O. A. SORENSEN.

SELF OPENING DIE.

APPLICATION FILED OCT. 16, 1918.

1,351,447. **Patented Aug. 31, 1920.**

2 SHEETS—SHEET 1.

Fig. 3.

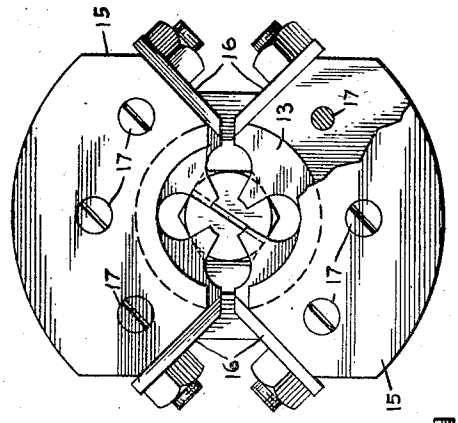


Fig. 2.

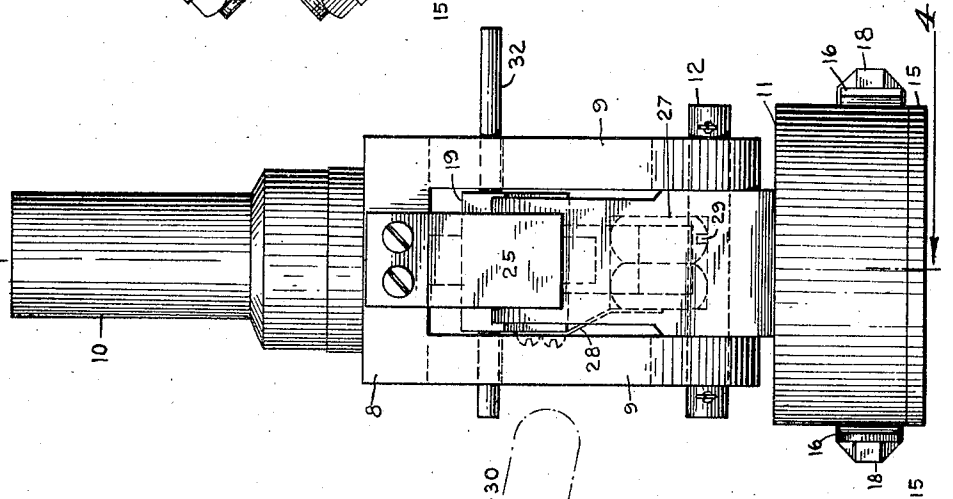
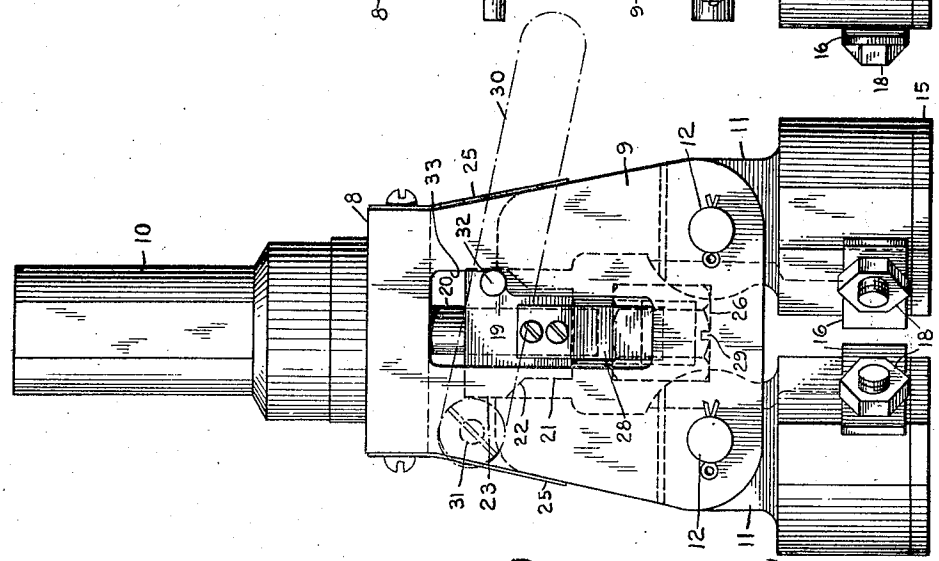


Fig. 1.



