(No Model.)

M. J. STARK.

SHEET METAL FOLDER.

No. 387,746. Patented Aug. 14, 1888.

FIG. 1.

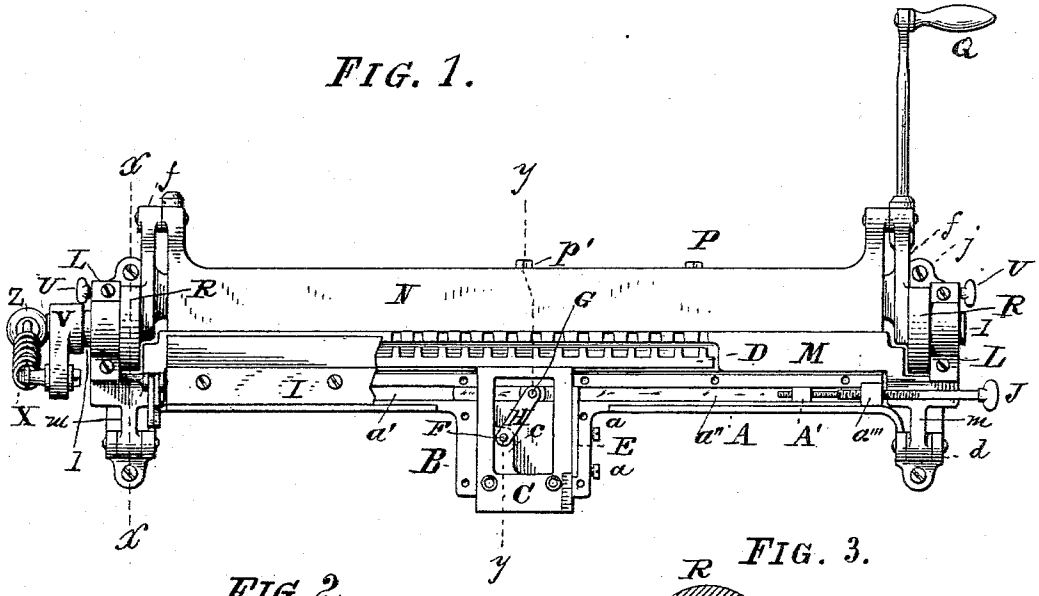


FIG. 2.

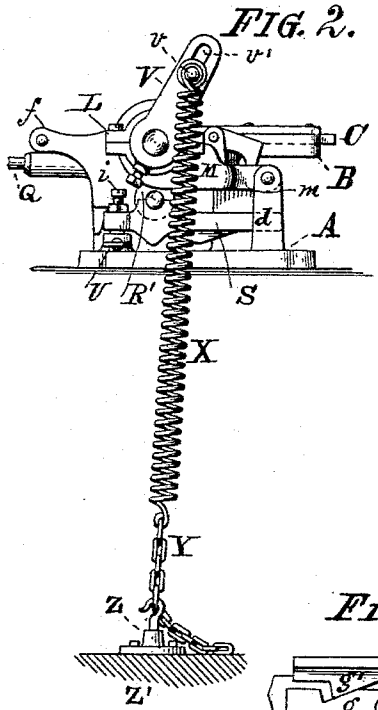


FIG. 3.

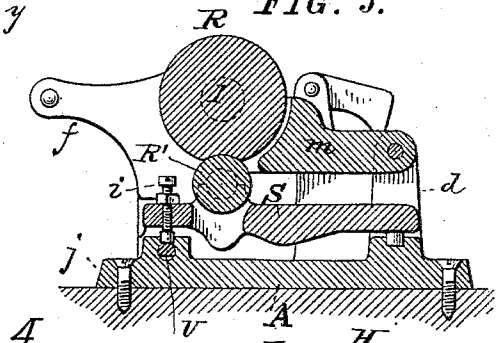


FIG. 4.

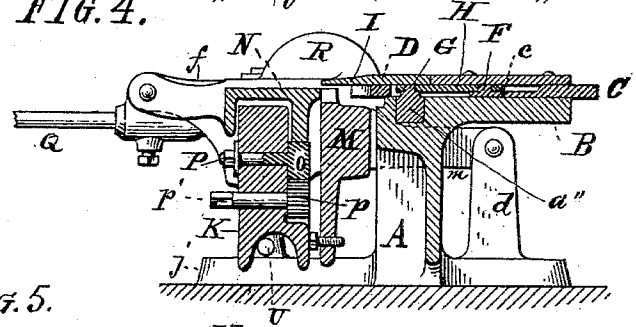


FIG. 5.

