

(No Model.)

T. A. DICKS.
STAMPING PRESS.

2 Sheets—Sheet 1.

No. 513,636.

Patented Jan. 30, 1894.

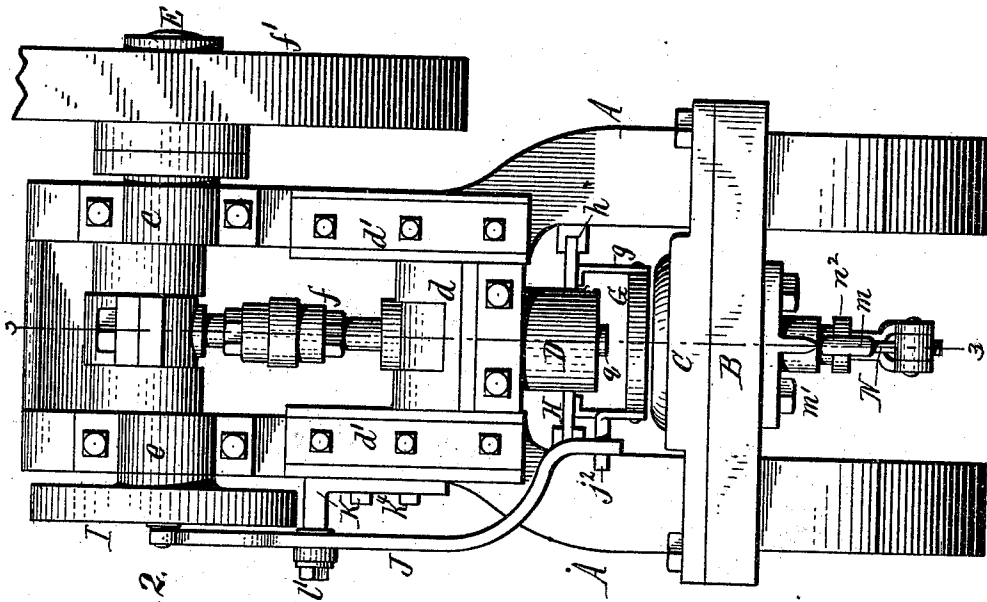


Fig. 2.

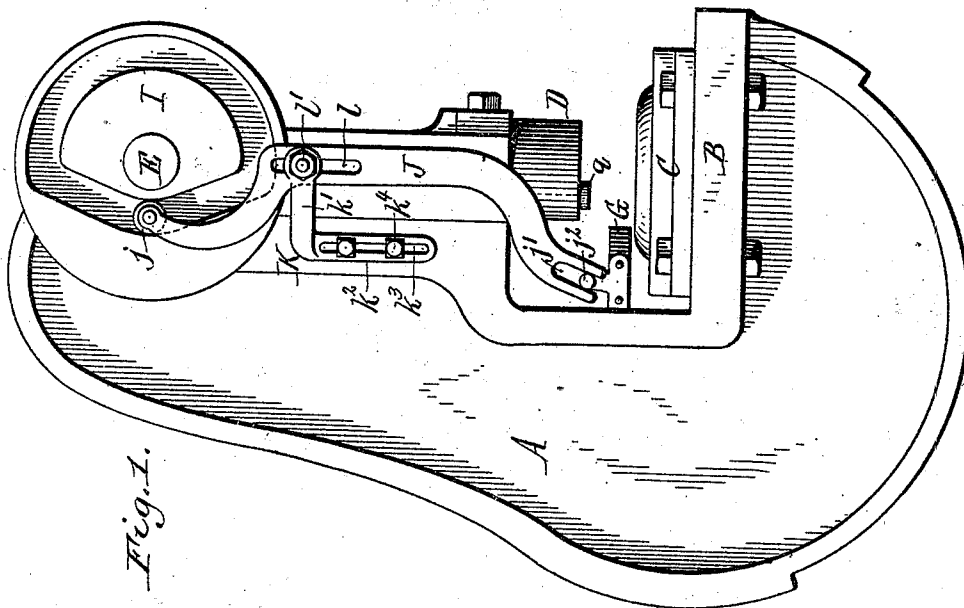


Fig. 1.