Inventor

Otto A. Sorensen

By his Attorney

Frank J. Kent

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2 SHEETS—SHEET 2.

Fig. 5.

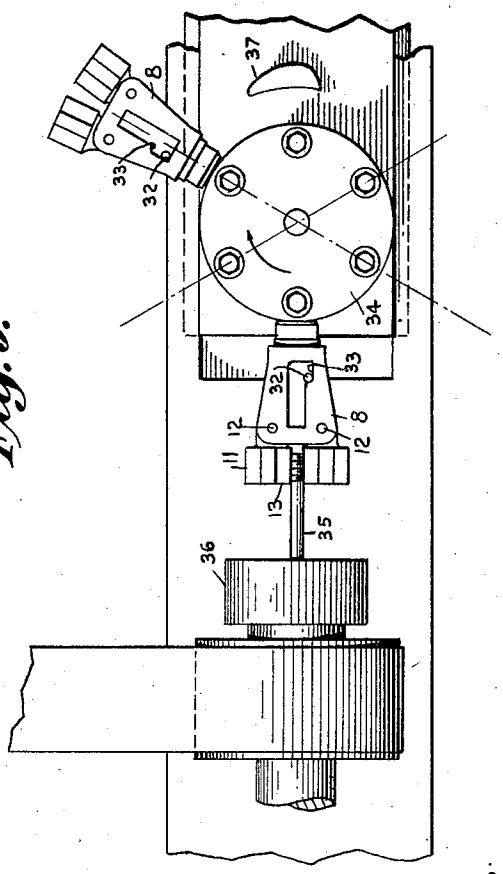


Fig. 7.

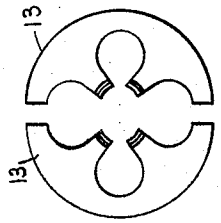


Fig. 6.

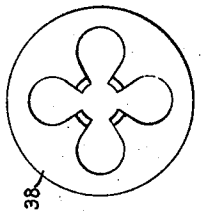
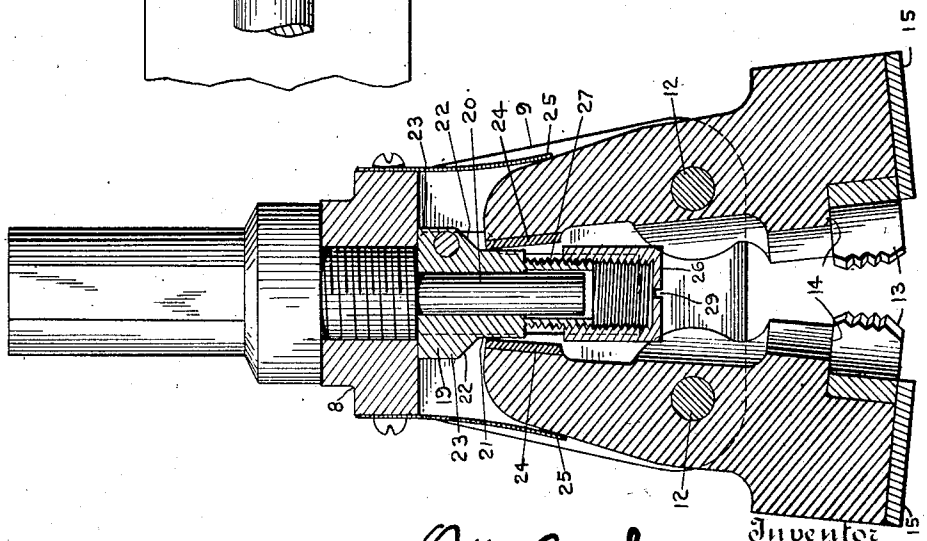


Fig. 4.



