

(No Model.)

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G. VAN WAGENEN.
COMBINED SHEARING AND PUNCHING MACHINE.

No. 484,832.

Patented Oct. 25, 1892.

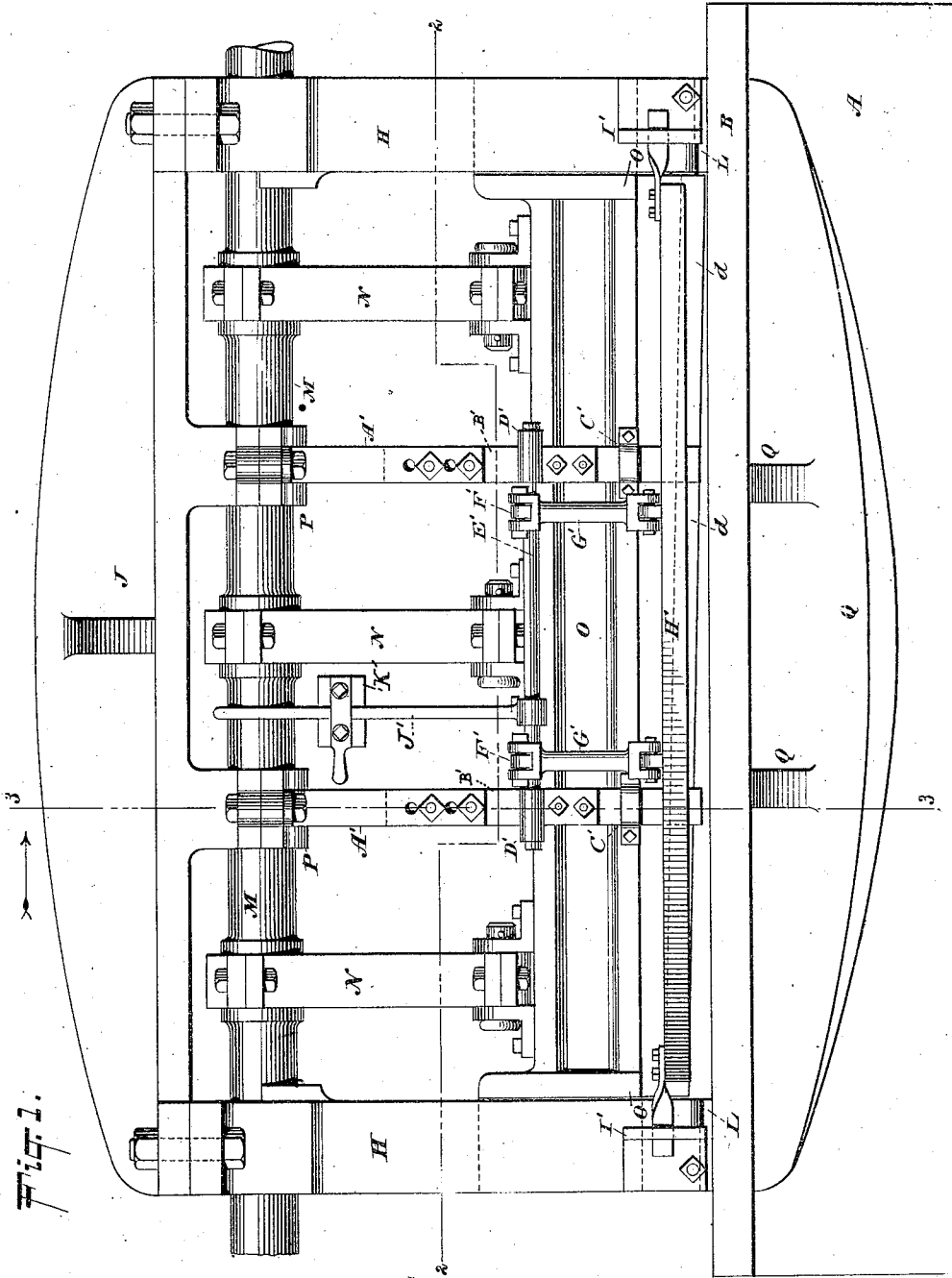


Fig. 1.

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(No Model.)

