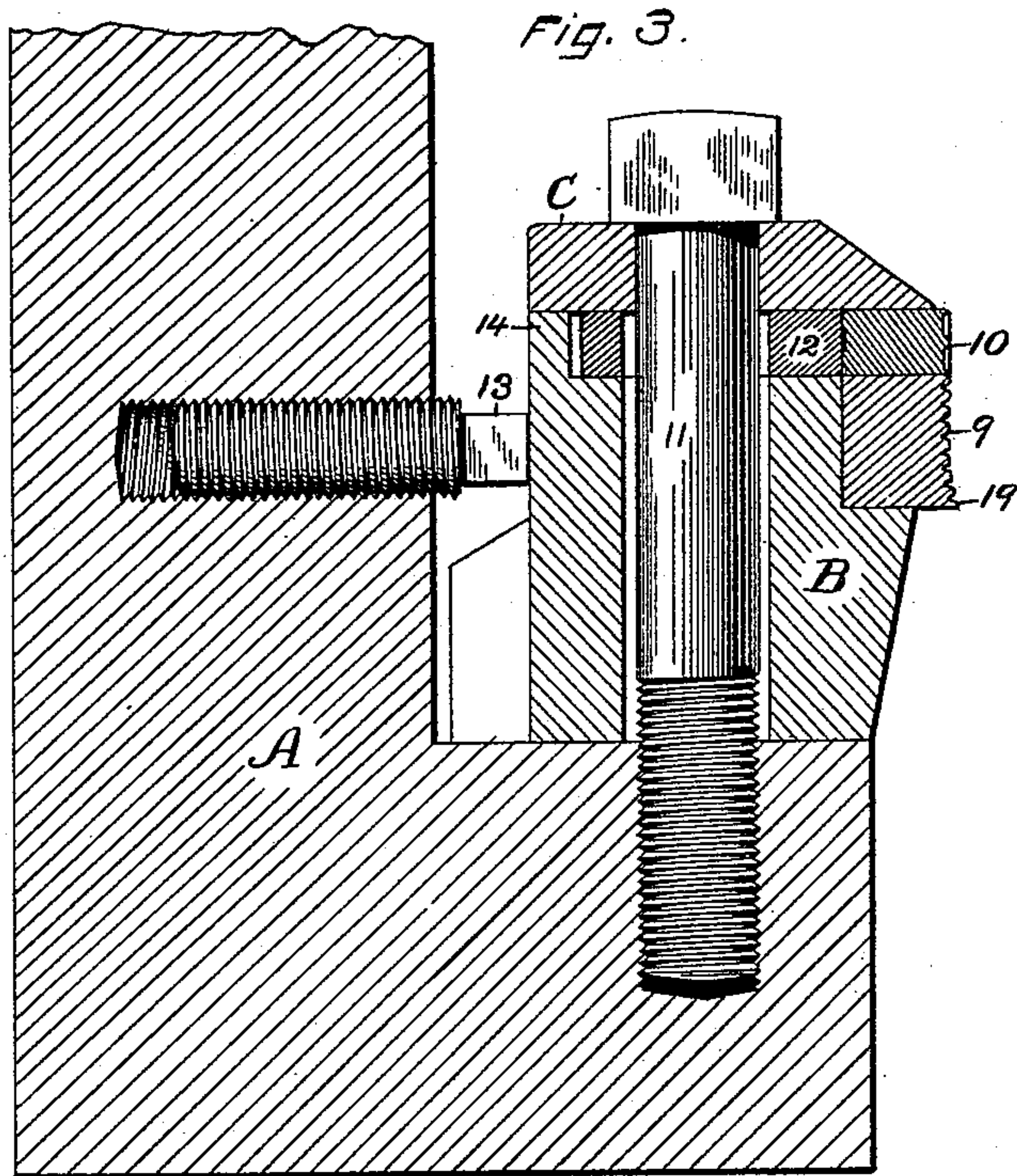
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3 Sheets—Sheet 3.

