July 13, 1943. H. C. ERDMAN 2,324,143

METHOD OF MAKING THREAD ROLLING DIES

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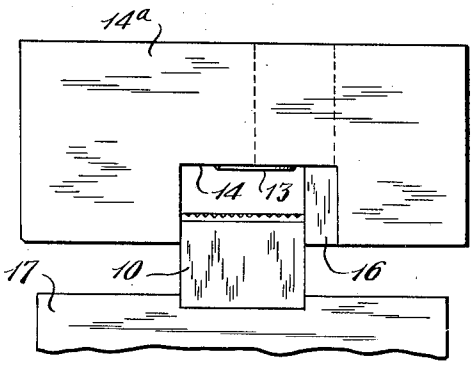


FIG. 1

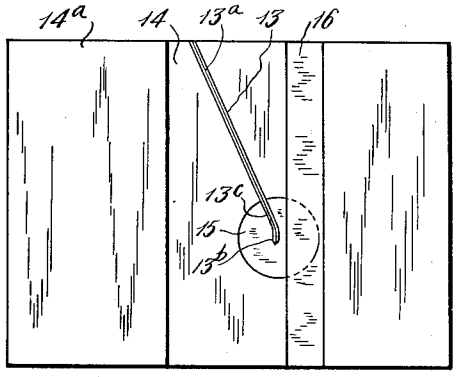


FIG. 2

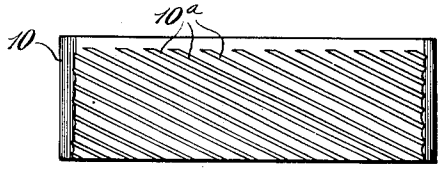


FIG. 3

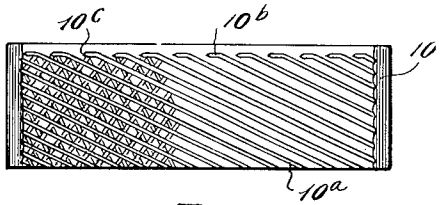


FIG. 4

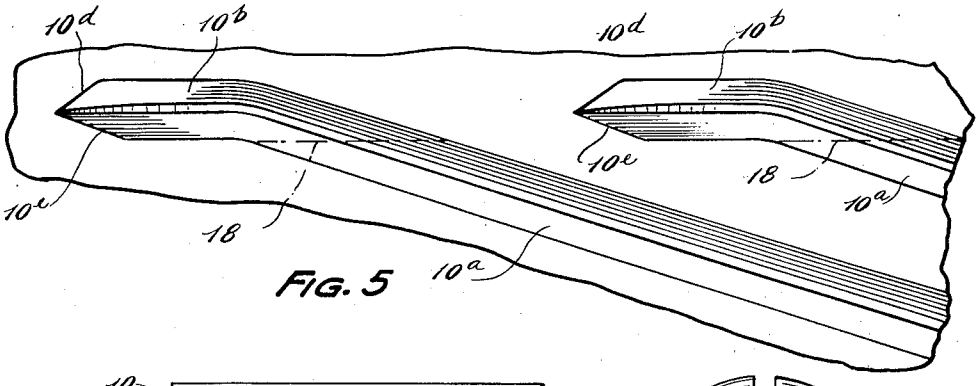


FIG. 5

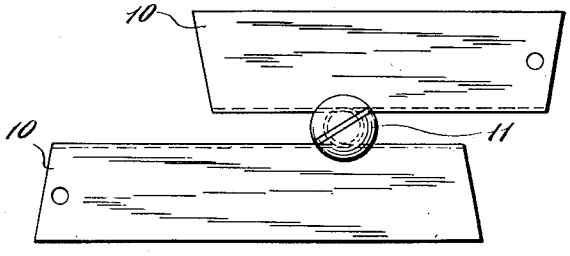


FIG. 6

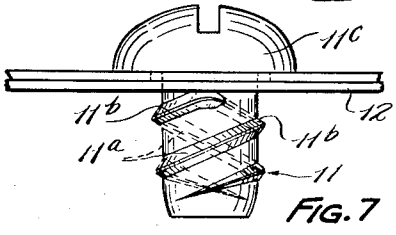


FIG. 7

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METHOD OF MAKING THREAD ROLLING DIES

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Application January 28, 1943, Serial No. 473,780

3 Claims. (Cl. 76—107)

This invention relates to a process of making thread rolling dies of the type disclosed in my application Serial No. 451,450, filed July 18, 1942.

In application Serial No. 451,450 there are disclosed dies not only for rolling the thread or threads on screws but for forming shoulders thereon which are continuations of the thread or threads on the screw, which shoulders extend for a distance at zero pitch and which are provided at their free ends with specially formed portions which prevent the reentry of the thread or threads when the screw is turned in the reverse direction.

With the dies of my application Serial No. 451,450 self-tapping combined screws and rivets, referred to as "scrivets," are formed, these scrivets having V-threads. The shoulder forming portions, which are located a distance from the head of the scrivet equivalent to the thickness of the sheets to be fastened together, are also of V-formation and are of the same thickness, height, and proportions as the threads themselves.

The object of this invention is to provide an improved method by which rolling dies such as disclosed in my application Serial No. 451,450 may be formed.

The invention may be further briefly summarized as consisting in certain novel steps of the improved method which will be described in the specification and set forth in the appended claims.