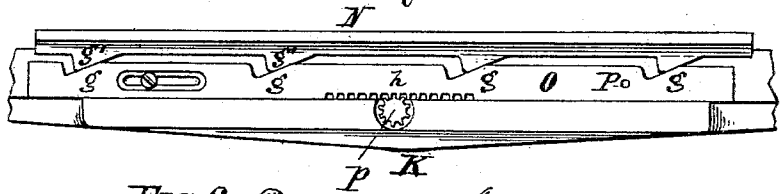
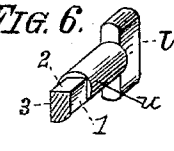


FIG. 6.



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UNITED STATES PATENT OFFICE.

MICHAEL J. STARK, OF BUFFALO, NEW YORK, ASSIGNOR TO ADAM HEINZ AND GEORGE J. MUNSCHAUER, OF SAME PLACE.

SHEET-METAL FOLDER.

SPECIFICATION forming part of Letters Patent No. 387,746, dated August 14, 1888.

Application filed January 26, 1888. Serial No. 261,967. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL J. STARK, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Sheet-Metal Folders; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

My present invention has general reference to sheet-metal folders; and it consists, essentially, in the novel and peculiar combination of parts and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claims.

In the drawings already mentioned, which serve to illustrate my invention more fully, Figure 1 is a plan of my folder, a portion of the blade being removed to expose the underlying parts. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse sectional elevation in line *x x* of Fig. 1. Fig. 4 is a similar view in line *y y* of said Fig. 1. Fig. 5 is an elevation of the folder-wing, showing the mechanism for operating the same. Fig. 6 is a perspective view of the cam button or bolt.

Like parts are designated by corresponding letters of reference in all the figures.

The object of my invention is the production of a more serviceable, better adjustable, and easier operated sheet-metal folder than has heretofore been produced. To attain this object I construct my folder of a bed or base, A, having forwardly extending a projection, B, serving as a guide for a slide, C, of the gage D. This projection B is formed integral with the base or bed piece A, and it has a gib, E, rendered adjustable by set-screws *a*, to take up wear of the parts and allow the slide to work freely, but without play, in said guide B.

The slide C is of an open rectangular contour or frame, having in its open space a lug, *c*, provided with a stud, F, with which and a similar stud, G, engages a link, H, as clearly shown in Figs. 1 and 4. In the bed A is a longitudinal groove, *a'*, Fig. 1, into which is placed a sliding bar, *a''*, to which the stud G, heretofore mentioned, is affixed. The forward end of this sliding bar *a''* has an internally-screw-threaded projection, A', wherewith engages the gage-screw J, consisting of the usual right and left threaded screw-bolt, as shown, one of the threads of this bolt engaging with the screw-threaded projection A' just mentioned, while the other larger thread operates in a stud-nut, *a'''*, Fig. 1.

It will be observed that by screwing the gage-screw J through the stud-nut into the projection A' the movement thereby imparted to the bar *a''* will be transferred in opposite direction to the slide C by the link H, in a manner readily understood from the drawings. The gage consists of a bar having a series of projections, as clearly shown in Fig. 1, and since its construction and its manner of being used does not differ materially from the old and well-known gage a detailed description is omitted.

In conjunction with the bed A and its gage and folder-blade I operates the folder-bar K. This bar is journaled in bearings L L on the end of a clamping-bar, M, and has rearwardly-projecting arms *f f*, to which are pivoted the wing N, this portion of the folder being old and well known.

In existing folders the wing is raised and lowered by means of a wedge, O, having inclines *g*, engaging with similar inclines, *g'*, on said wing. This wedge-piece is secured in position by a cap-screw, P, and has heretofore been moved laterally to raise and lower the wing N by unscrewing the cap-screw P and then pushing on it in the proper direction. This operation is a very awkward one and results, generally, in several vain attempts before the proper position of the wing is reached. To overcome this very objectionable feature of the old folders, I provide for a positive means of adjustment by forming in the bar O a rack, *h*, and engaging therewith a pinion, *p*, the spindle of which is provided with an angular wrench-section, *p'*, corresponding in size and shape with the head of the cap-screw P, so that if the wrench which is used for manipulating said cap-screw is placed upon the angular wrench-section *p'*, Figs. 1 and 4, said pinion, and by it the wedge-bar O, can be moved in a very sure and ready manner. This is quite

an essential and novel feature in folders and is of considerable importance for making quick and positive adjustment of the wing N.

In the folders as heretofore constructed the clamping-bar M pivoted to the uprights *d* of the bed A by the arms *m*, is raised by turning the wing-bar with the handle Q, the circular notched bearers R resting upon rollers R′, journaled in the shoes S, which are pivoted within the uprights *d*, in which are also pivoted the clamping-bar M. These shoes are rendered adjustable vertically by means of the set-screws *i;* but since the vertical motion of the clamping-bar always remained the same unless changed by adjustment of the set-screws *i*, and since it is very difficult to get at these screws, there was heretofore practically no ready means of adapting or changing the folder for various thicknesses of metal to be formed. It is true in a folder of more recent construction the set-screws are arranged to rest upon what I consider an attempt at an elastic base; but even if thereby the clamping-bar is rendered elastic, it is not thereby made adjustable and adapted for considerable range in thickness of the material to be folded. To provide for such ready means of adjustment, I locate underneath the set-screws *i* two cams, U, consisting of cylindrical bars *u*, having thumb-heads for easy manipulation and notches 1, 2, and 3, Fig. 6, (more or less,) of proper depth, so that if these several notches are successively turned upward the clamping-bar is raised and lowered respectively the difference in the depth of these notches, and thereby the distance between the top edge of the clamping-bar and the bottom side of the folder-blade varied in an absolutely positive manner.

