

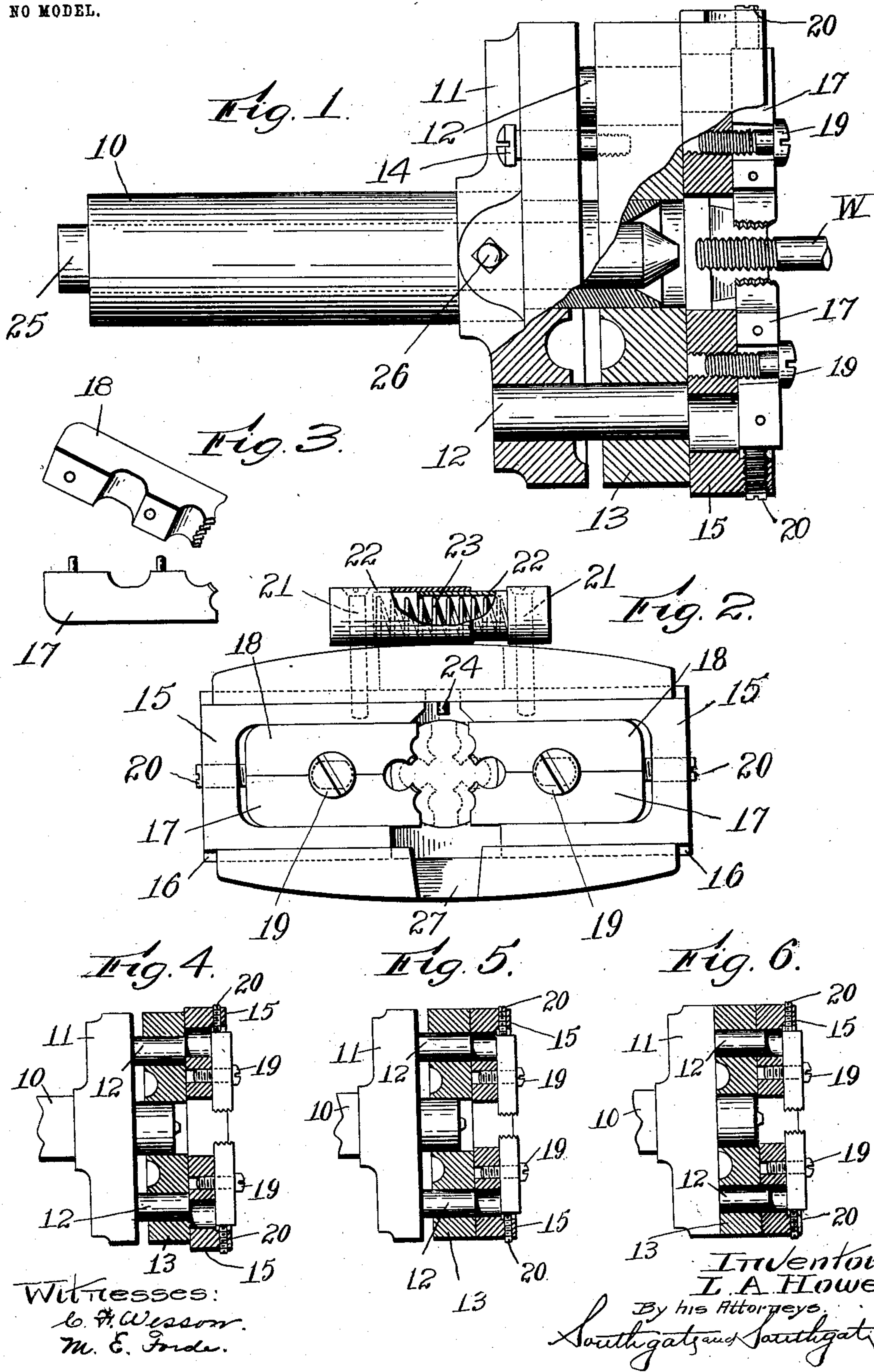
No. 739,873.

