

(No Model.)

4 Sheets—Sheet 1.

C. A. HIGBEE.
THREAD CUTTING TOOL.

No. 585,204.

Patented June 29, 1897.

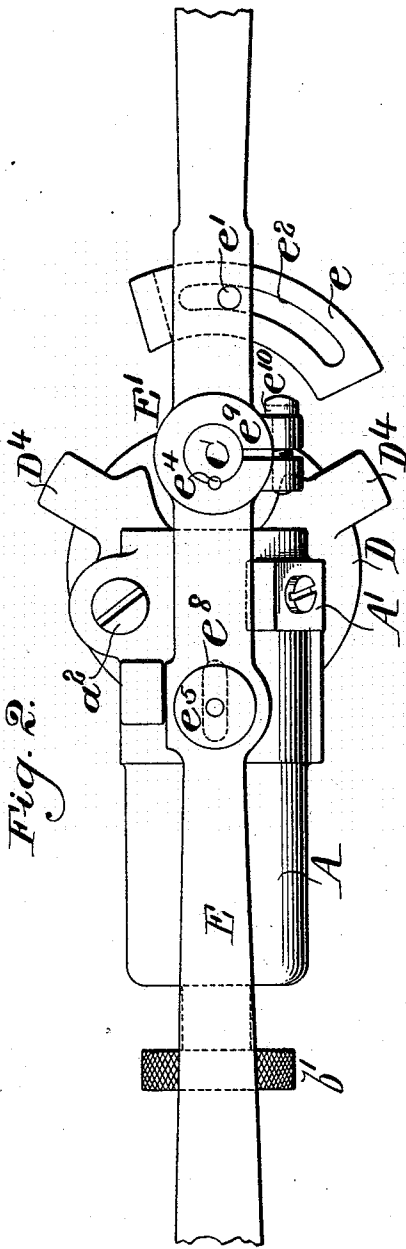
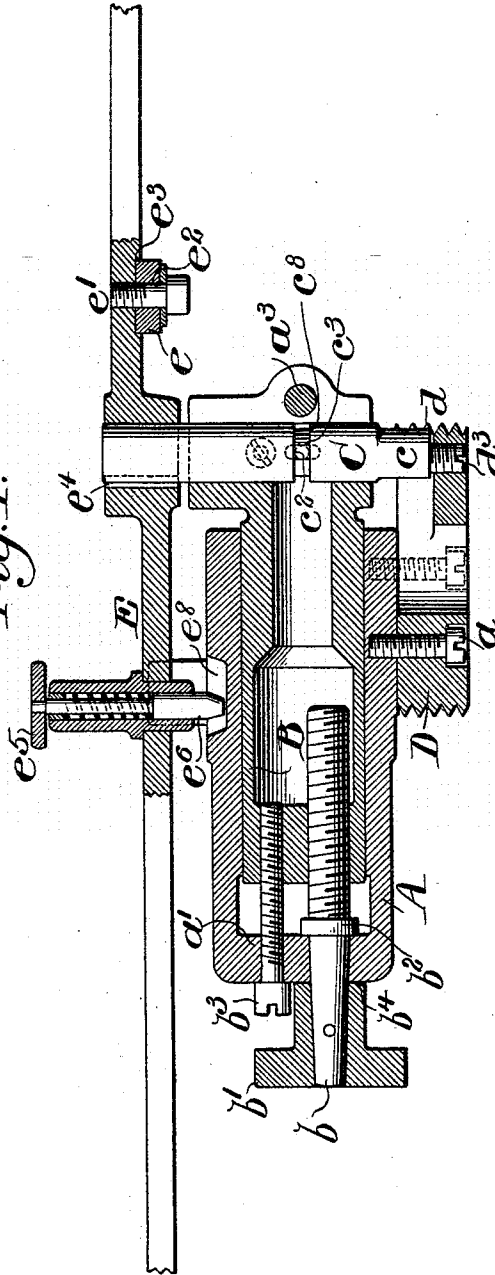


Fig. 1.