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By Wilhelm Wronner.
Attorneys

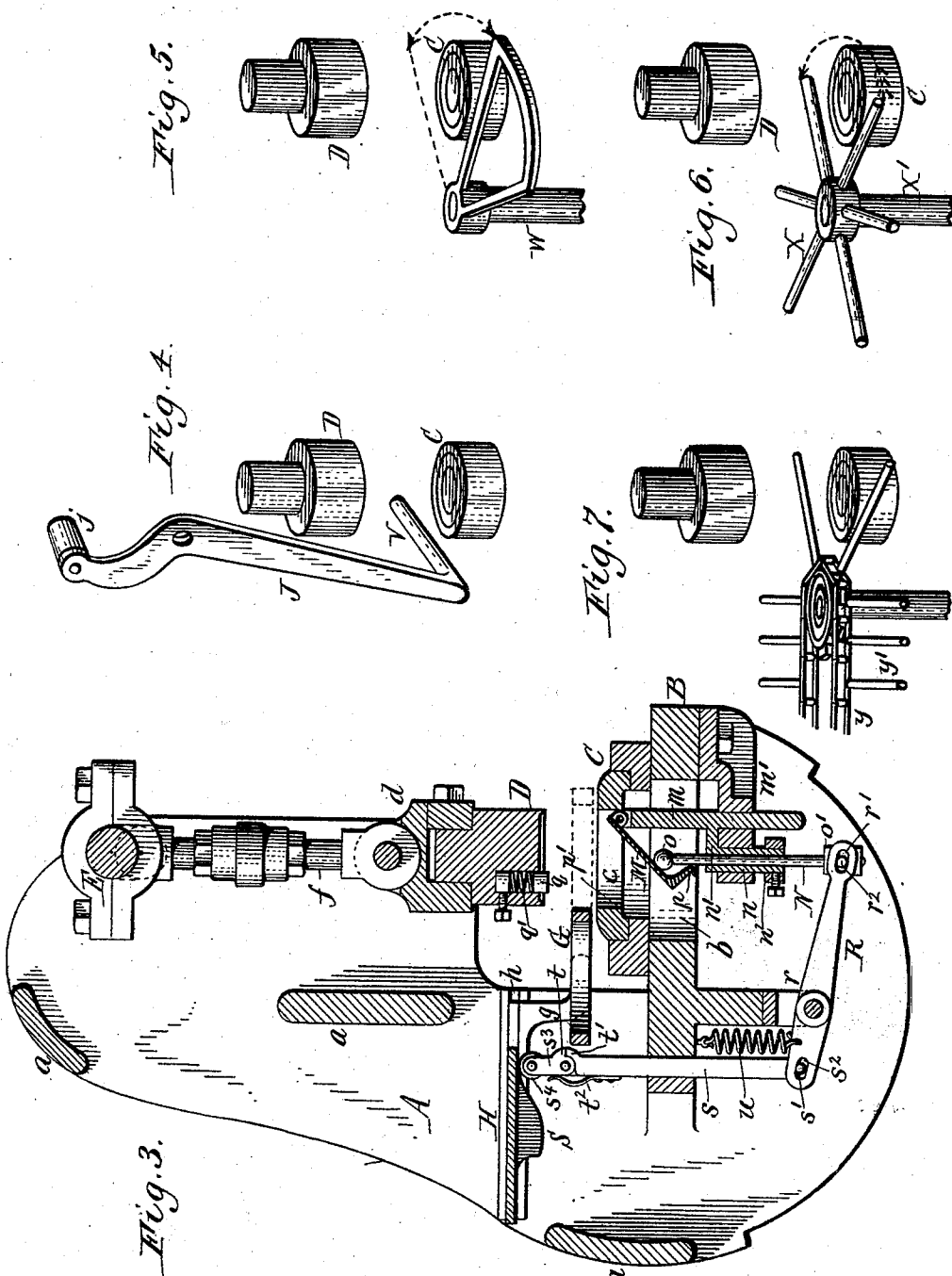
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2 Sheets—Sheet 2.