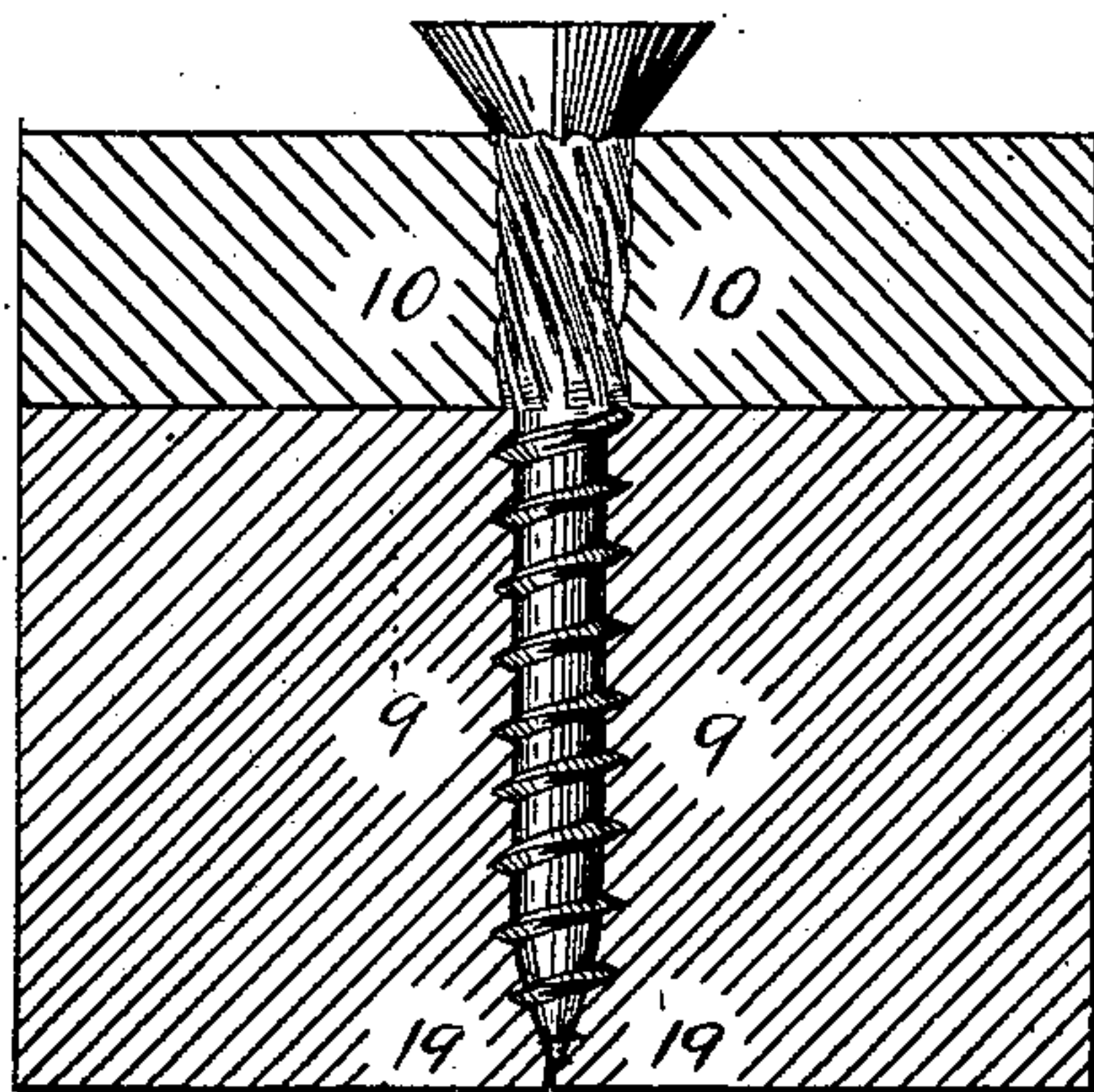
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Fig. 10.



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UNITED STATES PATENT OFFICE.

HORACE K. JONES, OF HARTFORD, ASSIGNOR TO THE RUSSELL & ERWIN MANUFACTURING COMPANY, OF NEW BRITAIN, CONNECTICUT.

METHOD OF AND MEANS FOR ROLLING SCREWS.

SPECIFICATION forming part of Letters Patent No. 470,805, dated March 15, 1892.

Application filed November 27, 1891. Serial No. 413,212. (No model.)