PATENTED SEPT. 29, 1903.

L. A. HOWE.
SELF OPENING DIE.

APPLICATION FILED NOV. 28, 1902.

NO MODEL.



UNITED STATES PATENT OFFICE.

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SELF-OPENING DIE.

SPECIFICATION forming part of Letters Patent No. 739,873, dated September 29, 1903.

Application filed November 28, 1902. Serial No. 133,140. (No model.)

To all whom it may concern:

Be it known that I, LEWIS A. HOWE, a citizen of the United States, residing at Barre, in the county of Worcester and State of Massachusetts, have invented a new and useful Self-Opening Die, of which the following is a specification.

This invention relates to that class of thread-cutting dies in which the threading-jaws may be separated to permit the work to be withdrawn without turning the dies back over the threads which have been cut thereby.

The especial object of this invention is to provide a strong, compact, and inexpensive form of self-opening die in which the cutting-teeth will be permitted to move back substantially instantaneously from their operative position when the die is opened to release the work, so that the threads may be fully cut to the desired length and will not be injured during the withdrawal of the work or by partial or imperfect clearance of the cutting-teeth, to provide a construction which may be accurately adjusted to cut threads of the desired diameter, and to employ divided dies or cutting-tools which may be separated so that their cutting-teeth may be readily sharpened or ground when required.

To these ends this invention consists of the self-opening die and of the combinations of parts therein, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying drawings, Figure 1 is a plan view, partially broken away, of a self-opening die constructed according to this invention, the die being shown in its open position to permit the withdrawal of the work. Fig. 2 is a front view thereof, the closed position of the cutting-teeth being indicated by dotted lines. Fig. 3 is a perspective view of one of the divided dies; and Figs. 4 to 6, inclusive, are diagrammatic views illustrating the operation of the construction, Fig. 4 showing the parts in the same position as in Fig. 1, Fig. 5 showing the cutting-dies moved into position so that the locking-pins may engage their sockets, and Fig. 6 showing the parts locked in the operative position they occupy during the use of the die.

Two forms of dies are now employed for

cutting threads upon rods, bolts, or for similar purposes. For ordinary purposes—for example, in the use of an ordinary die-stock—a solid or fixed die is employed, which has to be run back over the threads when the work is being removed therefrom. Reversal of a die or the running of the same back over the threads which have been formed thereby is objectionable in practice, not only for the reason that the back travel of the die injures and mars the thread which has been cut on the operative travel, but is also objectionable by reason of the fact that it quickly wears out and dulls the thread-cutting teeth.

To produce the better classes of screw-threads, self-opening dies are now employed, in which the die is opened so that the threading-teeth are moved away from the work when the thread has been completed, so that the work can be withdrawn without running the die back over the thread which has been cut thereby. The self-opening thread-dies which have heretofore been employed are, however, comparatively complicated and expensive in construction, and in a number of such constructions the dies are not released from their threads promptly enough to insure a perfect clearance during the withdrawal of the work nor to permit the cutting of perfect threads up to the limits to which the die is run. To overcome these objections, a self-opening die constructed according to this invention has been especially designed to provide a compact and inexpensive construction, which is adapted for use in substantially all locations and in which the dies will be held in operative position by means of locking bolts or pins, which will permit the threading-teeth to move promptly out of engagement with the work the instant the die is released. To accomplish these results, a self-opening die constructed according to this invention comprises a base-piece or support, laterally-separable members which carry the thread-cutting teeth, and means providing pin-and-socket connections between the base-piece and said members, which pin-and-socket connections hold the members in operative position, but permit them to open when moved away from the base-plate. The base-plate is preferably carried by a shaft or spindle,

which may be secured in a turret-head or other means for supporting the die.