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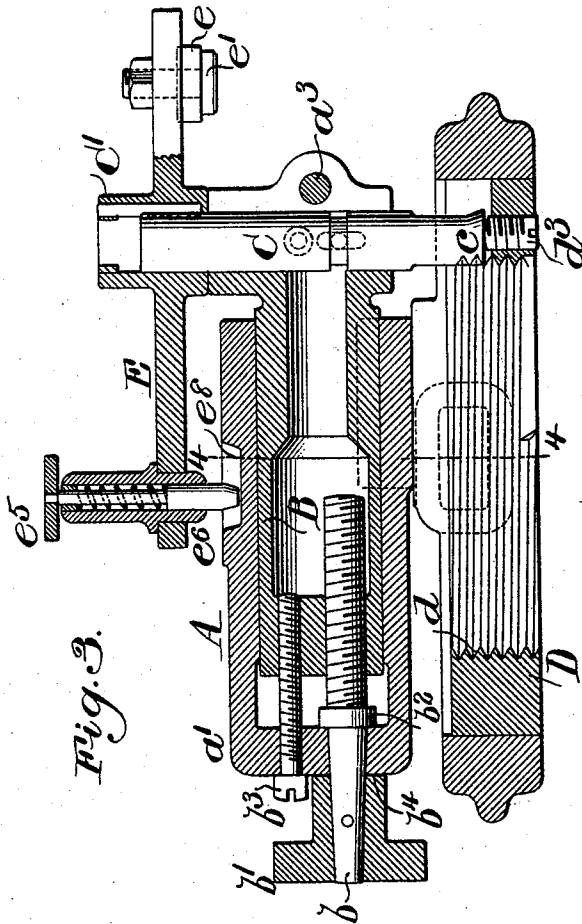


Fig. 3.

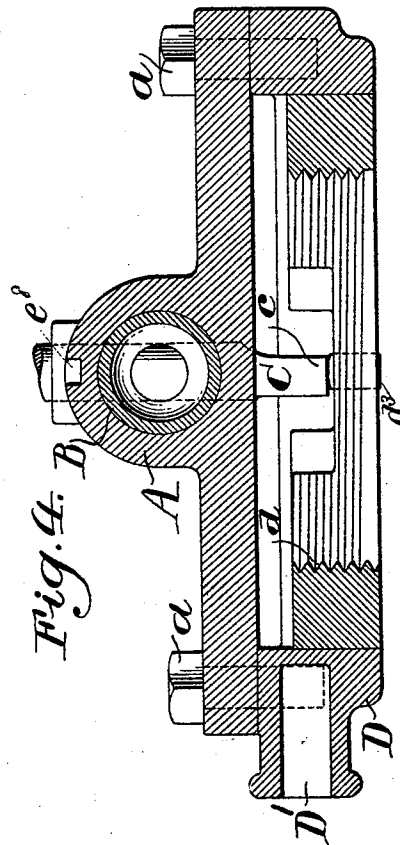
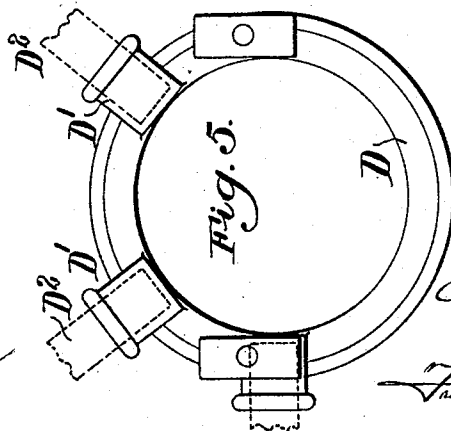