To all whom it may concern:

Be it known that I, HORACE K. JONES, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Methods of and Means for Rolling Screws, of which the following is a specification.

My invention relates to improvements in methods of and means for rolling screws; and the objects of my improvements are to facilitate the process of rolling, to produce an improved product, and to improve the means employed in said process.

In the accompanying drawings, Figure 1 is a plan view of my dies and die-holder with the cap removed. Fig. 2 is a side elevation of the same with the cap in place. Fig. 3 is a vertical section of the same on line $x x$ of Fig. 1. Fig. 4 is a like view of parts of the same with different adjusting devices for the shank-rolling die. Fig. 5 is an enlarged face view of a portion of one of the shank-rolling dies with one form of working face. Fig. 6 is a like view of the same with another form of working face; and Figs. 7, 8, and 9 are side elevations of screws as rolled by my process, the configuration of the shank being of different designs corresponding with the three different designs shown for the working face of the shank-rolling dies. Fig. 10 is a sectional view of a pair of dies in connection with a screw being operated upon by the finishing end of said dies.

The dies and die-holders, as shown, are of the class in which a pair of straight dies are set face to face and made to reciprocate in front of one another, and any of the ordinary machines for that purpose may be employed. A suitable machine for this work is shown and described in my patent, No. 419,777, dated January 21, 1890. My method or process may, however, be practiced by means of cylindrical or curved dies.

A designates a die-holder, on which I set the die-block B. In the face of this die-block I set the thread-rolling dies 9 and the shank-rolling dies 10, and I secure the same in place by means of a cap C and bolts 11, the latter passing through holes in said cap and die-

block. Said die-block is also provided with a sub die-block 12, having holes, through which said bolts 11 pass. These holes in the die-block and sub die-block are somewhat larger than the bolts to permit of adjustment. Adjusting-screws 13 are screwed into the back of the die-holder with their heads resting on the back of the die-block, as shown in Figs. 1 and 3. The sub die-block 12 lies in a rabbet on the top of the die-block B, and between it and the back shoulder 14 of said rabbet at each end there is a wedge 15. Secured to each end of the die-block there is an end piece 16, through which adjusting-screws 17 extend, with their grooved end 18 resting in shouldered recesses in said wedges, as clearly shown in Fig. 1. The thread-rolling dies 9 not only thread the body of the screw, but they have the usual raised or more prominent portion 19 near their bottom edge for threading the pointed portion of the screw. Any ordinary dies for rolling the threads on pointed wood-screws may be employed. An example of a suitable die for so doing is found in my patent, No. 425,035, dated April 8, 1890. The thread-rolling die will be placed in front of the solid portion of the die-block, while the sub die-block will be back of the shank-rolling die.

In use a pair of each of the dies will be employed, and they will be set face to face the proper distance apart to roll the screw between them. By loosening the bolts 11 and turning the adjusting-screws 13 the complete die-block, dies, and all may be adjusted so that the thread-rolling dies will be the proper distance apart, all substantially as in machines now in use, so far as adjusting the complete die-block is concerned. If it should be found that the shank-rolling dies are not properly adjusted, they may be separately adjusted without disturbing the adjustment of the thread-rolling dies by turning the adjusting-screws 17 to move the wedges 15 to set and hold the sub die-block farther out or in to properly support the shank-rolling dies in position. While my dies with the separate adjustment are especially adapted for use in rolling pointed wood-screws, it is evident that this feature of my improvement is applicable

to dies for rolling tire bolts or pins, such as are described in my patent, No. 446,739, dated February 17, 1891.

In Fig. 4 I have shown the sub die-block as made adjustable by set-screws 19, one at each end, extending through the back shoulder of the die-block and bearing upon the rear edge of the sub die-block 12, as a substitute for the adjusting-screws 17 and wedges 15 first described.