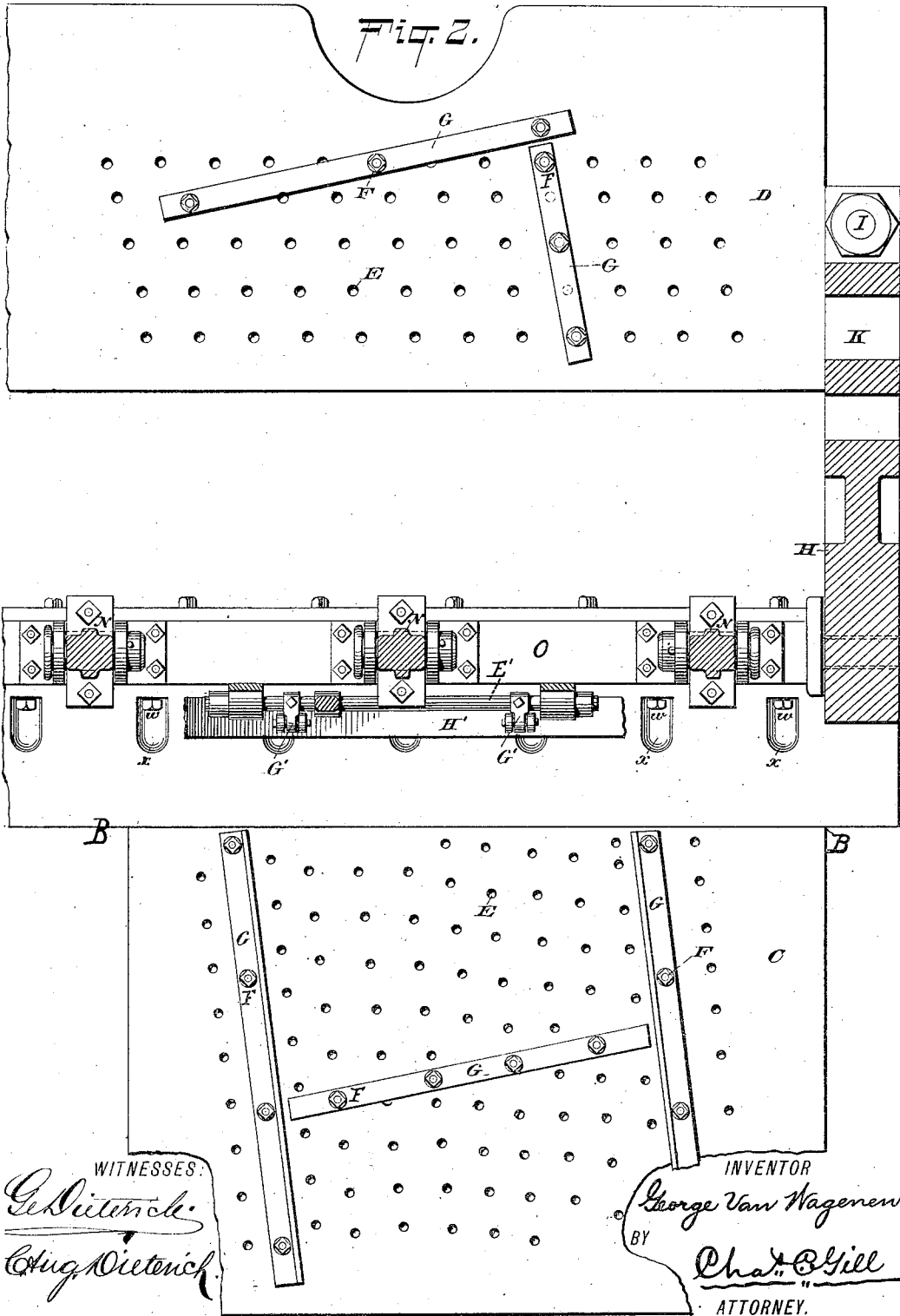
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