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Witnesses:
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UNITED STATES PATENT OFFICE.

THOMAS A. DICKS, OF BUFFALO, NEW YORK.

STAMPING-PRESS.

SPECIFICATION forming part of Letters Patent No. 513,636, dated January 30, 1894.

Application filed March 13, 1893. Serial No. 465,708. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. DICKS, a subject of the Queen of Great Britain, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Stamping-Presses, of which the following is a specification.

This invention relates to sheet metal stamping presses and similar machines and has the object to provide the same with means for automatically pushing aside the operator's hands before the punch strikes the die to prevent injury to the same.

In the accompanying drawings consisting of two sheets:—Figure 1 is a side elevation of a stamping press provided with my improvement. Fig. 2 is a front elevation thereof. Fig. 3 is a sectional elevation of the press in line 3—3, Fig. 2. Figs. 4, 5, 6 and 7 are fragmentary perspective views showing several modifications of my invention.

The main frame of the press consists of two standards A A, cross pieces *a* connecting the standards, and a table B having a central opening *b*.

C represents the die which is secured upon the table in any suitable manner. As shown in Fig. 3 this die is provided with a central opening *c* which is arranged over the opening of the table.

D represents the punch arranged above the die and adapted to co-operate with the latter. This punch is secured to a vertically movable cross head *d* which slides in guides *d'*, arranged on the front side of the standards.

E represents the crank shaft journaled in bearings *e* at the upper end of the standards and having its crank connected with the cross head *d* by a rod *f*. This crank shaft is provided at one end with a driving pulley *f'* and a suitable clutch for uncoupling the driving pulley from the crank shaft, when the punch is in its raised position.

In cutting or stamping plain work, the blank after it is cut from the sheet of metal, drops through the openings in the die and the table as represented in Fig. 3, while in embossing sheet metal, a solid die is used from which the article is removed by hand after it is embossed or stamped.

It frequently happens that the hands or fingers of the operator are injured between the

punch and die in attempting to adjust or center the blank when the press is in motion, or in removing scrap from the die. In order to prevent the hands of the operator or any obstruction from remaining upon the die during the downward movement of the punch, a movable guard device is provided which is constructed as follows:—G represents an open annular guard frame arranged above the die and adjacent thereto and supported by depending arms *g* from a horizontally reciprocating slide H. The latter is arranged in rear of the punch, between the standards, and is guided in horizontal ways *h* arranged on the inner side of the standards. I represents a grooved cam which operates the guide frame and which is secured to the end of the crank shaft opposite to which the driving pulley is secured. Motion is transmitted from the grooved cam to the guard frame by an upright rock lever J which latter is pivoted between its ends to the main frame. The upper arm of the rock lever is provided with a roller *j*, which engages with the groove of the cam I, and its lower arm is provided with a slot *j'*, which receives a laterally projecting pin *j''* secured to the adjacent side of the guard frame. When the punch is raised to its highest position, the guard frame is in its rearward position, as represented in Fig. 3, in which position the blank is placed upon the die. During the first portion of the downward movement of the punch, the guard frame moves forward and pushes away the hands of the operator if the same are between the die and punch. At the end of its forward movement, the guard frame remains at rest for a time, during which the punch passes through the opening in the guard frame and stamps or cuts the blank placed on the die and then rises again. During the last portion of the upward movement of the punch, the guard frame returns to its rearward position in which it clears the die. K represents an adjustable bracket which supports the rock lever and which is composed of an upper horizontal arm *k'*, and a lower vertical arm *k''* having a vertical slot *k'''*. This bracket is secured to the main frame by bolts *k''''* passing through the slot of its lower arm. The rock lever is provided with a vertical slot *l* which receives a pivot bolt *l'* attached to the upper arm of the

bracket. When it is desired to increase or decrease the throw of the guard frame, the pivot bolt l' and the bracket bolts k^4 are loosened and the bracket is shifted vertically, whereby the fulcrum of the rock lever is shifted, the bolts being again tightened after effecting the adjustment.

