

(No Model.)

C. T. MASON, Jr.

PROCESS OF CUTTING V-SHAPED SLOTS IN SHEET METAL.

No. 354,202.

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Fig. 3.

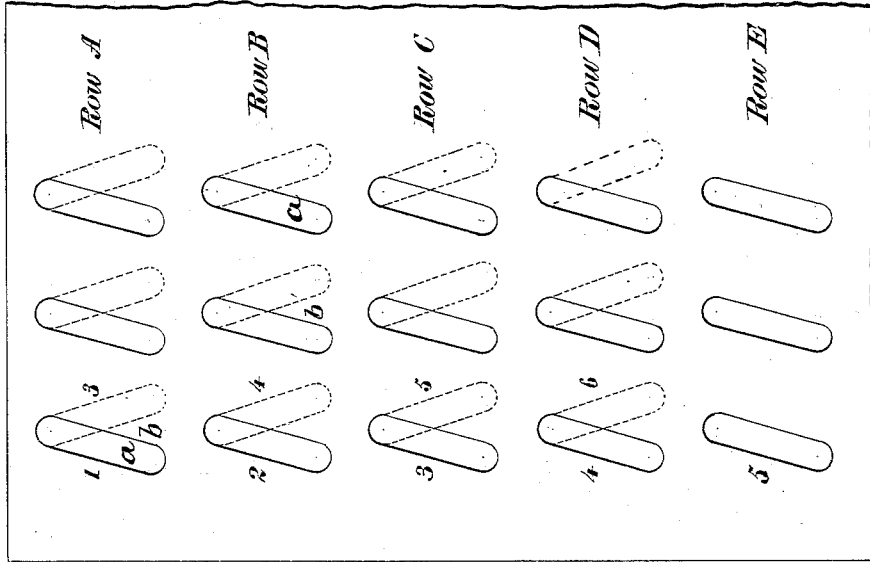


Fig. 1.

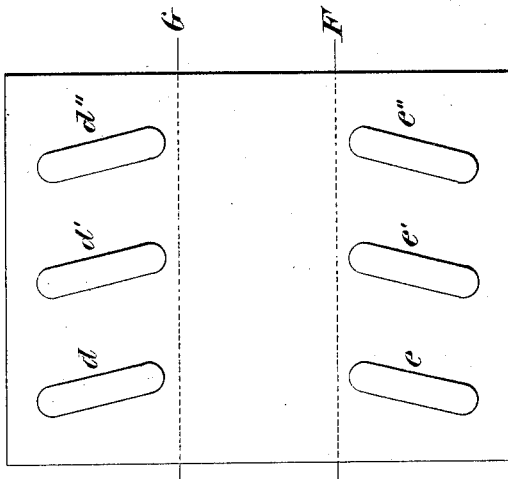
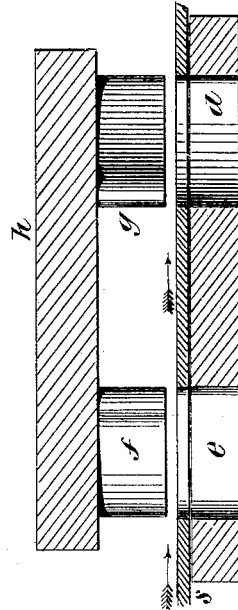


Fig. 2.



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PROCESS OF CUTTING V-SHAPED SLOTS IN SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 354,202, dated December 14, 1886.

Application filed May 25, 1886. Serial No. 203,247. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. MASON, Jr., of Sumter, Sumter county, South Carolina, have invented a new and useful Improvement in Processes of Forming Slots Containing Teeth in Sheet Metal, of which the following is a specification.

My invention consists in a new process of forming rows of V-shaped slots containing pointed teeth in sheets of metal, which sheets I employ as envelopes for cotton-ginning cylinders and cotton-picking stems.

By means of my invention I am enabled to form said slots and teeth rapidly over a sheet of metal, so that there is no waste of material by reason of one or more rows of slots being left incomplete at the edges, and so that the teeth will be produced by a shearing cut, and hence exceedingly sharp and ready for immediate use without filing or grinding; also, by reason of the order of formation and disposition of the slots, oppositely-inclined halves or legs of the same are produced in pairs simultaneously in different rows, so that there is an abundance of supporting metal around the points at which the punches act, whereby tearing, buckling, or yielding of said metal during the operation of the punches is avoided.

In carrying out my process I prefer to employ a punching-machine in which the punches and dies are disposed substantially as herein shown and described, and which embodies any suitable mechanism for vertically reciprocating said punches.

In the accompanying drawings, Figure 1 shows the disposition of the dies in which correspondingly-shaped punches enter. Fig. 2 is a vertical section showing the general arrangement of punches and their support and the dies with a sheet of metal to be operated upon in place. Fig. 3 illustrates the steps of my process of forming the V-shaped slots and teeth therein by suitable manipulation of the sheet under the punches.

Similar letters of reference indicate like parts.

In Fig. 3 I represent a sheet of metal containing five rows of V-shaped slots, as *a*, in each of which slots is formed a pointed tooth, *b*, the said tooth forming the solid angles of

the V. The said rows are marked, respectively, row A, row B, row C, row D, and row E, and I here show but three V-shaped slots in a row. In practice I make as many rows as the sheet to be operated upon will accommodate, and as many slots in a row as there are punches in the machine employed. Each V-shaped slot is formed by two separate strokes of a punch. Thus, for example, in row A each slot is composed of the leg or half 1 and the leg or half 3, these halves being oppositely inclined and formed at different times and never simultaneously.