In the specific construction illustrated the locking-pins are fastened in the base-plate, and mounted on the base-plate is a guide-piece, fitting into which and laterally movable therein are the separable die-carrying pieces. A spring normally tends to separate the die-carrying pieces, while on their inner faces the said die-carrying pieces are provided with sockets for receiving the ends of the locking-pins. The dies are preferably adjustably mounted in the pieces, and in order to provide a construction in which the threading-teeth may be readily sharpened or ground a special construction of split die is preferably employed, the parts of which are connected together by dowel-pins and are held up to their work by a back screw and locked into position by a holding-screw.

Referring to the accompanying drawings for a detail description of a self-opening die constructed according to this invention, 10 designates a hollow spindle or shaft. Carried by the spindle 10 is the base-piece or base-plate 11. Driven into or otherwise fastened in the base-plate 11 are the holding-pins 12. Movably mounted on the holding-pins 12 is a guide-piece 13. The guide-piece 13 is movable on the pins 12 toward and away from the base-plate, the limit of its forward movement being regulated by a stop-screw 14. As shown most clearly in Fig. 2, the guide-piece 13 has a transverse way or slot planed therein, and fitting into this slot are die-holding pieces 15, which are provided with extending flanges 16 for holding them in place. Adjustably mounted in the die-holders 15 are the two-part dies, one of which is illustrated in Fig. 3. As shown in this figure, each of these dies comprises separable sections or pieces 17 and 18, which are connected by dowel-pins. Each of the separable dies is fastened in place in its holder by a fastening-screw 19, and the position of such die is regulated by a stop-screw 20, so that by means of this construction by loosening the screws 19 and adjusting the stop-screw 20 the dies may be accurately adjusted to produce the desired results. The die-holders 15 are normally separated by a spring. Any arrangement of spring may be employed for this purpose. As herein illustrated, a screw 21 is threaded into each of the die-holders 15. The screws 21 extend out through slots in the guide-piece 13, and mounted on the screws 21 are the telescopic tubes or sections 22, containing the separating-spring 23.

To aid in setting the dies to their closed or operative position, I may provide a setting pin or stop 24, and, if desired, the under side of the guide-piece 13 may be provided with a clearance-opening 27, through which the chips may drop when the die is employed in horizontal position.

Any ordinary means may be used for regulating the length of thread cut by a die con-

structed according to this invention. For example, as shown in Fig. 1, the hollow shaft 10 may be provided with an adjustable slide or pencil 25, which may be fastened in place by a screw 26. The end of the pencil 25 which engages the work is provided with a somewhat tapering point. In the use of a threading-die as thus constructed when the thread has been cut on a piece of work the die will be opened, as illustrated in Fig. 1, so that the threading-teeth will be drawn back entirely free from the work W, as illustrated in Fig. 1.

To restore the die to operative position, the die-holders are first moved in, as illustrated in Fig. 5, so that their sockets are brought opposite the ends of the holding-pins, and the guide-piece is then moved back against the base-plate, so that the ends of the holding-pins will enter the sockets of the die-holders and lock the parts in operative position. When the guide-plate is again drawn away from the base-plate, the die-holders will be released from the pins and the die will again assume the position illustrated in Fig. 1.

Considering now the operation of my self-opening die in the actual work of cutting a screw-thread upon a rod or bolt, the parts of the die are first set to the position illustrated in Fig. 6. Either the work or the die itself, as the case may be, is turned, and after the end of the work has been entered between the cutting-jaws of the die the continued relative rotation will cause the end of the work to advance into the die until it engages the end of the adjustable stop or rod. During this thread-cutting operation the torsional strain, which is the principal strain upon a threading-die, will be transmitted through the guide-piece 13, so as to be applied substantially along the entire length of the pins 12. The only strain to be supported at the joint between the ends of the pins and the die-holders will be simply the strain resulting from the tendency of the threading-dies to be separated or forced apart. The continued operation after the end of the work strikes the central stop causes the lateral separation of the base-piece and guide-piece. When this has been continued sufficiently to release the die-holders from the ends of the pins, the die-holders will be separated and the cutting-teeth released from the work.