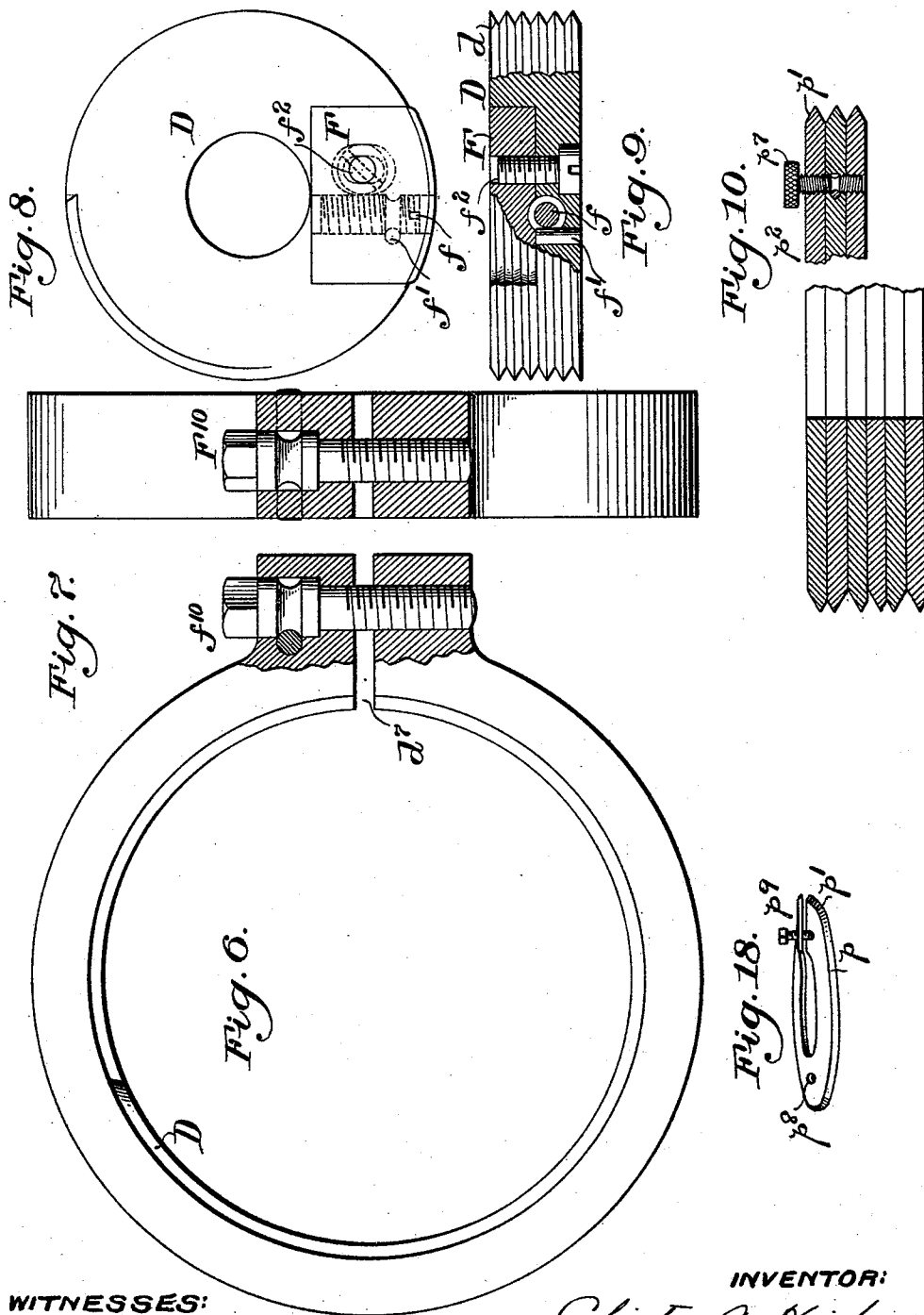
Fig. 4.



