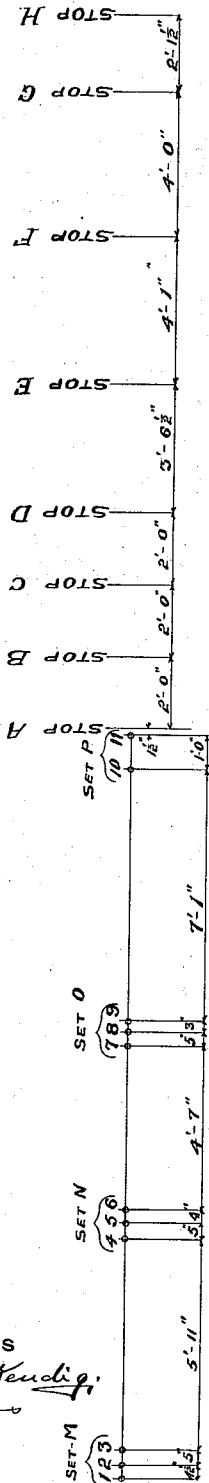


W. RAWLEY.
PROCESS OF PUNCHING.
APPLICATION FILED MAY 19, 1914.

1,156,928.

Patented Oct. 19, 1915.

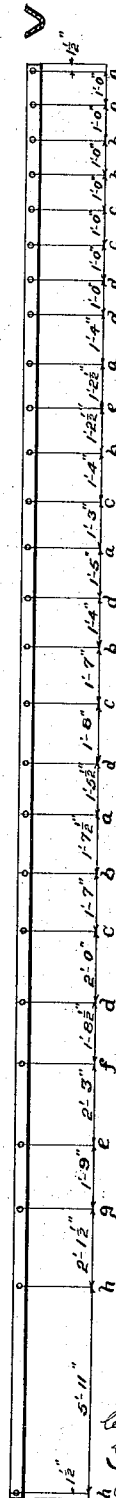
Fig. 1



WITNESSES

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Fig. 2



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PROCESS OF PUNCHING.

1,156,928.

Specification of Letters Patent.

Patented Oct. 19, 1915.

Application filed May 19, 1914. Serial No. 839,503.

To all whom it may concern:

Be it known that I, WAYNE RAWLEY, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Process of Punching, of which the following is a specification.

The invention relates to a process of punching material such as long strips or bars of metal where a series of holes having a certain predetermined spacing are required. The invention has for its object, the provision of a procedure whereby a series of sets of punches can be utilized simultaneously or after each movement of the material, so that the time consumed in punching the large number of holes required may be reduced to a minimum, and so that the number of longitudinal shifts of the material may be reduced to a minimum. The process is illustrated in the accompanying drawings, wherein—

Fig. 1 is a diagrammatic view indicating the arrangement of punches and stops for the strips of material to be punched, and Fig. 2 is a plan view of a strip of material after being punched by the punching arrangement of Fig. 1.

One of the primary uses of the process arises where the spacing of the holes in the strip of material need not be exactly uniform, but may vary within certain limits, and where it is desired to use a battery of punches already set up for use for other purposes, and separated by such distances that without the practice of the present invention a plurality of machines could not be used simultaneously upon the same material. One specific use for the process arises in the punching of the rivet holes in the legs of built-up poles wherein diagonal lacing strips extend from one leg of the pole to the next and are secured in their positions by means of rivets or bolts extending through the said holes. These legs or strips are in the form of angle irons as indicated in Fig. 2, but it will be understood that this showing is merely illustrative, and that the process is applicable to other shapes and cross sections.

In the arrangement as shown in Fig. 1 there are four sets of punches, M, N, O, and P, the individual punches being indicated by the reference numerals 1 to 11, and the distances between the individual punches

and between the sets of punches being indicated by the numerals accompanied by the foot and inch symbols. To illustrate, the distance between the punches 1 and 2 is four and one-half inches, between the punches 2 and 3 is five inches, and between the punch 3 of the set M and the punch 4 of the set N is five feet and eleven inches. These dimensions correspond to use as actually made by me, and the use here in connection with the dimensions of the punched bar on Fig. 2 will serve to make the invention clearer than would be the case with an abstract statement without a specific illustration. The machines carrying the sets of punches M, N, O, and P, may be of any type, and may carry any number of punches, the arrangement being such that any or all of the punches of any set may be thrown out of operation when desired. In the ordinary type of machine, the individual punches are held from moving upward and so being inoperative, by means of sliding blocks, so that when it is desired to throw any punch out of operation it is merely necessary to move the supporting block so that the individual punch which was supported by such block may move upward freely as the head which carries the punches moves down.