Inventor

Otto A. Sorensen

By his Attorney

Frank P. Clark

UNITED STATES PATENT OFFICE.

OTTO A. SORENSEN, OF NEW YORK, N. Y.

SELF-OPENING DIE.

1,351,447. Specification of Letters Patent. Patented Aug. 31, 1920.

Application filed October 16, 1918. Serial No. 258,356.

To all whom it may concern:

Be it known that I, OTTO A. SORENSEN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Self-Opening Dies, of which the following is a specification.

My invention relates to so-called "automatic" or "self-opening" dies of the type wherein the dies automatically open up upon completion of the screw-threading operation, to permit quick retraction of the work.

The objects of the invention are to provide a quick acting die of this character, of simple and substantial construction, which will consist of but few, sturdy parts and which will be relatively inexpensive of production.

A further and special object in my invention, is to eliminate the need for special dies or cutters and to enable the use in the device of standard cutters now on the market.

Briefly, the invention, in the form herein disclosed, consists of a pair of cutter jaws pivoted between the sides of a bifurcated supporting head, said jaws being engaged at their inner ends by a jaw closer slidingly mounted in the head and in the plane of the work, so as to be operated thereby to release the jaws. Means are provided for shifting said jaw closer in the reverse direction to close the jaws. The jaws at their outer ends are provided with seats for the cutters or die segments and with means for detachably securing the cutters in place.

Other features of the invention will appear as the specification proceeds.

In the accompanying drawings I have illustrated the invention embodied in a simple, practical form, but it will be understood that various changes and modifications may be made without departing from the true spirit and scope of the invention.

In said drawings, Figures 1 and 2 are side and edge views of the device; Fig. 3 is an end view of the same; Fig. 4 is a longitudinal sectional view, taken substantially on the plane of line 4—4 of Fig. 2, showing the jaws in the opened position; Fig. 5 is an illustration of an application of the invention to a turret lathe; Fig. 6 is a plan view of a commercial or standard type of one-piece die; and Fig. 7 is a view of the same split in two segments for use in my invention.

The body of the device is in the form of a supporting head 8, forked or bifurcated to provide the spaced sides 9, and provided at the rear with a suitable arbor or spindle 10 for engagement in a lathe, drill press, or other machine.

The coöperating cutter jaws are designated 11, and are shown pivoted intermediate their ends on pivot studs 12, between the forked sides of the head.

The cutters proper are illustrated as separately formed substantially semi-cylindrical die segments 13, engaged in substantially semi-cylindrical seats 14 formed in the outer ends of the jaws, said seats being open to the outer ends of the jaws and the segments being shown as secured therein by the overlying end or cover plates 15 and the edge engaging plates 16. The end clamp plates are shown held by screws 17 and the edge clamps by the nuts 18, which enables the cutter segments being readily removed and replaced and further provides for taking up any wear to clamp the cutters firmly in place.

The jaw closer comprises in the present illustration, a wedge block 19, slidably mounted on the stud 20, at the inner end of the jaws and provided with the outer relatively low abutment surfaces 21, connected by inclines or cams 22 with the higher abutment surfaces 23. In the opened condition of the jaws, the inner ends of the jaws, which may be provided with the hardened bearing surfaces 24, bear on the lower or reduced portions of the wedge block as shown in Fig. 4, and when the wedge block is advanced, the cam shoulders 22, act to spread or separate the inner ends of the jaws, thereby closing or bringing together the forward ends of the jaws as shown in Fig. 1. In the final closed position of the jaws, the inner ends of the jaws bear on the upper or raised portions 23 of the wedge blocks which serve to hold the jaws firmly closed. As the wedge block is retracted, the flat springs 25, bearing on the inner ends of the jaws, rock the jaws to open position and cause the jaws to closely follow the wedge surfaces.