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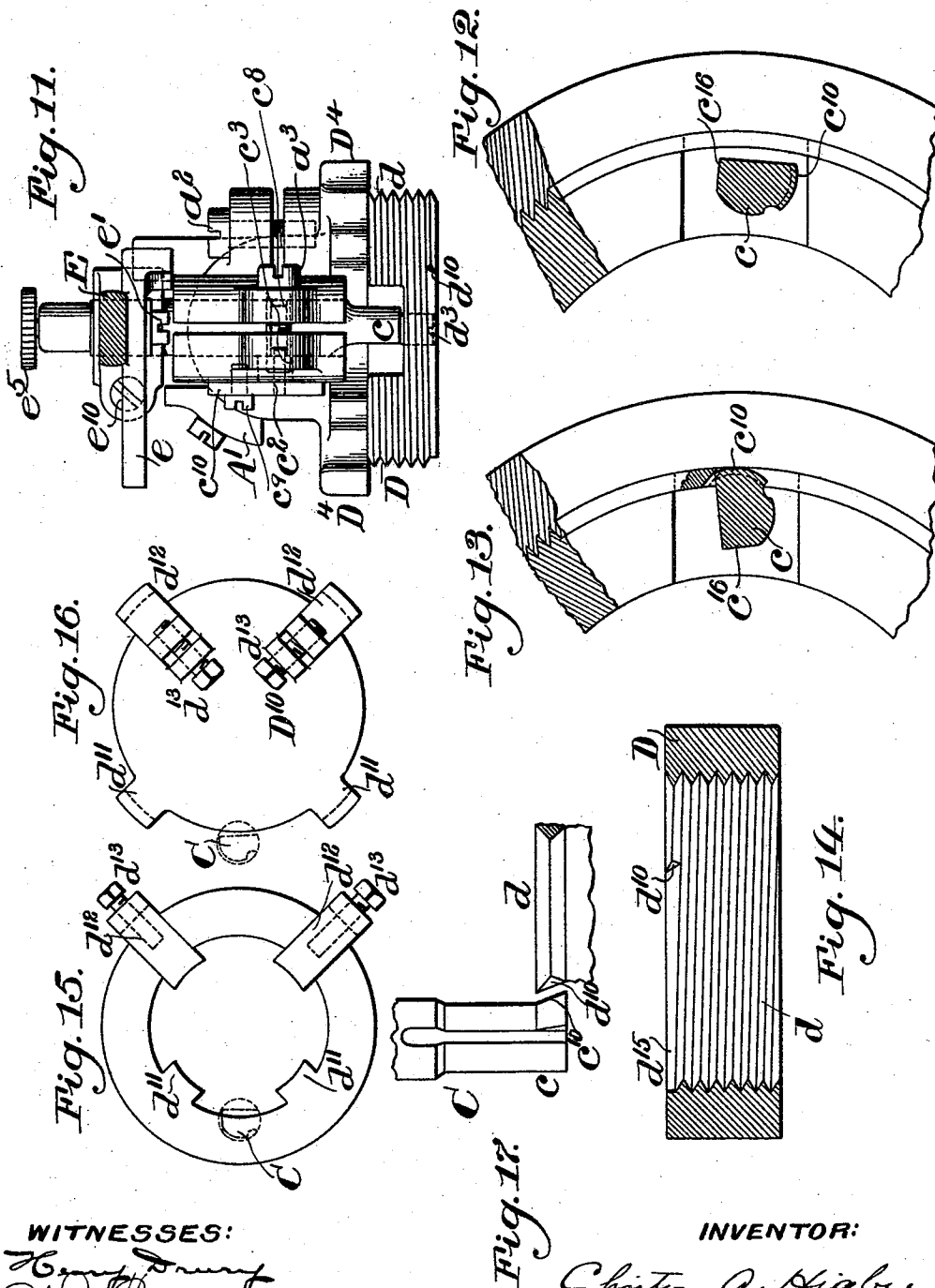
(No Model.)

4 Sheets—Sheet 4.

C. A. HIGBEE.
THREAD CUTTING TOOL.

No. 585,204.

Patented June 29, 1897.



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THREAD-CUTTING TOOL.

SPECIFICATION forming part of Letters Patent No. 585,204, dated June 29, 1897.

Application filed January 17, 1896. Serial No. 535,222. (No model.)

To all whom it may concern:

Be it known that I, CLINTON A. HIGBEE, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in Tools for Trimming Screw-Threads, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to tools for cutting down screw-threads so as to form a thread such, for instance, as is shown in my United States Patents Nos. 447,775 and 501,441, and has for its main object to provide a tool which will very quickly and neatly cut down a screw-thread.

A further object is to provide a die for use in connection with this tool or otherwise which is provided with threads for engaging with threads on a screw and with means for adjusting the threads so as to engage with screws of various sizes.

