

B. BORDEN.
PIPE THREADING DIE.
APPLICATION FILED MAR. 23, 1910.

1,038,482.

Patented Sept. 10, 1912.

Fig. 1.

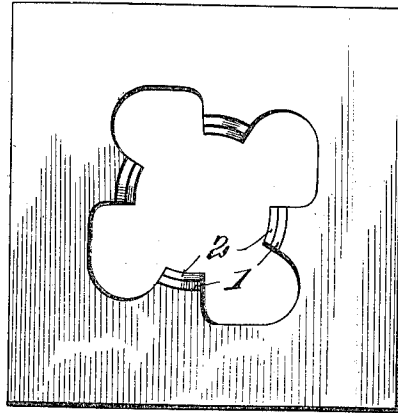


Fig. 2.

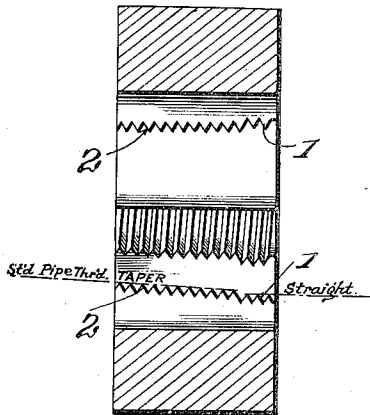


Fig. 3.

Fig. 7.

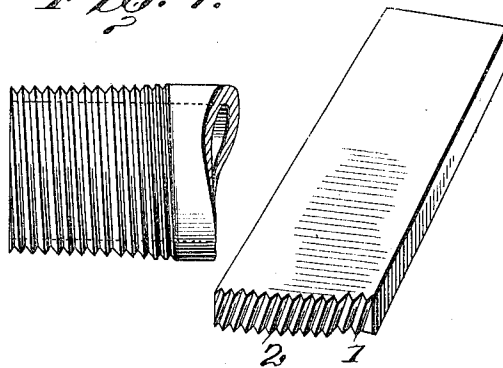


Fig. 4.

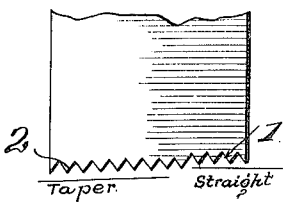


Fig. 5.

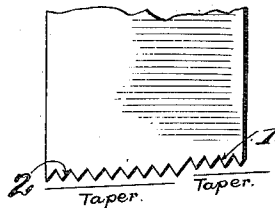
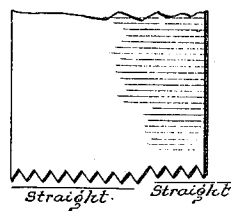


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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PIPE-THREADING DIE.

1,038,482.

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To all whom it may concern:

Be it known that I, BRADFORD BORDEN, of Toronto, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Pipe-Threading Dies; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The primary object of this invention is to so arrange the cutting threads of threading dies that engagement with a pipe or bolt may be readily initiated and the cutting of a standard thread completed with the expenditure of less energy than is ordinarily required with hand-tools. To this end, I arrange the threads of each die bit or segment, or the threads of a chaser, on two planes, the plane of the initially-acting or throat threads being farther from the axis of the tool than the plane of the main cutting threads, which latter threads are stepped up from the throat threads. The base line of the initially-acting threads is preferably straight, that is, parallel with the axis of the die or tool, but it may, however, be set on a slight taper, that is, at an angle to the tool axis. The plane of the base-line of the main cutting threads is in-set, relatively to the base-line of the throat threads, and such main threads are preferably tapered, their plane being always nearer the axis of the tool than the initially-acting teeth. By thus forming the die-segments or chasers, the throat of the tool is enlarged and of substantially uniform diameter, and the throat threads will cut partial threads or gutters, preferably on straight lines, and such throat threads will, unaided by any leader-screw, or its equivalent, hold the tool to the work as against the resistance which occurs in stepping up to the main cutting threads. The latter upon being brought into action, having to cut to less depth, will follow at correct pitch and with lessened resistance in the partial threads or gutters formed in the work by the throat threads. With my invention I am enabled to obtain, with a solid or non-adjustable die stock, the same result as with an adjustable die-stock going twice over the work, with the dies or chasers set farther in for the second operation. By forming the step up between the throat

threads and the main cutting threads, the respective base-lines being on different planes, I am enabled to set the throat threads outwardly sufficiently far to insure the die or tool readily taking hold of the work and hold the die or tool thereto when the main threads begin to act. Without the step up from one set of threads to the other the throat threads would have to be given a very abrupt taper which would be insufficient, without the aid of a leader-screw or its equivalent, to initiate engagement with the work.