The automatic opening of the die is accomplished by causing the work, as it ad-

vances, relatively, in the die, to engage and push back the wedge block. The block is, for this purpose, provided at its outer or forward end with an abutment 26, disposed in the path of the work and shown as a hollow thimble screwed on the threaded end portion 27 of the block. The adjustment of this abutment thimble enables the setting of the die for longer or shorter work and to retain the thimble in the position to which it is adjusted, I have shown a flat spring 28, carried by the block and bearing on one of the flattened sides of the thimble. The thimble may have a slot 29 cut in the end thereof to receive a screw driver or like instrument to enable the adjustment of the abutment from the open end of the die.

The die may be closed automatically, or by hand, as desired. In Fig. 1 I have indicated in dotted lines, a handle 30 adapted for manual operation, pivoted on the head at 31 and connected with a stud or pin 32, projecting transversely from the slide. This stud is shown as working in longitudinal slots 33, in the sides of the head, which limit the stroke or movement of the slide.

Fig. 5 illustrates one application of the invention to a turret lathe, wherein the dies are carried by the turret 34 and the work 35 is carried by a chuck 36 on the head stock of the lathe. In this case the dies are automatically closed by a cam 37 which engages the outstanding pins 32 to project the slides and close the jaws, as the dies swing around in the shifting of the turret.

In Figs. 6 and 7, I have illustrated how I may take an ordinary one-piece die 38 of standard, commercial construction and split the same apart into two segments 13, to fit in the seats provided therefor in the jaws.

The operation of the device, it will be seen, is simple and positive, the dies are readily interchangeable and the device is capable of using ordinary dies now on the market. A further important advantage is that the device consists of but few, simple parts which require but little machine work, so that the die can be simply and inexpensively manufactured. By substituting different kinds of cutters, the various operations of cutting screw threads, milling, etc., can all be performed.

I claim:

1. A self-opening die comprising a supporting head, coöperating jaws pivoted in said head, cutters carried by said jaws, a stud rigidly secured to the head and centrally projecting therefrom between the rear ends of the pivoted jaws, a jaw closer slidingly mounted on the stud in position to be tripped by the work to release the jaws, and means for sliding said jaw closer in the reverse direction to close the jaws.

2. A self-opening die comprising a supporting head, coöperating jaws pivoted in said head, cutters carried by said jaws, a centrally extending stud rigidly secured to the head and projecting between the pivoted jaws at the rear ends thereof, a jaw closer slidingly mounted on the stud in position to be tripped by the work to release the jaws, an abutment on said jaw closer longitudinally adjustable for different lengths of work.

3. In a self-opening die, a supporting head, coöperating jaws pivoted intermediate their ends in said head, cutters on the outer ends of said jaws, a wedge block slidingly mounted in the head at the inner ends of the jaws, an integral extension projecting from the wedge block, means for advancing said wedge block between the inner ends of the jaws and an abutment on said wedge block extension in position to be engaged by the work.

4. A combination like that set forth in claim 4, wherein the abutment is longitudinally adjustable on the wedge block extension and means are provided for retaining said abutment in adjusted position.

5. A combination like that set forth in claim 4, wherein the jaws are provided with seats in their forward ends for cutters of standard design, and means are provided for engaging the ends and one side of the cutters for detachably securing such cutters in said seats.

6. In combination, a bifurcated head having longitudinal slots in the sides thereof, jaws pivoted between the sides of said head, a longitudinal stud in the head at the inner ends of the jaws, a wedge block slidingly engaged on said stud for spreading the inner ends of the jaws, a transverse pin on the wedge block operating in the longitudinal slots in the sides of the head, an adjustable abutment on the wedge block in position to be engaged by the work, the jaws having cutter seats in their outer ends, cutters engaged in said seats and means for detachably securing said cutters in such seats.

7. A combination like that set forth in claim 4, wherein the jaws are provided with opposed substantially semi-cylindrical seats in their forward ends, the cutters are in the form of substantially semi-cylindrical segments to fit in said seats and side clamps are provided one on each side of the jaws for engaging opposite edges of the segments to hold them in their seats.

In testimony whereof I affix my signature.

OTTO A. SORENSEN.