Most of the breakages of the pivots of the wing-bar are due to the clamping-bar coming in too close contact with the folder-bar, because the means for altering the pressure of the clamp are so slow and inaccessible that the operator will try to do the folding without first adapting the machine to his particular want. This is at once overcome by my buttons, because as soon as the operator finds that the folder works hard, owing to improper adjustment, he can at once return the wing-bar to its normal position and turn the buttons to correspond with the material to be operated upon.

The folder-bar K, with the wing N, are in large folders quite heavy, and to manipulate them for any length of time in the operation of folding is very tiresome. To make this operation easier, I have counterbalanced the folder-bar by extending one of the pivots *l* beyond the bearing L and attaching thereto a lever, V, and engaging therewith a coil spring, X, in such a manner that when the folder-bar is raised into a position where the same is in perfect equilibrium the said lever is pointing downward in a perpendicular position, so that whether the folder-bar is moved forward or backward of its center of gravity the coil-spring X will be tensioned, and thereby caused to counteract the gravitating tendency of the bar. Means for adjusting the tension of the spring are provided by the slotted aperture in the lever V (marked *v′*) enabling the stud *v* to be moved nearer to or farther away from the center of the pivot, thereby increasing or decreasing the leverage and by more or less tensioning the spring by engaging the proper link of the chain Y with the foot-hook Z, fastened upon the floor Z′, as clearly shown in Fig. 2.

I am aware that in so-called "cornice brakes" the folder-bar is balanced by counter-weights and that adjustment is made by shifting the weights. One of the most serious objections to the weights in such devices is the sluggishness of the same caused by inertia of the mass and the considerable momentum attained by the bodies in motion, so that for the purpose of a quick-acting folder such a weight device is not applicable, and is not, therefore, an equivalent, or at best but a very unsatisfactory one, for my spring device.

It will be readily observed that in the cam-bolt there may be quite a number of notches for the various differences in adjustment. I prefer in the present instance three to correspond with IC, IX, and IXX tin, well-known terms designating thickness of tin-plate, which covers the ordinary range of variation required, though by increasing the number and depth of notches additional variations may be produced.

I have described Fig. 3 of the drawings to be a transverse sectional elevation in line *x x* of Fig. 1, the figure being supposed to be correct when looking in the direction from left to the right. No attention, however, is paid in this Fig. 3 to parts beyond the part *f*, for the reason that Figs. 2 and 4 show them properly.

Having thus fully described my invention, I claim as new and desire to have secured to me by Letters Patent the following:

1. In sheet-metal folders, the combination, with the bed-piece A, having the guide-piece B fitted with a gib and set-screws, of the slide C, having the link H, connecting the gage with the gage-screw, as described, whereby the lateral movement of the said gage-screw causes the movement of the slide in a direction at right angles to that of the said gage-screw, as and for the object specified.

2. In sheet-metal folders, a gage, D, operated by a gage-screw, J, having stud G, in combination with the link H and slide C, having the stud F, as and for the purpose stated.

3. In sheet-metal folders, a bed having a forwardly-projecting guide, B, fitted with gib E and set-screws *a a*, in combination with an open slide, C, having the link as an intermediary between it and the gage-adjusting screw J, substantially as and for the object stated.

4. In sheet-metal folders, the combination, with the shoe S, of the adjusting mechanism

consisting of the cam-shaped button U, whereby the clamping-bar M is adjusted, substantially as and for the purpose specified.

5. The combination, with the clamping-bar, of the shoe S and the buttons U, having notches of varying depth to raise and lower the clamping-bar by turning said buttons, as indicated.

6. In sheet-metal folders, the wing N, having the inclines g', in combination with the wedge-bar O, having the rack h, wing-bar K, and pinion p, as and for the purpose stated.

7. In sheet-metal folders, the combination, with the wing-bar K, having the pivots l, of the lever V, spiral spring X, and a tensioning device for the spring, as stated.

8. The combination, with the wing-bar K, having the pivot l, of the slotted lever V, stud v, spiral spring X, chain-links Y, and the foot-hook Z, as and for the purpose specified.

In testimony that I claim the foregoing as my invention I have hereto set my hand in the presence of two subscribing witnesses.

MICHAEL J. STARK.

Attest:

MINNIE HEIM,

WM. O. STARK.