In order to accurately position the material being punched and determine its forward feed past the punches after each punching operation, the stops, A, B, C, D, E, F, G, and H, are provided in alinement with the series of punching machines. These are preferably positive stop means, but the process could be carried out with the same effect if the stop means were merely indicating marks to which the end of the material being punched is moved after each punching operation. The spacing between these stops as indicated in feet and inches is the spacing required for the punching of the bar as illustrated in Fig. 2. Below is a table indicating the punches used, when the end of the material being punched is brought to each of the stops.

At stop A throw in gear the punches	1-6-8-10-11
" " B " " " "	2-4-7-10-11
" " C " " " "	3-5-9-10-11
" " D " " " "	3-6-7-10-11
" " E " " " "	2-11
" " F " " " "	4
" " G " " " "	4
" " H " " " "	3-4

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Fig. 2 illustrates the punching secured in the strip of material, by the use of the

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punches and stops spaced as indicated in Fig. 1. When the end of the strip is at the stop A, the holes marked *a, a, a, a*, are punched in the strip of material, and the punches employed in punching these holes are the punches 1, 6, 8, 10, and 11. The strip of material is then moved to the right until its end is at the stop B when the second punching operation occurs. In this operation the holes *b, b, b, b, b*, are punched, and the punches employed are the punches marked 2, 4, 7, 10, and 11 on Fig. 1. The rest of the table will be clear without further explanation, and it will be seen that while the spacing of the holes is not uniform it is approximately so, with an increase in dimension from the right to the left hand end of the bar or strip. It will be seen that in each operation a number of punches are not used, and in the sets M, N, and O, one punch only is used during each operation. The other punches in the sets are thrown out as heretofore explained. It will also be seen that it is characteristic of the arrangement of punches that the distance between the punches in each set is equal to or less than the distance between the holes to be punched in the bar, and that the distances between the sets of punches is greater than the distances between the holes to be punched. The use of the relatively closely spaced punches in each set permits of the selection as indicated in the table, whereby a certain amount of adjustment is permitted in positioning the holes, and the process permits of the use of a series of punching machines for simultaneous use, where such machines were not designed nor positioned for that particular use. In other words, the process permits the use of the ordinary shop equipment to secure the punching of a strip of material substantially uniformly, in a minimum amount of time and with a minimum number of shifts of the strip or bar. The process is of course particularly useful where there are a large number of parts or strips to be punched, so that the ma-

chines can operate for a considerable period of time without a rearrangement of punches or stops.

What I claim is:

1. A process of punching a series of holes with a predetermined spacing in a blank, which consists in positioning the blank and punching a set of holes therein while the blank is in such position, some of which holes are spaced apart distances substantially multiples of the distances of the said predetermined spacing, feeding the blank ahead a predetermined distance, and punching another set of holes in the blank while in such position, some of which holes lie between the holes of the first set having the multiple distance spacing, and similarly repeating the operation until the blank is provided with the desired series of holes spaced with exact and approximate regularity.

2. A process of punching a series of holes with a predetermined spacing in a blank, which consists in positioning the blank and punching a set of holes therein while the blank is in such position, some of which holes are spaced apart distances substantially multiples of the distances of the said predetermined spacing, and some of which are spaced apart the desired final spacing, feeding the blank ahead a predetermined distance, and punching another set of holes in the blank while in such position, a part of which lie between the holes of the first set having the multiple distance spacing, and similarly repeating the operation until the blank is provided with the desired series of holes, a part of which are regularly spaced and a part of which are spaced with approximate regularity.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

WAYNE RAWLEY.

Witnesses:

CHAS. W. PELTON,
G. J. BRODENEYER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."