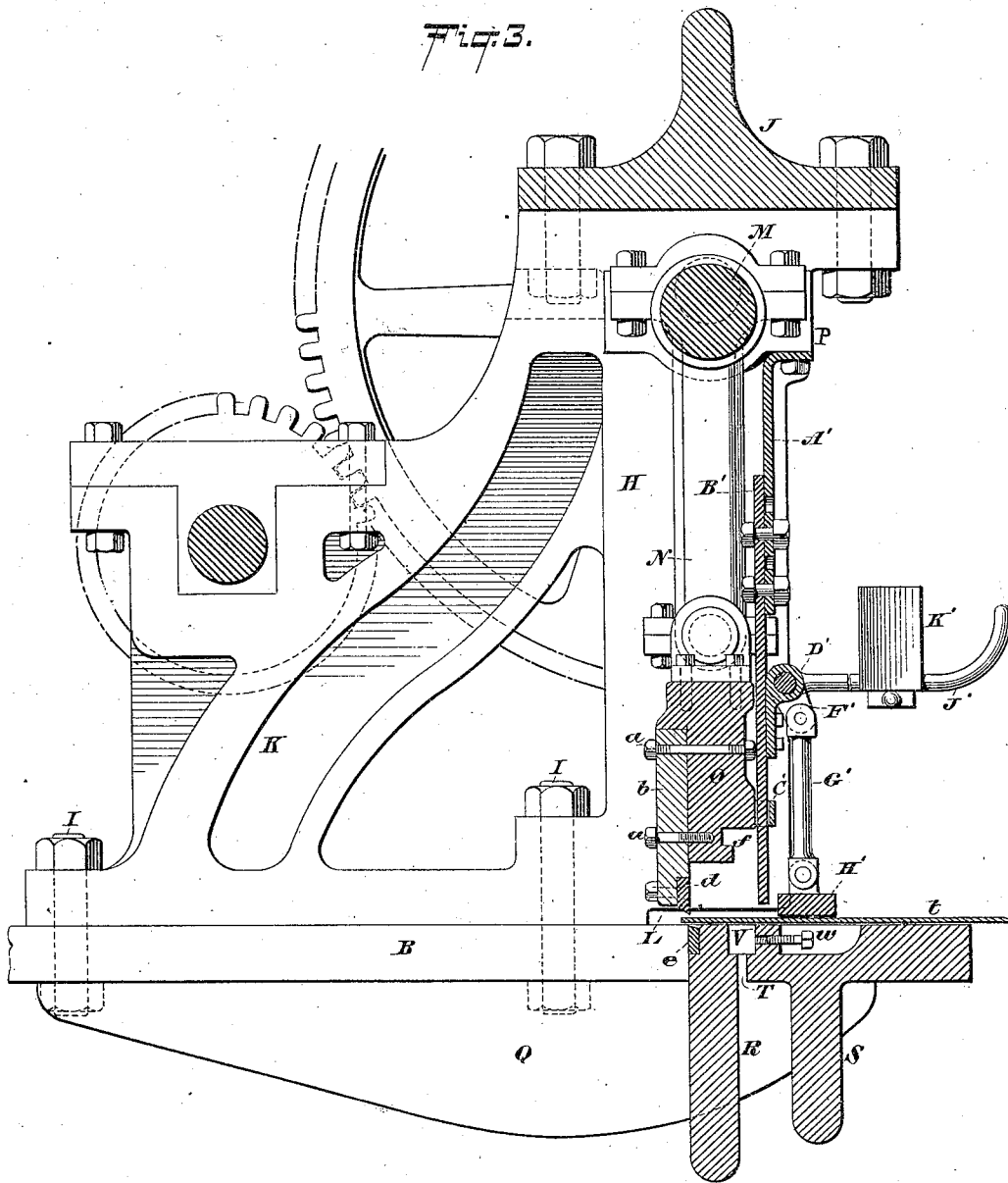
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Fig. 3.