My invention can be best understood in connection with the accompanying drawings, in which—

Figure 1 is a vertical elevation of one form of my device arranged to cut down a thread on a female screw. Fig. 2 is a plan view of the device shown in Fig. 1. Fig. 3 is a view similar to that shown in Fig. 1, showing an arrangement for cutting down the thread on a male screw. Fig. 4 is a section on the line 4 4 of Fig. 3. Fig. 5 is a view of a die employed in connection with the device shown in Fig. 3, showing the convenient mode of applying removable handles. Fig. 6 is a view of a die similar in general character to that shown in Fig. 3, illustrating a mode of adjusting the die to engage with screws of slightly different sizes. Fig. 7 is a front view, partly in section, of the die shown in Fig. 6. Fig. 8 is a view of a threaded block adapted to engage with a female screw and showing means for adjusting the screw-threads so that they will engage with slightly different size female screws. Fig. 9 is a front view, partly in section, of the threaded block shown in Fig. 8. Fig. 10 is a view of a threaded block illustrating a convenient mode for changing the number of threads to an inch. Fig. 11 is a front view of the de-

vice shown in Fig. 1. Figs. 12 and 13 are views of the end of the cutting-tool and illustrating a mode of finishing and cutting down a thread. Fig. 14 is a section of the threaded block shown in Fig. 11 and serving also to illustrate a finishing cut such as would be made on the thread of a male or a female screw. Figs. 15 and 16 are views, respectively, of blocks adapted to engage with male and female screws and showing means whereby they may be adjusted so as to engage with screws which vary considerably in diameter. Fig. 17 is a view illustrating a mode of finishing the cut, and Fig. 18 is a view illustrating a mode of adjusting the thread so as to engage with a screw having more or less threads to an inch.

D is a threaded block which is provided with threads, as *d*, for engaging with the threads of a screw to be treated. This block may be of various forms, that shown in Figs. 1, 9, 11, and 16 being adapted for use with a female screw and that shown in Figs. 3, 4, 6, 14, and 15 for use with a male screw.

Secured to the block, as by means of screws *a*, is a guide or case in which a holder for the cutting-tool is guided. As shown, the guide consists of a tubular casting A, in which slides the holder B, which may conveniently be of the form shown.

To adjust the holder, a screw *b*, provided with a milled head *b'*, may be employed. The longitudinal movement of this screw relatively to the case is prevented by means of the collars *b²* *b⁴*.

b³ is an adjustable stop for limiting the movement of the holder.

C is the cutting-tool, which has a head *c*, provided with cutting edges arranged in a manner to be more fully explained. The cutting edges will come down across the thread or threads to be cut, and to adjust the width of the cut I provide an adjustable stop, as *d³*, for the cutter, the screw *b* of course serving to adjust the cutter toward and from the top of the thread to be cut.

To operate the tool to cut down a thread, I provide a suitable handle or handles. These may, as shown in Fig. 5, be removable bars which fit in sockets *D'* in the device, or a permanent handle may be provided, as shown in Fig. 1. In this latter figure a handle E is se-

cured to the top of the cutter C, and means are provided for securing the handle, when desired, to the case, so that the whole device can be moved together. As shown, a spring-pressed plunger e^6 , provided with a head e^5 , is adapted to engage in a slot e^8 in the case.

When the tool is operated to finish a cut, after shaving off the top of the thread the plunger e^6 is withdrawn from the slot, disconnecting the handle from the case, and the cutter C alone operated.

To limit the movement of the entire device when the top of a thread is being planed or cut off, I provide suitable stops. These are shown at D^1 , (see Fig. 11,) and to limit the operation of the cutter C when it is being operated alone I provide a stop, preferably adjustable. Such a stop is shown in Figs. 1 and 2. An arc-shaped piece e , preferably seated in a way e^2 , is held in position by a screw e^1 . The screw fits in the slot e^2 , and by loosening it the stop e can be moved forward and back, and so limit the movement of the handle, and therefore of the cutter, as desired. An abutment or stop A' is secured to the case and coacts with the stop e .

The case and holder may very conveniently be cast, and to form a tight fit I may conveniently split the case, as shown in Fig. 11, securing the two parts by a screw at a^2 . The bore for the cutter may also be formed in the same way, a screw a^3 binding these parts. The handle may be secured to the cutter in a similar way by a screw e^{10} , and the rotation of the cutter in the handle is prevented by a key e^4 .