It will be noticed that in the operation of this die the opening action is practically instantaneous, and I regard this as a feature of importance, as it enables me to cut complete threads over the entire length of the work operated upon, so that a uniform thread may be formed, if desired, up to shoulders or other abutments, whereas in previous forms of dies where the cutting-teeth are held in position by the engagement of inclined faces or cams only a gradual opening of the die can be accomplished, which would result in the incomplete threading over the last portion of the work acted upon.

A self-opening die constructed according to

this invention may be used in many different situations. For example, it may be employed for one of the tools of a turret-head, it may be employed on a live-spindle, (for example, on an ordinary lathe or upright drill,) or it even may be employed as a hand-operated die-stock or threading device. Furthermore, in the use of a self-opening die constructed according to my invention it is not necessary to have the die released in all cases by the engagement of the work with the end of the rod or pencil 25, because at any time when desired by drawing back on the work the guide-piece will be separated from the base-plate, causing the die to open.

I am aware that numerous changes may be made in practicing my invention by those who are skilled in the art without departing from the scope thereof as expressed in the claims. I do not wish, therefore, to be limited to the construction I have herein shown and described; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a self-opening die, the combination of a base-plate or support, laterally-separable members which are movable toward and away from the base-plate, and pins extending from the base-plate to normally engage sockets in the laterally-separable members to hold them in place, but permitting them to separate when moved away from the base-plate and off from the ends of the pins.

2. In a self-opening die, the combination of a base-plate or support, pins extending from the base-plate, a guide-piece mounted on the pins and movable thereon, to and away from the base-plate, and laterally-separable members mounted in the guide-piece with sockets therein which are engaged by the ends of the pins when the guide-piece is in its normal position, but which are disengaged from the ends of the pins when the guide-piece is moved away from the base-plate or support so that said laterally-separable members will then be released and the die allowed to open.

3. In a self-opening die, the combination of a base-plate or support, laterally-separable members mounted so as to be movable toward and away from the base-plate or support, and straight-sided, square-ended pins engaging sockets in the laterally-separable members when the parts are in normal position, and releasing said laterally-separable members to permit a substantially instantaneous opening of the die when the laterally-separable members are disengaged from the ends of the pins.

4. In a self-opening die, the combination of a base-plate or support, holding-pins extending therefrom, a guide-piece mounted on the holding-pins so as to be movable toward and away from the base-plate, laterally-separable members with sockets for receiving the ends of the pins mounted in the guide-piece, and dies having threading-teeth adjustably mounted in the laterally-separable members.

5. In a construction of the class described, the combination of a die-holder, a divided threading-die comprising two sections, each of which has a single line of threading-teeth, a holding-screw having its shank in a slot formed between the engaging faces of the die-sections, with its head overlapping the die-sections for clamping the die-sections in place but permitting the same to be moved longitudinally past the holding-screw when the same is loosened.

6. In a construction of the class described, the combination of a sectional die comprising two parts, each of which is provided with a single line of threading-teeth, a clamping-screw having its shank in a slot between the engaging faces of the die-sections with its head overlapping said die-sections to clamp them in adjusted positions, and a single adjusting-screw having a square end engaging the ends of both of the die-sections to simultaneously move the same longitudinally.

7. In a self-opening die, the combination of a base-plate or support, laterally-separable members carrying thread-cutting teeth, a pin extending from each of said members, tubes mounted on said pins, one inside the other, a separating-spring mounted inside said tubes for normally separating the members, and pin-and-socket connections for holding the members in working position.

8. In a self-opening die, the combination of a base-plate, holding-pins extending therefrom, a guide-plate mounted on said pins, laterally-separable members mounted in the guide-plate, pins extending from said members, tubes mounted on said pins and fitting one inside the other, and a separating-spring mounted within said tubes, the separable members having sockets for receiving the ends of the holding-pins to lock them in operative position.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LEWIS A. HOWE.

Witnesses:

C. H. FOLLANSBY,
JAMES CRANE.