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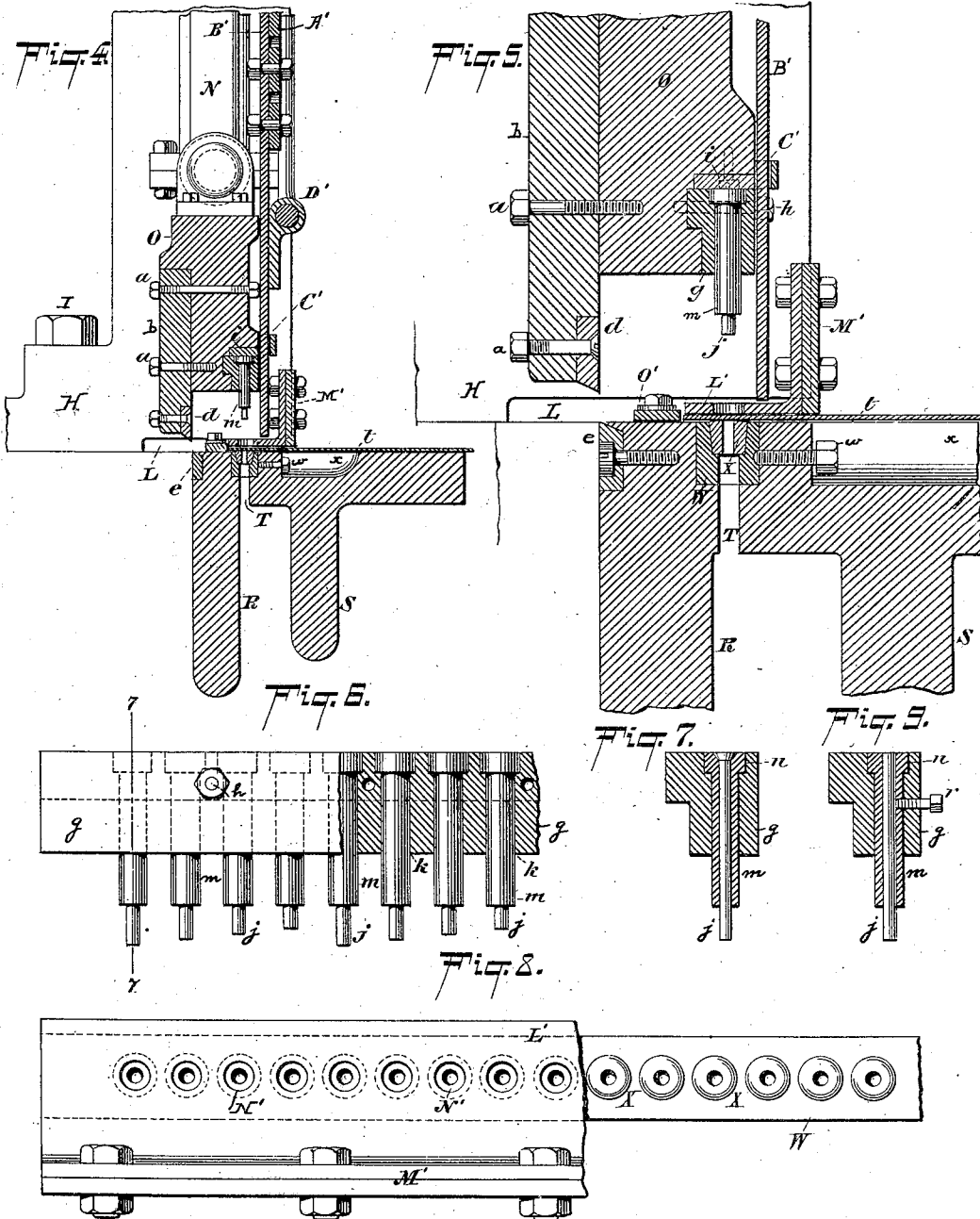
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GEORGE VAN WAGENEN, OF NEW YORK, N. Y.