In order to adjust the cutter vertically while its free rotation is permitted, a slot c^3 is provided in the side of its socket, and a pin c^2 projects through the slot and engages with the groove c^8 in the cutter. The pin is adjusted by a screw c^9 , which holds a plate c^{10} , to which the pin c^2 is fastened in any desired position.

The device shown in Figs. 3 and 4 is substantially the same as that shown in Figs. 1 and 2, the threaded block D being, however, provided with internal threads to engage with threads on a male screw. I have also shown sockets D' for removable handles, in which case no handle E need be provided, and to turn the cutter C a polygonal head may be formed at C' , to which a suitable spanner or wrench may be applied.

Before describing certain very important details of the construction of the die which adapt it for use with screws of different sizes I will describe the preferred form of the cutting-tool and the operation of the device.

The preferred form of the construction of the cutter-head is shown in Figs. 12, 13, and 16, which are about full size. The edge c^{16} is the planing or cutting edge, which serves to cut off a thread so as to plane it completely down for a portion of its length, as shown in my prior patents referred to or as shown at d^{15} in Fig. 14. The edge c^{10} is the finishing

edge and is preferably formed with an outward bevel, as shown, so as to make a beveled finished end, (shown at d^{10} , Fig. 17.)

In operation the threaded block is screwed onto or into the screw (male or female) which is to be treated, the proper adjustments having been made by means of the screws b^3 and d^3 , the screw b^3 limiting the depth of the cut and the screw d^3 the width. Then the cutter C is advanced by means of the screw b till it engages with the top of the thread, the cutting edge being then in the position shown in Fig. 13. The tool is then turned by means of the handle, causing the cutter to shave off the top of the thread, the length of the cut being limited by the stops D^1 . The tool is turned back, the cutter further advanced by the screw b , and another cut taken, this continuing till a cut of the proper depth is made, the proper depth being when the thread is completely cut down, and as the screw b^3 limits the depth of the cut there will be no danger of cutting into the body of the screw. This shaving process will, however, leave the end of the cut unfinished. To finish this cut, the handle E, if this is used, is disconnected from the case A, and on being turned brings the edge c^{10} of the cutter against the thread and finishes the cut in the manner shown in Fig. 17. If necessary, two or more cuts may be made to properly finish the end of the thread, the cutter being properly adjusted by means of the screw b .

In practical use I have often found that screws which have or are supposed to have the same number of threads to the inch vary somewhat, so that a block which is made to fit a certain sized screw—as, for instance, one with eight threads to an inch and two inches in diameter—will sometimes bind when it is attempted to screw it onto this sized screw. To remedy this, I have devised an arrangement of block shown on Sheets 3 and 4 of the drawings, and it consists in providing the block with means for moving some portion or all of the threads toward and from the center of the die. This motion when it is simply intended to make a block fit a screw which has threads which are very nearly the same size as those on the block need be but very slight.

In Fig. 8 I have shown a block which is adapted to fit in a female screw. This block has a block F, which has screw-threads on its face, which, when the block is in its normal position, form a continuation of the threads d on the rest of the threaded block, these threads d being made a little smaller than those of a standard screw, so that the block cannot fail to fit any screw of the required diameter having the same number of threads to an inch. To prevent any looseness when the screw with which the block engages is larger than the threaded block, the block F can be adjusted forward and so take up this looseness. As shown, a screw f , which is itself held from longitudinal movement by a

pin f' , serves to adjust the block, and a set-screw f^2 serves to hold the block in position after it is correctly set.

The block which is adapted to engage with a male screw can be very conveniently adjusted by splitting it, as indicated at d' , Fig. 6, and by enlarging or decreasing the size of the ring by means of the screw f^{10} .

Figs. 15 and 16 show blocks so arranged that screws varying considerably in diameter can be engaged by them. To effect this, I provide the die with a block or blocks d^{11} , which are stationary and which of course are provided with screw-threads, and with another block or blocks d^{12} , which are radially adjustable, as by means of screws d^{13} , and which adjustable blocks are also provided with threads. By properly adjusting the blocks d^{12} the effective diameter of the main block (shown in Fig. 15) can be enlarged or diminished, so that it will engage with various-sized male screws and the block shown in Fig. 16 with various-sized female screws.