The working face of the shank-rolling die in Fig. 2 is shown as consisting of slightly-oblique ribs and grooves to produce spiral elevations and depressions, as shown on the shank of the screw in Fig. 7. The working face of the die is shown in Fig. 5 as consisting of intersecting grooves and diamond-shaped elevations to produce a reticulated configuration of shank, as shown on the screw in Fig. 9, while the square across ribs and elevations on the working face of the die (shown in Fig. 6) are to produce longitudinal ribs on the shank, as shown in Fig. 8. Having shown these three designs in the working face of the shank-rolling dies, other designs may readily be devised for giving any desired form to the raised portion of the shank. I have also shown the raised portion of the shank as extending from the screw-head to the thread and the shank-rolling dies as set close to the thread-rolling dies; but it is evident that these dies may, if desired, be separated more or less by placing a strip of metal between them or by forming a blank space on the face of the die, as shown and described in my aforesaid patent, No. 446,739. It is also evident that a longer screw might be rolled in the dies herein shown, with a blank space on the shank between the head and raised portion of the shank.

In using my dies the raised portion of the shank and the thread on the body and point of the screw are rolled simultaneously. In rolling a thread on a wood-screw the thread is so coarse that the screw is very liable to be bent where the thread runs out at the shank. By simultaneously rolling the raised portion of the shank and the thread, especially if the raised portion of the shank has spiral or reticulated elevations and depressions, this bending at the junction of the shank and thread is practically overcome. In rolling gimlet-pointed wood-screws there is a severe strain on the stock, having a tendency to force the work endwise away from the portion of the dies that thread the point. By simultaneously rolling the point and shank the stock is much better held up to the work of threading the point with any design of shank-rolling dies; but in the reticulated design, as in Figs. 5 and 9, the working face of the die forms a positive lock against such endwise slipping of the blank.

The advantage of simultaneously rolling the shank and the point of the screw may be reaped even if the thread on the body of the screw is not rolled at the same time. For

example, suppose a pointed screw-blank had the thread rolled on its body in dies that had no point-threading portion, thereby leaving the point plain, while the body was threaded. A blank or partially-finished screw of this kind may be placed in the dies herein shown and the thread on its point rolled simultaneously with rolling the shank.

In rolling a wood-screw there is a tendency of the blank to slip so that it does not rotate in unison with the movement of the thread-rolling dies, and to prevent this slipping it has been found necessary to transversely notch or roughen a considerable portion of the dies. This is objectionable because the thread produced is somewhat ragged and rough instead of being smooth and solid. By simultaneously rolling the shank and thread the dies which roll the raised portion of the shank act in connection with the blank like a pair of racks and a pinion, and insure the proper rotation of the blank, so that the dies need not be roughened, and a smooth and solid thread can be rolled. So, also, the shank-rolling dies will cause the screw to rotate properly therein when the thread on the point only is rolled simultaneously with the shank.

The screws herein shown and referred to as produced with my dies by my process have been made the subject-matter of two separate applications, the same being Serial No. 411,608, filed November 11, 1891, and Serial No. 412,764, filed November 23, 1891.

Having shown two different adjusting devices for separately adjusting the shank-rolling dies and known adjusting devices for adjusting the complete die-block, it is evident that the particular adjusting devices shown are not essential to the general combination of said dies and adjusting devices. The die-blocks and sub die-blocks, as separate pieces from the thread-rolling and shank-rolling dies, are for convenience in making; but inasmuch as the die-block and thread-rolling die move together when adjusted, and the sub die-block and shank-rolling dies also move together when adjusted, it is evident that making each die-block and its die in one piece instead of two separate pieces would be a clear equivalent, so far as the combination of adjusting devices therewith is concerned.

I claim as my invention—

1. In dies for rolling screws, the combination of the thread-rolling dies, the shank-rolling dies, and the adjusting devices for separately adjusting their relative working position for simultaneous action, substantially as described, and for the purpose specified.

2. In dies for rolling screws, the combination of a die-holder, a thread-rolling die, the shank-rolling die, the devices for adjusting the thread-rolling die on the die-holder, and the devices for separately adjusting said shank-rolling die, substantially as described, and for the purpose specified.

3. The combination of dies having a raised

portion for rolling a thread on the point of the screw and dies for rolling the shank, the same acting together on the unthreaded shank and point of the screw, substantially as described, and for the purpose specified.

4. The method of rolling gimlet-pointed wood-screws, which consists of simultaneously rolling the thread on the tapering point and elevations and depressions on the unthreaded

shank, whereby the action of the dies in rolling said shank and point insures the rotation of the blank within the dies and also tends to hold the blank up to the work of threading the point, as described.

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