COMBINED SHEARING AND PUNCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 484,832, dated October 25, 1892.

Application filed July 14, 1890. Serial No. 358,741. (No model.)

To all whom it may concern:

Be it known that I, GEORGE VAN WAGENEN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in a Combined Shearing and Punching Machine, of which the following is a specification.

The invention relates to improvements in combined shearing and punching machines for sheet metal; and it consists in the organization and combination of elements hereinafter described, and particularly pointed out in the claims.

15 The machine which has been made the subject of this application was designed and built by me for use particularly in the manufacture of the sheet-metal sugar-wagons described and claimed in Letters Patent of the United States
20 granted to the Geo. Van Wagenen Company on the 27th day of May, 1890, being numbered 428,790, and for such manufacture it has been especially efficacious. The body of said sugar-wagon is composed of five pieces (the ends,
25 sides, and bottom) sheared from long sheets of steel, the edges of the sides and ends being cut at an angle to the length of the sheet and being provided with rows of apertures to receive the rivets by which the parts of the
30 wagon are held together. By means of the present invention I shear and punch the parts of the body of said wagon, the shearing and punching being carried on either successively or simultaneously, and said parts when
35 brought together have their edges and rows of apertures in proper alignment to permit the riveting being rapidly completed by a riveting-machine. It has been my purpose
40 in the construction of the present machine to secure great durability and effectiveness with simplicity of construction and the minimum weight. The dies for the punches are parallel with the cutters, and hence the proper
45 relation of the rows of apertures or rivet-holes with the edge of the sheet may with certainty be secured. The dies and punches are also readily transferable for varying the distance
50 between the rivet-holes, and any one or more of the punches in case of breakage may be withdrawn and others substituted for them.

The special features of construction, with their mode of operation, will appear more fully

in the detailed description hereinafter presented.

Referring to the accompanying drawings, 55 Figure 1 is a front elevation of a machine constructed in accordance with the invention; Fig. 2, a transverse section of the same on the dotted line 2 2 of Fig. 1; Fig. 3, a vertical section of the same on the dotted line 3 3 of Fig. 60 1; Fig. 4, a detached vertical section similar to Fig. 3, but illustrating the application of the series of punches to the carrier. Fig. 5 is an enlarged sectional view of the same; Fig. 6, a detached front elevation, partly in
65 section, of the punch-bar with the punches in position; Fig. 7, a vertical section of said punch-bar on the dotted line 7 7 of Fig. 6; Fig. 8, a top view, partly broken away, of the die-bar and stripper-plate; and Fig. 9 is a vertical
70 section illustrating a modified form of punch.

In the drawings, A designates the base of the machine, upon which is mounted the bed B, consisting of the front platform C and rear
75 platform D, adapted to receive the sheets of metal intended to be cut and punched. The platforms C D are provided with the perforations E over their surfaces to receive the bolts F, by which the gages G may be secured
80 in place in any desired position and at any requisite angle. The platforms C D are provided with a number of perforations E, in order that gages G may be shifted and arranged
85 with respect to each other at will, in accordance with the character of the sheets to be cut and the angle at which it is desired to punch their edges.

Upon opposite sides of the bed B are provided the standards II, which are secured to
90 the bed-plate B by bolts I, as shown in Fig. 3, and are connected at their upper ends by the bar J. (Illustrated more clearly in Fig. 1.) The standards II are substantially vertical on their front edges and at their rear sides
95 are formed with the rearwardly-extending brackets K, through which the bolts I pass into the bed B. Beneath the standards II are formed the recesses L, opening frontward, as illustrated in Figs. 3, 4, and 5, and the purpose
100 of which will be hereinafter explained.

By reason of the employment of the brackets K and bolts I in the manner illustrated in Fig. 3 I am enabled to form the recess L in

the lower face of the standards H without detriment to the durability and effectiveness of the machine. In the upper ends of the standards H is journaled the shaft M, upon which by means of the links N is suspended the carrier-bar O, to which the knife and punches are secured. The middle portions of the shaft M are journaled in and sustained by the bearings P, suspended from the tie-bar J. The ends of the carrier-bar O enter and are guided by vertical slots formed in the standards H, (shown by dotted lines in Figs. 1 and 2,) the purpose being to insure a direct vertical reciprocating movement in said carrier-bar under the action of the crank-shaft M and links N.

