

M. STEPHENS.

Machines for Punching Sheet-Metal.

No. 143,473.

Patented Oct. 7, 1873.

Fig. 1.

Fig. 2.

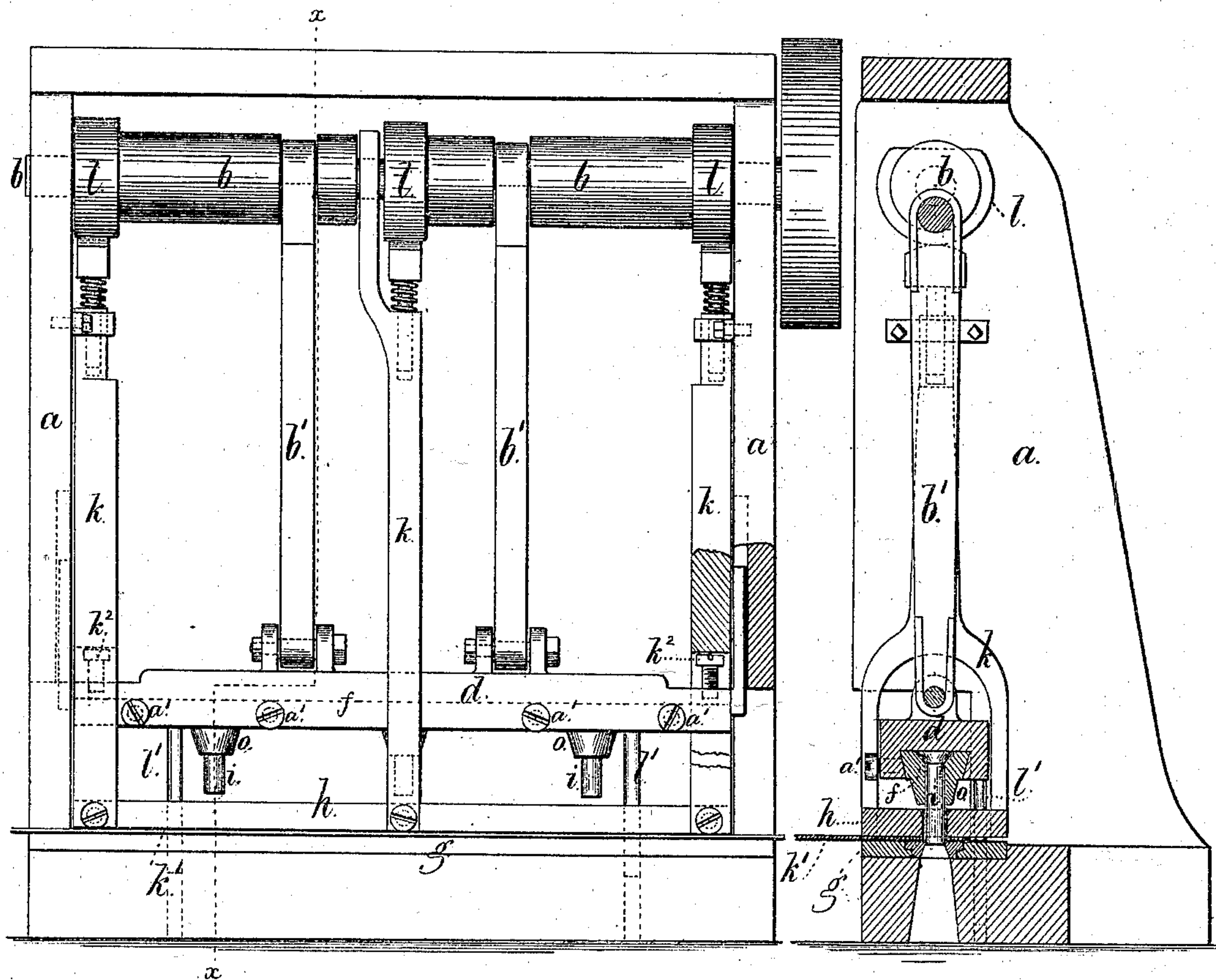
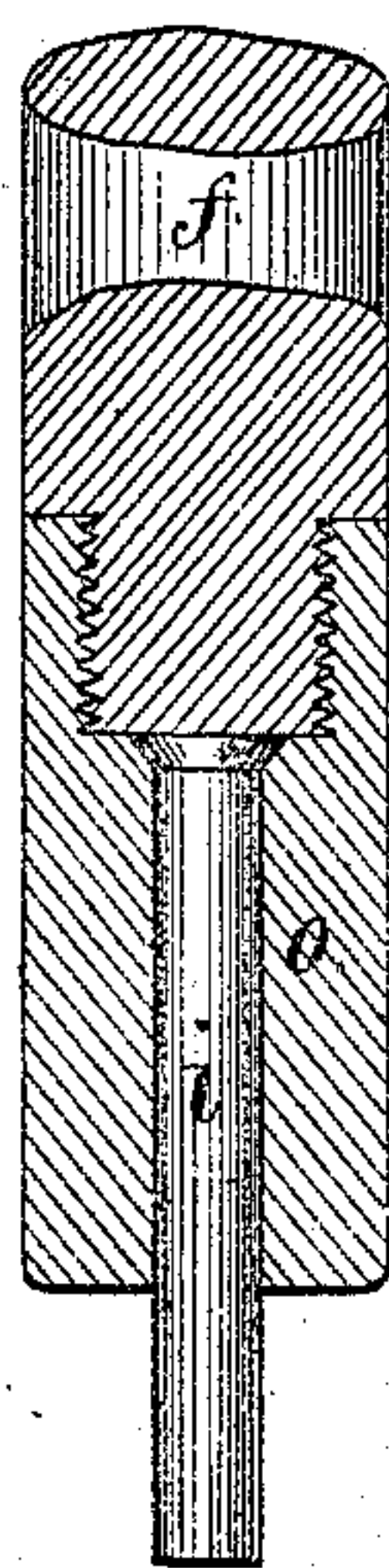
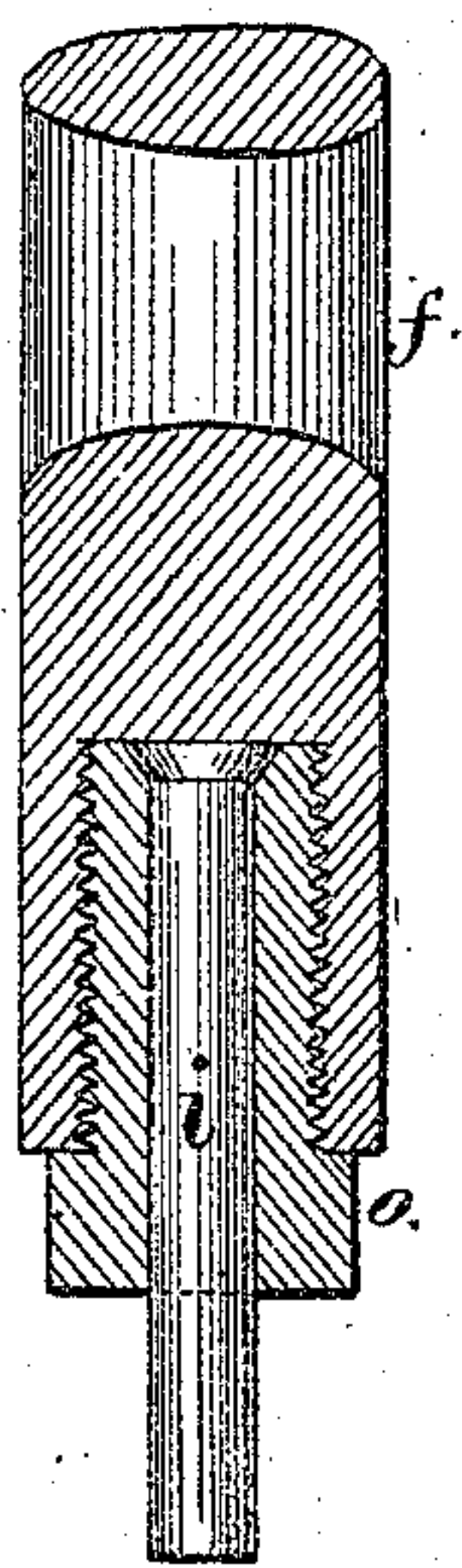