When a solid die is employed, only the movable guard frame above the die is necessary to protect the operator against injury, but when an open die is employed, from which it is sometimes necessary to remove scrap, an additional guard is preferably arranged within or underneath the die, which is constructed as follows:—M represents a vertically movable guard plate which is arranged in the opening of the die and which rises into a horizontal position during the forward movement of the guard frame so as to push the fingers of the operator out of the opening in the die, and then descend out of the way to permit the stamped sheet of metal to drop through the die. This guard plate is pivoted at its front end to the upper end of a vertically movable supporting rod m which latter is guided with its lower end in a bracket m' secured to the under side of the table. N represents a vertical lifting rod whereby the supporting rod and the guard plate are operated. This lifting rod is arranged in a vertically movable sleeve n which latter is guided in the bracket m' in front of the supporting rod m , and connected with said rod by a horizontal arm n' . The downward movement of the sleeve n and rod m is limited by the arm n' striking the top of the bracket m' , while their upward movement is limited by a collar n^2 secured to the lower end of the sleeve n and striking the under side of said bracket. The lifting rod is provided at its upper end with a spherical knuckle or head o which bears against the under side of the guard plate, and at its lower end with a collar o' which is adapted to bear against the lower end of the guide sleeve. R represents a rock lever whereby the guard plate is operated and which is arranged lengthwise underneath the table. This rock lever is pivoted between its ends to a hanger r formed on the under side of the table so as to swing vertically, and its front bifurcated arm is provided with slots r' which receive a transverse pin r^2 secured to the lower end of the lifting rod. S represents a trip cam whereby the guard plate is raised. This trip cam is arranged lengthwise on the under side of the slide H, and provided with an inclined front end and an abrupt rear end. s represents a vertically sliding bar guided in the rear portion of the table and provided at its lower end with a transverse pin s' engaging with a slot s^2 formed in the rear arm of the rock lever R. s^3 is an upright trip arm pivoted with its lower end to the upper end of the sliding bar s and provided at its upper end with a roller s^4 adapted to bear against the trip cam. The trip arm is prevented from moving forward beyond a perpendicular po-

sition by a stop t formed at its lower end in front of its pivot, and bearing against a similar stop t' formed at the upper end of the sliding bar in front of said pivot. The trip arm is yieldingly held against rearward movement on the sliding bar by a flat spring t^2 secured at one end to the rear side of the sliding bar s and bearing at its free end against the rear side of the trip arm. The sliding rod is held in its raised position by a spring u attached at its respective ends to the rear arm of the rock lever R and the under side of the table. During the forward movement of the guard frame G the trip cam S depresses the sliding rod and thereby raises the guard plate through the medium of the rock lever R and the lifting rod N and supporting rod m . At the end of the forward stroke of the guard frame the trip cam has passed the roller of the trip arm which permits the sliding bar to rise under the reaction of its return spring and the guard plate to descend. During the backward movement of the guard frame the abrupt rear end of the trip cam engages against the trip arm causing it to swing rearward on its pivot at an angle to the sliding bar, and allowing the cam to ride over it without depressing the sliding bar. As soon as the trip cam in its backward movement clears the trip arm, the latter is again returned to its normal upright position by the spring t^2 , preparatory to again depressing the sliding bar. The movements of the guard plate and the guard frame are so timed that the guard plate is raised to its highest position by the time that the guard frame reaches the center of the die. In the position of the parts represented in Fig. 3 the lifting rod N, supporting rod m and guide sleeve n are in their lowest position and the guard plate is inclined from its front toward its rear end, which position permits the stamped sheet to drop through the die. During the first portion of the upward movement of the lifting rod, it raises the guard plate until the latter assumes a horizontal position, while during the last portion of the upward movement of the lifting rod its collar engages against the lower end of the guide sleeve and raises the sleeve and the supporting rod, together with the guard plate, until the upper surface of the latter is flush with the top of the die. The upward movement of the guard plate M and the forward movement of the guard frame G are so timed that should the operator place his fingers in the opening of the die during the downward movement of the punch the fingers will be first pushed upward out of said opening by the guard plate M, and then forwardly off the die by the guard frame G before the punch descends upon the die. The front end of the guard plate is preferably provided with a depending hook p which is adapted to engage against an internal shoulder p' formed on the under side of the die so as to limit the upward movement of the free end of the guard plate. As soon as the guard