The bed-plate B is strengthened on its lower side by the longitudinal and transverse flanges Q and is provided directly beneath the carrier-bar O with the transverse ribs R S, between which a slot T is formed for the escape of the punchings, and above this slot the facing sides of the ribs R S are recessed to form the pocket V for the die-bar W, which is an elongated bar extending transversely across the machine and contains a series of circular pockets to receive the dies X. Upon the rear side of the carrier-bar O is secured by bolts *a* the knife-bar *b*, which carries at its lower inner edge the knife *d*, as illustrated in Figs. 3 and 5, which co-operates with the lower knife or cutting-edge *e*, secured to the upper rear edge of the rib R. Upon the front lower portion of the carrier-bar O is provided the recess *f* to receive the punch-bar *g*, the latter being secured in place by bolts *h*. The punch-bar *g* has above it the steel plate *i* to prevent the upper ends of the punches (lettered *j*) from bruising the metal during the operation of the machine. The punch-bar *g* is an elongated bar extending transversely across the machine, being secured, as illustrated in Fig. 5, to the carrier-bar O, and contains a series of apertures *k* to receive the metal cylindrical pockets *m*, having the shoulders *n* at their upper ends to rest upon a corresponding shoulder formed in the punch-bar. The pockets *m* are adapted to be inserted into and withdrawn from the punch-bar *g* at will and are adapted to receive the punches *j*, which extend downward a proper distance below the pockets *m*, the latter also extending below the punch-bar *g* a sufficient distance to properly sustain the punches. The upper ends of the punches *j* may be headed, as illustrated in Fig. 7, for the purpose of preventing their withdrawal downward from the pockets, or a like effect may be secured by means of screws *r*, extending through the punch-bar and pockets and engaging the punches, as illustrated in Fig. 9, the only object in either construction being to prevent the metal from drawing the punches from the pockets. The steel plate *i* above the punch-bar *g* receives the pressure at the upper ends of the punches *j*, and thereby prevents the carrier O from being bruised or roughened during the operation of punching.

As will be observed in Fig. 6, the punches *j* vary in length, and hence when in use all of the punches will not simultaneously engage the metal to be punched, but will gradually one after another enter the same, and thus insure the proper punching of the holes without splitting the metal or jarring the machine. It will be readily understood that the punch-bars and die-bars will correspond in respect to the vertical plane of the apertures formed in them to receive the punches and dies, respectively, and that these bars will be removed and others substituted for them, according as it may be desired to punch holes varying in distance from each other. The punches *j* are independent of each other, and hence should any one become broken or bent it alone may be withdrawn from the punch-bar *g* and another quickly substituted in its place. The punches *j* consist simply of sections of draw-steel rod tempered at the point or entering end, and hence it will be understood that they may be very inexpensively and quickly made and that no particular expense will be incurred in keeping a supply on hand. The pockets *m* effectually sustain the punches *j* and enable them to be quickly inserted in position or transferred from one punch-bar to another.

As above described, the die-bar W is directly below the punch-bar *g* and is provided with dies X, adapted to receive the points of the punches *j* after the latter have passed through the sheet of metal to be punched, said sheet being illustrated in Figs. 3, 4, and 5 and lettered *t*. The die-bar W may also be readily withdrawn from the machine at will, since it simply rests in the pocket V, being there held by bolts *w*, which pass through a section of the bed B and engage the front side of said bar. In the upper face of the bed B are formed the recesses *x*, through which the bolts *w* are passed and which permit the introduction of said bolts without leaving any elevations upon the surface of the bed B to interfere with the proper handling of the sheets of metal to be sheared and punched.

Upon the bearings P are secured the upper ends of the plates A', which extend downward and are connected by bolts with the upper ends of the plates B', which extend downward to within a short distance of the upper face of the bed B and pass through loops C', secured to the front edge of the carrier O, as illustrated in Figs. 1 and 3.

The plates A' B' are connected by the bolts, as illustrated in Figs. 1 and 3, for the purpose of making them adjustable as to their length; but it is evident that, if desired, these two plates may be made from a single piece of material instead of two if a vertical adjustment is not preferred. Upon the face of the plates B' are secured the bearings D', in which the rock-shaft E' is journaled. The rock-shaft E' carries the knuckles F', to which are pivoted the links G', carrying at their lower ends the presser-bar H', which extends transversely across the machine and has its ends guided

in the plates I', as illustrated more clearly in Fig. 1. Upon the rock-shaft E' is also secured the arm J', carrying the counterbalance-weight K'.