In the accompanying sheet of drawings illustrating the method of forming the thread rolling dies,

Fig. 1 is a view of a hydraulic press shown in simplified form for stamping the shoulder forming portions of the dies as continuations of the parallel milled grooves;

Fig. 2 is a face view of the stamp;

Fig. 3 is a view of one of the dies before the shoulder forming portions are applied;

Fig. 4 is a view of the same after the shoulder forming portions have been applied;

Fig. 5 is an enlarged view of a section of one of the completed dies;

Fig. 6 is an edge view of the dies shown in the act of rolling threads on a scrivet; and

Fig. 7 is a view showing on an enlarged scale a scrivet employed for holding two work pieces together.

By reference to Figs. 3 and 4 which show the inner side of one of the dies 10 before and after the shoulder forming portions of the grooves have been applied, it will be seen that each die has thread rolling grooves composed of two portions including parallel V-portions 10*a* and shoulder forming V-portions 10*b* which extend in a plane parallel to the edge of the die and at a suitable distance therefrom depending upon the thickness of the two pieces of stock or the two work sheets which are to be clamped together. As is customary, the die has on the starting point thereof deformations 10*c* which insure the desired or correct rolling of the scrivet blank between the dies. These dies form the scrivet 11 shown in Fig. 7, the scrivet having a pair of V-threads 11*a* and each thread having a shoulder 11*b* which is located a predetermined distance from the underside of the head 11*c* to receive between the head and the shoulders a pair of work sheets 12 and to clamp them firmly between the head 11*c* and the shoulders 11*b*, as shown in Fig. 7. It will be understood that the dies may be employed for rolling one, two, or more V-threads on the scrivet by varying the distance between the parallel portions 10*a* of the grooves in the die. In Fig. 6 there are shown two dies 10 in the act of rolling threads on the scrivet 11.

It will be noted by reference to Fig. 7 that the end of the shoulder portion is slightly downturned toward the free end of the shank of the scrivet. This is accomplished by suitably shaping the end of the groove forming the shoulder forming portion 10*b* of the die. This is shown clearly in Fig. 5 wherein the upper portion 10*d* of the end of the shoulder forming portion 10*b* is made shorter than the lower portion 10*e* which is preferably formed parallel with the portion 10*a* of the groove. It will be understood that these downturned portions of the threads at the ends of the shoulders of the scrivet assist the shoulders in effectively preventing the withdrawal of the scrivet by turning it in the reverse direction.

Referring now to the method of forming suitable extensions of the parallel grooves 10*a* in the die 10 so as to produce the shoulder forming portions 10*b*, it will be seen by reference to Fig. 3 that the die in its partially formed condition has simply straight parallel grooves 10*a* milled therein whereas in Fig. 4 the grooves 10*a* have, in addition, shoulder forming portions 10*b* formed therein at the correct distance from the edge of the die against which the head of the scrivet blank is to rest. This is accomplished by the use of a stamp 13 which is composed of a straight portion 13*a*, a shoulder forming portion 13*b* and a second straight portion 13*c*

which is formed as a continuation of the straight portion 13*a* (see Fig. 2). The portions 13*a*, 13*b*, and 13*c* are formed as a V-rib which projects from the inset surface 14 of a stamping member 14*a*. The parts 13*b* and 13*c* are formed on a cylindrical piece 15 which is carefully fitted into a circular socket formed in the member 14*a* with the straight portion 13*c* in perfect alignment with the portion 13*a*.

In the use of this stamp there is first placed in the member 14*a* a liner 16 of a width such that the shoulder forming portion 13*b* is spaced the correct distance to space it from the top edge of the die a distance equivalent to the distance that the edge of the shoulder forming portion 10*b* is located from the head of the scrivet blank on which the thread is to be formed. Then each die 10 is placed in a holder 17 shown in Fig. 1 and the parts 14*a* and 17 with the die 10 supported by the latter are placed in a hydraulic press with the V-rib of the stamp 13 in line with one of the straight grooves 10*a* and the press is closed with the straight portions of the ribs 13*a* and 13*c* fitted into one of the grooves 10*a*. This is repeated for each of the milled V-grooves 10*a* in the die 10 either by a hydraulic feeding device which feeds the die through the member 17 or by manually positioning the stamp for each groove. Each time the press is closed the shoulder forming portion 10*b* and a short section of the groove 10*a* are stamped into the die as shown by the dotted lines 18 in Fig. 5, thus completing the thread forming groove of the die with the shoulder forming portion 10*b*. The thread forming grooves of the companion die 10 are formed in a similar manner.

Thus it will be seen that I have provided an improved method of forming on the die 10 straight portions 10*a* and stamped portions 10*b* which extend as continuations of the portions 10*a* parallel to the edge of the die so as to form on the scrivet at a suitable distance from the head thereof shoulder forming portions which extend for a distance at zero pitch.

While I have shown the preferred method of forming thread rolling dies, I do not desire to be confined to the precise details shown but aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of the invention.

Having thus described my invention, I claim:

1. The method of forming a die for rolling threads on a scrivet with a thread portion or portions and a shoulder forming portion or portions spaced from the head of the scrivet, which comprises forming on the die parallel grooves, and stamping the shoulder forming portion as continuations of the parallel portions.

2. The method of forming a die for rolling threads on a scrivet with a thread portion or portions and a shoulder forming portion or portions spaced from the head of the scrivet, which comprises forming parallel grooves in the die and stamping as continuations of said grooves shoulder forming portions with short extensions of the parallel grooves.

3. The method of forming a die for rolling threads on a scrivet with a thread portion or portions and a shoulder forming portion or portions spaced from the head of the scrivet, which comprises forming parallel grooves in the die, and with a stamp having a rib with a straight portion which is adapted to be fitted into each of the parallel grooves of the die and having also a shoulder forming portion, forming the shoulder forming portion of the die as a continuation of each of said grooves with the straight portion of the rib of the stamp fitted successively into the parallel grooves formed in the die.

HARVEY C. ERDMAN.