F. E. WELLS.

METHOD OF MAKING DIES.

APPLICATION FILED JUNE 1, 1914.

1,125,784. Patented Jan. 19, 1915.

Fig. 1.

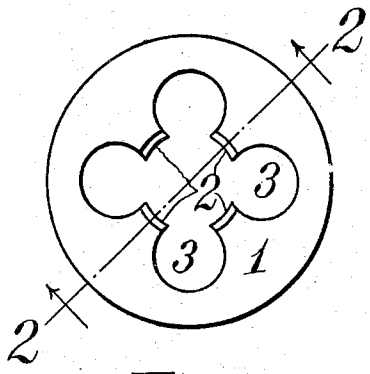


Fig. 3.

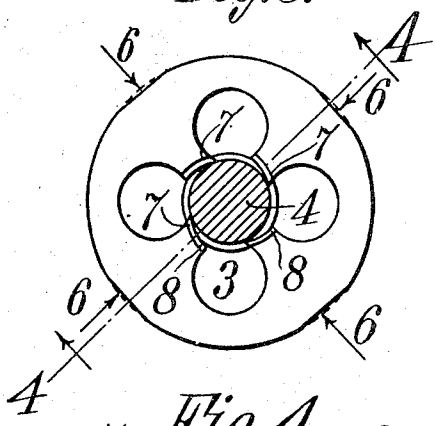


Fig. 2.



Fig. 4.

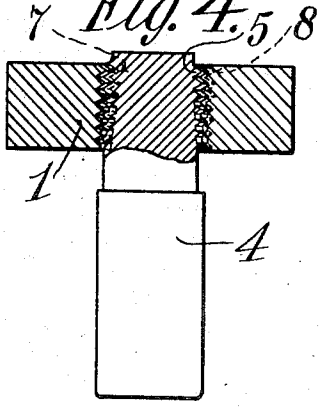
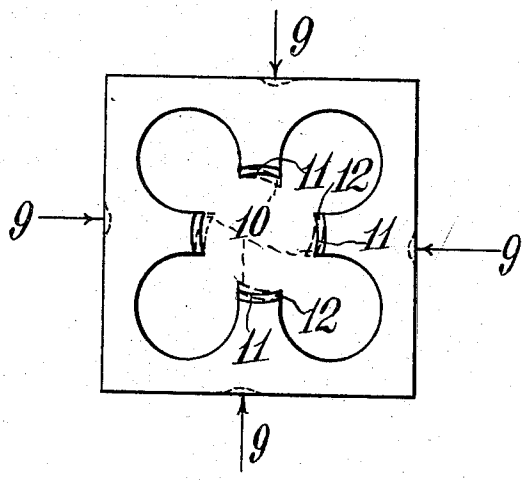


Fig. 5.



WITNESSES:

F. E. Hartwell.

G. M. Potter

INVENTOR.

Frederic E. Wells.

BY

Chapin & Co.

ATTORNEY.

UNITED STATES PATENT OFFICE.

FREDERIC E. WELLS, OF GREENFIELD, MASSACHUSETTS.

METHOD OF MAKING DIES.

1,125,784. Specification of Letters Patent. Patented Jan. 19, 1915.

Application filed June 1, 1914. Serial No. 841,985.

To all whom it may concern:

Be it known that I, FREDERIC E. WELLS, a citizen of the United States, residing in Greenfield, county of Franklin, and State of Massachusetts, have invented certain new and useful Improvements in the Method of Making Dies, of which the following is a specification.

This invention relates to improvements in the method of making dies for cutting screw threads.

The present practice in making dies for cutting screw threads on iron bolts, pipes, etc., is to drill a hole of suitable size in a piece of round or rectangular shaped piece of steel, then, by means of a tap, cut a screw thread in this hole, then, drill or form several other holes, called clearance holes, around the threaded hole. This method is objectionable, not only on account of its expense, but, by reason of the fact that it is difficult to obtain a thread of the correct size. In order to provide for the necessary adjustment as the teeth of the threads wear away, it is common to compensate for this wear by cutting the dies in two halves to permit the die to be opened or closed to make it cut larger or smaller, as may be required, by means of a suitable adjusting device which spans the opening. In either case the cutting threads of the die will no longer form a true circle, consequently some of the cutting points of the die will cut, and others will only make contact with the piece to be threaded at the heel portion only of the thread and, instead of cutting the threads will bind on the work resulting in injury to the threads and requiring more power to accomplish the work. In case the dies are not made adjustable, particularly in dies for cutting a tapered thread on a pipe, owing to the die advancing on an inclined surface or plane, all of the teeth will bind or wedge on the threads being cut to a considerable degree, the result being that the threads are torn or imperfectly formed. A remedy for this objection has long been sought. On the larger size dies it has been partially overcome by cutting away portions of the teeth of the die between the threads on the heel of the threads. This operation has been found to be slow, expensive, and unreliable.