5 When the arm J' and weight K' are in the position illustrated in Fig. 3, they cause a pressure through the links G' and bar H' upon the sheet of metal *t*, resting upon the table B; but when the arm J' and rod K' are turned
10 upward to the position illustrated in Fig. 1 the rock-shaft E' is caused to rotate in its bearings D' and through the knuckles F' elevate the links G' and bar H', thus releasing the sheet of metal *t* and permitting its removal or adjustment at will. It will not be
15 necessary at all times to make use of the presser-bar H', with its connecting mechanism; but I recommend its use, particularly during the operation of shearing, since the effect of
20 the bar is to firmly hold the sheet of metal upon the table B and facilitate the successful operation of the machine. When, however, the punching alone is being carried on or the shearing and punching carried on together,
25 the bar H' will be withdrawn from the machine and a stripper-plate L' applied over the die-bar W, as illustrated in Figs. 5 and 8, said bar being bolted to the transverse carrier-bar M', which at its ends is bolted to the standards H H adjacent to the bed B. The stripper
30 L' contains a series of apertures N', arranged directly over apertures in the dies X and centrally below the punches *j*. The stripper L' is in the form of an angle-plate and is
35 secured at a proper elevation above the bed-plate B to permit the introduction of the sheet of metal *t* beneath it, as illustrated in Fig. 5. During the operation of punching the stripper L' prevents the end of the sheet
40 of metal *t* from being carried upward by the punches *j*. When the operation of punching is being carried on alone, I prefer to apply the gage O' to the upper surface of the bed B, beneath the carrier O, as illustrated in section
45 in Fig. 5, for the purpose of engaging the edge of the sheet of metal *t* and insuring the apertures being formed at the proper position in said sheet *t*. The gage O' consists of a strip of metal held down by screws, and it
50 may be adjusted in accordance with the distance the apertures are to be punched from the extreme edge of the sheet of metal. During the operation of shearing and punching at one time the gage O' will not be made use
55 of, since under these conditions it will be necessary for the sheet of metal *t* to project beyond the cutters *d e* in order that its edge may be sheared. It will be noted upon reference to Fig. 5 that the location of the cutters
60 *d e* with relation to the punches *j* is such that both operations may be carried on together without difficulty, and also that when it is desired simply to shear the metal the punch-bar *g* may be withdrawn from the machine, or when it is simply desired to punch
65 the metal the knife-bar *b* may be withdrawn. It will not be necessary, however, to with-

draw the knife-bar *b* from the carrier O during the operation of punching unless the location of the apertures to be formed in the
70 sheet *t* is such that its extreme edge should be extended beyond the vertical plane of the cutters *d e*.

If it should be desired to shear and punch
75 or either shear or punch a sheet of metal wider than the space between the inner vertical faces of the standards H, said sheet will have its outer portions passed into the recesses L beneath the said standards, these
80 recesses permitting the adjustment of the sheet transversely across the machine at will, in order that the operations of punching and shearing may be conveniently carried on to meet the requirements of any special size or
85 form of sheet. During the operation of simultaneously shearing and punching I prefer to remove the rock-shaft E', arm J', weight K', links G', presser-bar H', and guide-plates
90 I' and substitute for them the stripper L', its carrier-plate M' being at such time bolted to the lower front face of the standards H. The stripper L', although not exerting the positive downward force of the presser-bar H', is but a slight distance above the bed B and will effectually prevent the sheet of metal *t*
95 from being carried upward by the punches or tilting downward under the action of the cutters.

As will be understood, the gages G will be shifted in accordance with the angle on which
100 the sheet of metal is to be cut. It will not be necessary that the sheet of metal when placed on the machine shall engage all five of the gages G shown in Fig. 2; but it is desirable that it shall firmly rest against one of the longitudinal or side gages, and also under some
105 conditions against one of the transverse or end gages. After the desired angle on which it is desired to shear or punch has been determined the gage may be set accordingly, so
110 that each successive sheet placed against them will be sheared and punched, as desired, without the heretofore necessary preliminary of measuring and marking off the angles on the sheet.
115