Fig. 3.

Fig. 4.



Witnesses

Chas. H. Smith
Geo. E. Partridge

Inventor

Melvin Stephens,
per L. M. Gerroll
Att'y.

UNITED STATES PATENT OFFICE.

MELVIN STEPHENS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN MACHINES FOR PUNCHING SHEET METAL.

Specification forming part of Letters Patent No. 143,473, dated October 7, 1873; application filed June 13, 1873.

To all whom it may concern:

Be it known that I, MELVIN STEPHENS, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Means for Punching Sheet Metal, &c., of which the following is a specification:

Punches for sheet metal are usually made with a sufficiently large stock for securing the same in the holder or for handling, and with a tapering end formed for forging or turning, and terminating as a short cylindrical punch, adapted to the die with which the punch is to be used. By this construction it is necessary to make both the punch and its stock of steel, and, in case of injury to the end of the punch, the entire punch and stock have to be replaced, or reformed, turned, and fitted. In other cases the punch has been made of steel and placed within a hollow stock.

In punching several holes at one time into sheet metal there is a risk of the punches becoming bent or injured as they rise, in consequence of the buckling of the sheet metal, causing it to bind against the sides of the punches, or else the sheet metal may occupy a slightly angular position to the punches as they rise and bind against them.

My invention is made for preventing injury to the punches and lessening the expense of manufacture or repair, and producing a punch that is much stronger and more durable than those heretofore constructed.

My improvement is especially available in machines that are employed for punching rows of holes in sheets of metal for making pipes, tubes, &c., but may be otherwise employed.

In the drawing, Figure 1 is an elevation, partially in section, of the punching-machine. Fig. 2 is a cross-section of the same at the line *x x*, and Figs. 3 and 4 represent the punches sectionally and in larger size.

The frame *a* receives a shaft, *b*, that is revolved by competent power, and the pitmen *b'* and cranks give motion to the head-block *d*, that is guided at its ends by slides upon the frame *a*. Within the head-block *d* is the punch-bar *f*, introduced endwise into a dovetailed recess, and carrying the punches hereinafter described. Set-screws *a'* prevent end movement in the punch-bar. The dies corresponding in size and position are made by openings through the plate *g*, which plate is secured to the bed of

the machine; or separate dies may be set in the bed or in a movable bar. The holding and stripping plate *h* is moved by the bars *k*, that extend up to the cams *l* upon the shaft *b*. These cams *l*, acting upon the bars *k*, press the plate *h* upon the sheet of metal, *k*¹, to be perforated, and straighten out any inequalities or undulations, and hold the sheet while the punches pass through the same and are withdrawn, so as to produce accuracy in the relative positions of the perforations; and by holding the sheet down as the punches rise the metal is stripped off the punches, and any risk of injury by the sheet springing and binding against the sides of the punches is prevented, because the sheet is held flat until the punches are withdrawn. It is preferable to provide a movable yielding head to each of the bars *k*, with a roller for the cam and intervening spring, to allow for varying thicknesses in the metal, and the plate *h* can be lifted by the upward movement of the head-block *d*, acting through springs between that and the bars *k*, or preferably by screws *k*², as shown. The bars *k* may be adjustable in length, so as to be set for different thicknesses of sheets, and dispense with the springs between the plate *h* and the actuating-cams *l*. The guide-rods *l'* serve to maintain the correct relative positions of the punches and dies.

The punches are each made of a rod or wire of steel, *i*, of uniform section, or nearly so, except that at one end a head is made by upsetting the metal; and this rod or wire is of a size corresponding sectionally to the hole to be punched, and the stock *o* for this punch is made of metal, with a hole bored through it to receive and support such punch. The punch is longer than the stock, so that its end projects sufficiently to act with the die in punching the hole. The stock *o* is either screwed into or formed with the punch-bar, or it may be screwed into or upon a handle or secondary stock.

Under all circumstances the stock, when in use, prevents the punch itself bending. The head keeps the punch from being pulled out of the stock as the punch is drawn out of the metal punched, and in case of injury to the punch it can easily be drawn or driven out of the stock, and either ground or repaired, or another substituted, without loss of the stock or injury to the same.

The stock is shown in Fig. 3 as screwing into

the punch bar or holder, and in Fig. 4 as screwing upon a bar or handle.

The punches in the machine should be of slightly different lengths, so as to punch the holes successively.

The holding and stripping plate may be movably connected to the head-block and provided with springs to press the stripping-plate upon the sheet to be punched, and these springs yield as the punches descend.

I claim as my invention—

The die-plate *g*, clamping-plate *h*, and actuating-rods *k*, in combination with the punches *i* and punch-bar *f*, inserted into the dovetailed recess in the head-block *d*, substantially as set forth.

Signed by me this 11th day of June, A. D. 1873.

MELVIN STEPHENS.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.