In stating that the roots or base lines of the threads of the two series are on different planes, it is understood that reference is made also to the points of the threads; and although all the threads of each series are shown as full threads with knife-like edges, it is to be understood that in some instances some of the points may be blunted. In either event, however, the base lines and points of the threads of the different series are on different planes, and the main threads are stepped up from the initially acting threads.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a face view and Fig. 2 is a transverse sectional view of a solid die constructed in accordance with my invention. Fig. 3 is a view in perspective of a chaser or segment die. Fig. 4 is a side elevation of a die on an enlarged scale. Figs. 5 and 6 show slight modifications. Fig. 7 shows a thread formed by the solid die of Figs. 1 and 2.

My present improvements are applicable to solid dies; adjustable dies, and chasers capable of automatically receding during the threading operation.

In Figs. 1 and 2 I have shown a solid die having, as usual, a central opening and a series of inwardly-projecting threading bits. The base of the threads 1 in the throats is outwardly set relatively to the base of the main cutting threads 2. In consequence, the diameter of the opening of the die is greatest at the throat, and it is thus formed so that the initially-acting threads will remove comparatively little metal, and will form on the work but partial threads or gutters, being intended to cut inwardly but a third, or less, of the required depth. The base-line

of these initially-acting threads is preferably straight, on a plane paralleling the axis of the die or tool. By forming the throat on a substantially uniform enlarged diameter so that the threads thereof will cut practically nothing more than gutters, (in depth but a small fraction of that required for the completed thread) the die will start easily on its work. It is immaterial how many threads are in the throat, but for all practical purposes I have found that three or four are sufficient, as even when on a taper they will all hold the pipe equally against the increased resistance offered by the main threads when the step-up is made thereto.

The base of the main cutting threads 2 is in-set on a different plane from the base of the initially-acting threads, so that the die-opening is, throughout the length of the main threads, of less diameter than at its throat. The base of the second series of threads is set on a taper, and the base of the initially-acting threads may also be on a taper (Fig. 5) but such latter taper must not, in order to obtain the advantages of my invention, be very abrupt. It is not necessary, however, that the second series be tapered, since, as shown in Fig. 6, such threads may be straight and on a plane parallel with the first-acting series. This is desirable for threading bolts.

In practice, starting the die or tool on the work is comparatively easy on account of the small amount of metal which the first series of threads are required to remove. The latter, although practically complete threads, form only gutters or partial threads in the pipe, being out-set to a degree which enables them to readily take hold of the work. The main cutting threads, when the step-up is made thereto, travel in the gutters or partial threads on the pipe, and complete a standard taper thread. The initially-acting threads, in the throat of the die, ordinarily make but one-third of a cut, or less, but they hold the tool to the work as against the increased resistance in stepping up to the main cutting threads. As the latter follow in the gutters or partial grooves formed by the first series of threads, the standard thread may be cut with less exertion than if all the chaser-threads were cut on a continuous taper, and starting is far easier than if the first series of threads were cut on a more abrupt taper than the main threads.

In using an adjustable die-stock with dies having straight threads, to make starting easy the dies are first set to cut about one-third the required depth, and then after this operation is completed the dies are adjusted to standard. The stock will then start on the work with comparative ease on account of the partial threads previously formed. The result of the double operation of an adjustable die-stock is attained by forming the dies as hereinbefore described, the first series of threads effecting an easy starting, and forming partial threads or gutters in which the second series of threads follow to cut to standard taper. I am thus enabled to obtain in one operation the same result as in two operations of an adjustable die-stock.

The advantages of my invention will be apparent to those skilled in the art. By so forming the threads of a pipe or bolt threading die that the plane of the base-line of the initially-acting threads is always outside the plane of the base-line of the finishing threads, whether the former threads are on straight lines or on a taper, I am enabled to obtain an easy-working die capable of readily initiating the threading operation and making the completion of the thread cutting comparatively easy.

I claim as my invention:—

1. A die formed with a cutting face having a series of threads in its throat, and a series of main cutting threads, the roots or base lines of the threads of the two series being on different planes, and the main threads stepped up from the throat threads.

2. A die formed with a cutting face having a series of threads in its throat whose base line is on a plane substantially parallel with the axis of the die, and a series of main threads whose base line and points are on different planes from the base line and points of the first mentioned threads.

3. A die formed with a cutting face having a series of threads in its throat whose base line is on a plane substantially parallel with the axis of the die, and a series of main threads whose base line and points are at acute angles to the first mentioned threads.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

BRADFORD BORDEN.

Witnesses:

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JOHN A. MURPHY.