The punches and pockets *m* are adapted for use either singly or in series, whether combined with the special punch-bar shown or with some other form of holder for the pockets. The pocket *m* serves as a socket to receive the plain straight punch and to sustain
120 it throughout the greater portion of its length, the entering end of the punch only being exposed. It is immaterial when only a single punch, for instance, is used whether the pocket
125 *m* is held by the punch-bar shown or by any of the other well-known appliances for holding punches; since the pocket will effectually sustain the punch and admit of the latter being formed from a plain rod of a diameter corresponding with that of the holes to be formed.
130 Should under any circumstances the punch-rod become bent or broken, the pocket *m* will remain unaffected and be ready to receive

another punch-rod, whereas with the punches heretofore made an injury to the point resulted in a total loss of the entire punch, including its thick stock. In accordance with my invention the pocket *m*, which dispenses with the thick stock of the old punches, is never destroyed when the point of the punch is injured, but is still as capable as ever of having another point or plain punch-rod slipped into it. It is to be noted, also, that the carrier *O* is recessed on its front and rear edges to receive the punch and knife bars, respectively, thus insuring strength to the structure, and that the bed is recessed to receive the die-bar and lower cutter, thereby firmly sustaining them.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The bed-plate and the standards *H* thereon, combined with the crank-shaft *M*, journaled in said standards, the links *N*, carrier *O*, cutters *d e*, presser-bar *H'*, rock-shaft *E'*, links *G'*, arm *J'*, and weight *K'*, the whole being arranged and operating substantially as and for the purposes set forth.

2. The carrier *O*, suspended by links from the crank-shaft *M*, and the cutters *d e*, secured, respectively, to said carrier and the bed-plate, combined with the plates *A' B'*, the latter carrying the bearings *D'*, the rock-shaft journaled in said bearings and carrying the weighted arm *J'* and links *G'*, and the presser-bar *H'*, suspended by said links, substantially as and for the purposes set forth.

3. The reciprocating carrier *O*, provided with the series of punches, combined with the bed having the recess *V*, recesses *x*, and discharge-opening *T*, the die-bar secured in said recess *V* by bolts *w*, and the stripper *L'*, substantially as and for the purposes set forth.

4. The bed *B*, having the platforms *C D*, perforated over substantially their entire surfaces, the adjustable gages *G* thereon, and the bolts *F*, by which said gages are secured at any desired angle, combined with the standards *H*, the crank-shaft *M*, journaled in said standards, the links *N*, the carrier *O*, the knife *d*, secured to said carrier *O*, and the knife *e*, secured to said bed *B*, substantially as and for the purposes set forth.

5. The bed-plate *B*, the standards *H* thereon, the crank shaft *M*, journaled in said standards, the links *N*, the carrier *O*, having the longitudinal recess *f* at its lower front portion, the punch-bar *g*, detachably secured in said recess, and the series of detachable punches carried by said bar *g*, combined with the die-bar *W*, seated in the recess *V* of said bed-plate, the series of dies *X*, seated in said bar *W*, the discharge-opening *T*, leading from said recess *V*, the removable stripper *L'*, having the series of apertures *N'*, and the bar *M'*, carrying said stripper, substantially as and for the purposes set forth.

6. In the combined shearing and punching machine, the reciprocating carrier *O*, the removable punch-bar secured to said carrier, the series of punches connected with said punch-bar, and the knife *d*, secured to said carrier *O*, combined with the bed *B*, the series of dies *X*, supported therein, and the knife *e*, secured to said bed, substantially as and for the purposes set forth.

7. The reciprocating carrier *O*, having the recess *f*, the punch-bar secured in said recess and carrying the punches, the knife-bar *b*, secured to said carrier, and the knife *d*, secured to said bar *b*, combined with the bed *B*, the series of dies *X*, supported therein, and the knife *e*, secured to said bed, substantially as and for the purposes set forth.

8. The reciprocating carrier *O*, the series of punches carried along one edge thereof, and the knife *d*, carried at the other edge thereof, combined with the bed *B*, the series of dies *X*, seated in said bed in line with said punches, the knife *e*, secured to said bed in operative line with said knife *d*, and the stripper *L'*, having the series of apertures *N'* in line with said punches and dies, substantially as and for the purposes set forth.

Signed at New York, in the county of New York and State of New York, this 12th day of July, A. D. 1890.

GEORGE VAN WAGENEN.

Witnesses:

CHAS. C. GILL,
ROBERT A. PORTEOUS.