frame G reaches the end of its forward movement the guard plate drops to permit the stamped sheet to pass through the die.

In order to facilitate the dropping of the stamped plate through the die the punch is provided in its under side with a recess which receives a push block *q* and a spring *q'* which tends to press said block downwardly. In the normal position of this push block its lower face projects below the face of the punch so that when the punch descends upon the die, the push block is forced farther into its recess, and its spring is strained. This causes the push block to press downwardly on the stamped sheet and force it downwardly the instant it is severed from the blank. The push block is preferably arranged in the rear portion of the punch so that the rear portion of the stamped sheet will drop slightly in advance of its front portion and thereby cause it to slide down the inclined guard plate more readily.

In the modified construction represented in Fig. 4 the lower arm of the rock lever J is provided with a lateral guard finger *v* which oscillates between the die and punch. This construction is very desirable for small dies in which only a small movement of the guard is necessary to sweep across the die.

In the modification illustrated in Fig. 5 the guard frame is constructed in the form of an open segment which is secured at its inner end to an upright rock shaft *w*, so as to swing horizontally over the die.

If desired, the guard frame may be constructed in the form of a horizontal spider X mounted on an intermittently rotating shaft X', and having its arms arranged to sweep across the top of the die, as represented in Fig. 6; or an endless belt *y* provided with arms *y'* arranged to pass adjacent to the die, as shown in Fig. 7 may be employed.

I claim as my invention—

1. The combination with the die and the punch moving toward and from the same, of a movable guard for pushing aside the hand of the operator, arranged to move adjacent to the die before the punch strikes the latter and to clear the space above the die, when the punch is raised above the same, substantially as set forth.

2. The combination with the die and the punch, of a movable guard arranged to pass over the die before the punch strikes the die, substantially as set forth.

3. The combination with the die and the punch, of an open guard frame arranged to move over the die before the punch strikes the die, substantially as set forth.

4. The combination with the main frame, the die and the punch, of a movable guard frame arranged to pass over the die before the latter is struck by the punch, and a slide carrying the guard frame and moving in horizontal guides on the main frame, substantially as set forth.

5. The combination with the die and the

punch, of a movable guard arranged to pass over the die, and a cam whereby the guard is actuated, substantially as set forth.

6. The combination with the die and the punch, of a movable guard arranged to pass over the die, a rock lever having one arm connected with the guard and a cam engaging with the other arm of the rock lever, substantially as set forth.

7. The combination with the main frame, the die and the punch, of a movable guard arranged to pass over the die, a rock lever having one arm connected with said guard, a cam engaging with the other arm of the rock lever and an adjustable bracket secured to the main frame and supporting the rock lever, substantially as set forth.

8. The combination with the main frame, the die and the punch, of a movable guard arranged to pass over the die and provided with a laterally projecting pin, a rock lever provided with a slot at its lower end which receives the pin of the guard frame and with a slot near its middle, a cam engaging with the upper end of the rock lever, a bracket provided with a vertical slot and secured to the main frame by bolts passing through said slot, and a pivot bolt securing the rock lever to the bracket and passing through the middle slot of the rock lever, substantially as set forth.