Fig. 1 shows the disposition of the dies, which are arranged in two rows, the dies *d d'* being in one row, and the dies *e e'* being in the other rows. Above these dies are arranged the corresponding punches *f g*. These are rigidly attached to a support, *h*, Fig. 2, which is reciprocated by any suitable mechanism. The sheet *S*, Fig. 2, to be slotted is fed, as hereinafter described, forward between the punches and dies.

From Figs. 1 and 3 it will be seen that the space or interval between the rows of dies is equal to the distance between the rows A and C and B and D of the slots cut in the sheet, (shown in Fig. 3;) or, in other words, if a sheet of metal were placed above the dies and the punches operated that sheet would of course have the appearance, substantially, of Fig. 1, half of each V-shaped slot of the slots in one row and half of each V-shaped slot of the slots in the next row but one being formed. No slots in the intermediate row would be made. It will be apparent, therefore, that between the points of operation of the punches, as for example, between the openings *d* and *e*, a wide interval or supporting area of metal exists, so that buckling, breaking, or tearing of the metal under the action of the punches is avoided.

The process of forming the rows of V-shaped slots, as in Fig. 3, is as follows: The edge of the sheet is introduced under the punches corresponding to the dies *e e'*—say to the mark indicated by the dotted line *F*, Fig. 1. The punches are then brought down to form the half-slots (marked 1 in Fig. 3) and immediately raised. The sheet is then fed forward a dis-

tance equal to that between two adjacent rows, as between row A and row B; or, for example, so that its edge comes to the mark indicated by the dotted line G in Fig. 1, the punches over dies *e e' e''* being again brought down from the half-slots (marked 2 in Fig. 3.) So far the punches over the dies *d d' d''* have not acted upon the sheet because it has not reached them, and the punches which have acted have produced the left-hand halves of the slots of rows A and B. The sheet is now advanced again, the extent of forward feed being the same as before, and the consequence is that the sheet is thus brought over both rows of dies, and hence both sets of punches act upon it. The punches over dies *e e' e''* then form the left-hand half-slots 3 of the row C. The punches over dies *d d' d''*, however, form the right-hand half-slots 3 of row A. Consequently on the third downstroke of the punches the first row (row A) of V-shaped slots is completed. The sheet being advanced again an equal distance, the two sets of punches simultaneously acting from the right-hand half-slots 4 of row B, completing the slots of that row and the left-hand half-slots 4 of row D. The next advance produces the right-hand half-slots 5 of row C and the left-hand half-slots 5 of row E, and so on indefinitely. Supposing, however, that the sheet terminates at row E, then on the sixth stroke the punches above dies *d d' d''* only would meet the sheet, (the sheet having moved from under the punches corresponding to the dies *e e' e''*), and the aforesaid punches would then complete the slots of row D, and, finally, after another forward movement of the sheet, they would complete the slots of row E.

It will be apparent, therefore, that when the perforated sheet leaves the punching apparatus every row of V-shaped slots is necessarily completely finished, so that there is no row of partly-completed slots to be cut off, involving waste of time and material.

While I greatly prefer arranging my punches and dies so that the distance between the rows of dies shall equal the distance between alternate rows of slots in the finished sheet, I do not mean herein to limit myself to this exact spacing. I may make the distance greater, as, for example, equal to that between row A and row D in Fig. 3, or less, as, for example,

equal to the distance between adjacent rows, as between row A and row B in Fig. 3. The last arrangement is, however, objectionable because a proper supporting area of metal around the parts acted upon by the punches is not afforded.

In the accompanying drawings the slots, punches, &c., are shown very much enlarged for the sake of clearness. In actual practice I make the V-shaped slots each about five-sixteenths of an inch in length.

I claim as my invention—

1. The process of producing rows of V-shaped slots containing pointed teeth in sheet metal, which consists in, first, making simultaneously one half or leg of each slot in two different rows—as, for example, the half-slots 3 3 in the rows A and C, the said halves or legs being relatively oppositely inclined; second, making simultaneously the remaining oppositely inclined half or leg of each slot in one of said rows, as the half-slots 5 in row C, and also the half-slots in a new row, as the half-slots 5 in row E, substantially as described.

2. The process of producing rows of V-shaped slots containing pointed teeth in sheet metal, which consists in, first, producing simultaneously one-half of each slot in alternate rows, the said half-slots being oppositely inclined, as the half-slots 3 3 in rows A and C; second, producing simultaneously one-half of each slot oppositely inclined, as the half-slots 4 4 in the rows B and D; third, producing simultaneously one-half of each slot oppositely inclined, as the half-slots 5 5 in the rows C and E, and so on, substantially as described.

3. The process of producing a row of V-shaped slots containing pointed teeth in sheet metal, which consists in, first, producing one-half of each slot in the first row, as the half-slot 1 in row A; second, producing one-half of each slot in the succeeding row, as the half-slot 2 in row B; third, producing one-half of each slot in the third row, as the half-slot 2 in row C, and simultaneously therewith the remaining half-slot of the first row, as the half-slot 3 in row A, substantially as described.

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Witnesses:

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 E. M. ANDERSON.