In order to arrange the block so that it will serve to engage also with screws having a greater or less number of threads to the inch, I provide either the block itself or the blocks d^{11} d^{12} , if these be used, with a plate or plates and with means for separating the plate or plates in such a manner that the die will engage with threads of different finenesses on different screws.

It is of course evident that there are various modes of effecting this adjustment. In Fig. 18 I have shown a ring p , having a wedge-shaped edge p' . This ring is split, as shown, and the split ends can be moved toward and from each other, thus making a helical screw-thread which can be made to correspond to threads of different pitches.

Another and preferable mode especially adapted for use in connection with the blocks d^{11} and d^{12} is shown in Fig. 10. Here two or three plates p^2 are provided, each having a wedge-shaped edge p' . A set-screw p^7 serves to properly separate the several plates, so that they will engage with threads of different pitches.

Instead of employing positively-acting means as a screw to separate the plates they may be so constructed that when placed in different positions the wedge-shaped edges will be separated. Such a construction is illustrated in the left of Fig. 10, where plates are shown provided with wedge-shaped edges, the point of the wedge being nearer to one side than the other, so that if the plates are laid as indicated at the top of the figure they will engage with a fine screw and if laid as shown at the middle or lower part of the figure with coarser screws.

In the foregoing specification I have described the cutting-tool as secured to a block having threads which are adapted to engage with the threads of the screw to be treated, and have shown this block as a properly-

threaded block whose only function is to hold the cutting-tool in position and guide it while the cut is being made. It will, however, be clearly understood that any equivalent suitable supporting and guiding devices can be used instead of the blocks, if desired.

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

1. A device for cutting down screw-threads consisting of a block having threads adapted to engage with the threads of the screw to be treated, a guide or case secured to said block, a cutter-holder carried by said guide or case, means for adjusting said cutter-holder to and from the work and securing it in a determined position, a cutter secured and moving in the holder and a lever secured to the cutter and whereby it is operated to move it in the holder and against its work.

2. A device for cutting down screw-threads consisting of a block having threads adapted to engage with the threads of the screw to be treated, a case A secured to said block, a holder B guided in said case, a cutter C carried by said holder, lying transversely to the threads of the block, means to adjust the holder in the case and a handle or handles for turning the block.

3. A device for cutting down screw-threads consisting of a block having threads adapted to engage with the threads of the screw to be treated, a case A secured to said block, a holder B guided in said case, a cutter C lying transversely to the threads of the block carried by said holder, means to adjust the holder in the case, and a handle E secured to the cutter C whereby it can be moved in the holder, said handle being provided with means for securing it to the case A so that the whole device can also be turned together.

4. A device for cutting down screw-threads consisting of a block having threads adapted to engage with the threads of the screw to be treated, a case or guide A secured to the block, a holder adjustably held in said case or guide, a cutter carried by said holder, a handle E secured to the cutter and adapted to turn it in the holder, and a latch on said handle for connecting it to the case A substantially as and for the purpose specified.

5. In a device for cutting down screw-threads a block having threads adapted to engage with the threads of a screw to be treated, a cutter whose cutting edge projects across said thread or threads, means for moving said cutter toward the threads to be cut, means for adjusting the cutting edge across the threads, and an adjustable stop d^3 to limit the movement of the cutter across the screw-threads.

6. In a device for cutting down screw-threads a block having threads adapted to engage with the threads of a screw to be treated, a case A, a holder B, means for adjusting the holder in the case, a stop to limit the motion

of the holder, a cutter carried by the holder, and means for turning the device so as to cut off the thread on the screw under treatment.

7. In a device for cutting down screw-
5 threads a block having threads adapted to engage with the threads of a screw to be treated, a case A, a holder B, means for adjusting the holder in the case, an adjustable stop to limit the motion of the holder, a cutter carried by
10 the holder and means for turning the device so as to cut off the thread on the screw under treatment.

8. In a device for cutting down screw-

threads the combination of a cutter having suitable cutting edges, means for holding the
15 cutter in position relatively to the screw under treatment, means for moving one edge of said cutter parallel to the top of a screw-thread so as to shave it off, and means for
20 bringing the other edge of the cutter against the top of the screw-thread to finish the cut.

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Witnesses:

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