The present invention, therefore, relates to the method of forming the teeth with this relieved portion both in the larger and smaller sizes and one that is both simple and reliable.

In general the method consists in subjecting the die to a bending process either by blows or a steady pressure that is applied to the outer surface or periphery at as many points as there are clearance holes or spaces, and, in such a manner as to force the cutting points of the teeth radially toward and nearer the center of the die than the heel portions of the teeth. In order to carry out this process it would be necessary to form the diametrical distance between the teeth of the die a little greater than the finished or correct distance. In order to accurately determine the position of the finished teeth, or in other words, how much the points of the teeth are to be bent inward, it has been found desirable to employ a threaded size plug that is inserted in the threaded opening of the die prior to subjecting it to pressure or blows to force the teeth radially inward. This plug, may of course be formed to any desired shape to suit the requirements of the finished tooth.

In order to fully explain the method, reference to the accompanying figures is made in which:

Figure 1 is a plan view of a circular die that is formed with the usual threaded opening therethrough with the adjoining clearance spaces. Fig. 2 is a sectional view on the line 2—2 of Fig. 1 showing the tapered opening. Fig. 3 is a view showing the threaded size plug in place in the threaded opening of the die and the forward cutting ends of the teeth engaging the bottom of the threads on the plug after the bending process. Fig. 4 is a sectional view on the broken line 4—4 of Fig. 3, and Fig. 5 is a plan view of a rectangular shaped die showing in dotted lines the forward cutting edges of the teeth that have been bent inward.

Referring to the drawings in detail: 1 designates a circular shaped die having the cutting teeth 2 formed therein on a true circle, the usual clearance openings being indicated at 3. This figure shows the cutting teeth before they have been bent radially inward by blows or pressure.

4 designates a threaded plug formed with threads 5 cut thereon. The threaded end of this plug is now inserted in the threaded opening shown in Fig. 1 (see Fig. 3). After the threaded plug is inserted the periphery of the die 1 is subjected to blows or

pressure at the points indicated by the arrows 6. This operation forces the cutting points of the threads of the die inward toward the center until they engage the bottom of the threads of the size plug. The bent-in cutting points of the teeth of the die being clearly illustrated in Fig. 3 at 7 which is the true size required. The heel portion of each tooth is left practically undisturbed as indicated at 8. By reason of the fact that the heel portions 8 of the cutting teeth are left undisturbed the process produces what is termed a "relieved thread," for clearance purposes and to cause ease of operation. It will be observed that the position of the arrows 6 which indicates the points where pressure is applied, is slightly in front of the cutting points in order that the pressure may act to carry these points 7 radially inward. It should be observed from Fig. 3 that these points 7 are now on a true circle, and that the heel portions 8 are spaced a short distance from this circle.

Fig. 5 illustrates the under or cutting side of a rectangular solid die that is designed to be used for cutting threads on a pipe, after the process of relieving the threads has been performed as already described in connection with the figures; it being understood that the pressure is applied at the points indicated by the arrows 9. The bent-in cutting points being shown in dotted lines 10 and the full lines 11 their position before the process has been carried out, the heel portion of the relieved thread being shown at 12. It is also to be understood that the shape or form of the plug 4 may be varied, if desired, to vary the shape of the relieved or heel portion of the thread.

It has been pointed out that the size of the threaded opening shown in Fig. 1 is larger than the distance between the cutting points in the finished die in order that the heel portion may have proper clearance after the points are forced inward into contact with the size plug.

It is to be understood that I do not intend to limit myself to a closed die as I may, if desired, employ the method in dies that are open or cut, and made in one or two parts.

What I claim is:

1. The method of positioning the cutting points of a thread cutting die which consists in inserting a threaded size plug into the die, then forcing said points into contact with the size plug, whereby the heel portion of the teeth are relieved, as described.

2. The method of forming a threaded cutting die which consists as follows: first, forming the cutting teeth larger than the finished size, then inserting a size plug in the opening of the die, then subjecting the periphery of the die to pressure to force the cutting points of the teeth into contact with the size plug, whereby the cutting points of the teeth will represent the true size of the die and the heel portions of the teeth will be relieved to afford clearance, as described.

3. The method of positioning the cutting points of a thread cutting die which consists in inserting a threaded size plug into the die, then applying pressure to the external surface or periphery of the die on a line forward of said points to force the same into contact with the size plug.

FREDERIC E. WELLS.

Witnesses:
EDWARD F. SMITH,
ELEANOR E. SULLIVAN.