9. The combination with an open hollow die and a punch, of a finger guard arranged to move upward within the die to push out the fingers of the operator, substantially as set forth.

10. The combination with a hollow die and a punch, of a guard arranged to move upward in the die, and a movable guard arranged to pass over the die, substantially as set forth.

11. The combination with the hollow die and the punch, of a vertically movable guard plate arranged within the hollow die, and a lifting rod whereby said plate is raised, substantially as set forth.

12. The combination with the hollow die and the punch, of a vertically movable supporting rod arranged under the die, a guard plate arranged within said die and pivoted at one edge to said rod, and a vertically movable lifting rod bearing against the free portion of said guard plate, substantially as set forth.

13. The combination with the main frame, the hollow die and the punch, of a bracket secured to the main frame, a vertically movable supporting rod guided in said bracket, a guard plate pivoted at one edge to the upper end of the supporting rod, a vertically movable sleeve guided in said bracket and connected with the supporting rod, and a vertically movable lifting rod arranged in said sleeve and bearing with its upper end against said plate, substantially as set forth.

14. The combination with the main frame, the hollow die and the punch, of a bracket secured to the main frame, a vertically movable supporting rod guided in said bracket, a

guard plate pivoted at one edge to the upper end of the supporting rod, a vertically movable sleeve guided in said bracket and connected with the supporting rod, a vertically
 5 movable lifting rod arranged in said sleeve and bearing with its upper end against said plate, a stop for limiting the upward movement of said sleeve, and a stop arranged on the lifting rod and adapted to strike the lower
 10 end of said sleeve, substantially as set forth.

15 15. The combination with the main frame, the hollow die and the punch, of a vertically movable guard plate arranged within the die, a guard frame arranged to pass over the die, and connecting mechanism whereby the guard plate and guard frame are operated relatively to each other, substantially as set forth.

16. The combination with the main frame, the hollow die and the punch, of a vertically
 20 movable guard plate arranged within the die, a guard frame adapted to pass over the die, a slide guided on the main frame and carrying said guard frame, a cam arranged on said slide, and connecting mechanism whereby the
 25 guard plate is operated from said cam, substantially as set forth.

17. The combination with the main frame, the hollow die and the punch, of a vertically
 30 movable guard plate arranged within the die, a guard frame adapted to pass over the die, a slide guided on the main frame and carrying said guard frame, a cam arranged on said slide, a rock lever pivoted to the main frame, a lifting rod bearing with its upper end
 35 against the guard plate and connected at its lower end with one arm of the rock lever, and a sliding bar connected at its lower end with the other arm of the rock lever and bearing with its upper end against said cam, substan-
 40 tially as set forth.

18. The combination with the main frame, the hollow die and the punch, of a vertically movable guard plate arranged within the die, a guard frame arranged to reciprocate over the die, a slide guided on the main frame and
 45 carrying the said guard frame, a cam arranged on said slide and provided with an inclined front side and an abrupt rear side, a rock lever pivoted to the main frame and a sliding bar guided in the main frame and connected
 50 at its lower end to the rear arm of the rock lever, and a trip arm pivoted at its lower end to the upper end of the sliding bar and bearing with its upper end against said cam, a stop for limiting the forward swing of the
 55 trip arm, and a spring whereby the trip arm is yieldingly held against backward movement, substantially as set forth.

19. The combination with an open or hollow die, through which the cut blank is dis-
 60 charged, of a vertically movable guard plate arranged in said die, and a punch having a yielding push block or follower for pushing the cut blank through the hollow die, substantially as set forth.
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20. The combination with the hollow die through which the cut blank is discharged, of a vertically swinging guard plate arranged in said die and pivoted at one edge, and a
 70 punch having a yielding push block or follower adapted to push the cut blank through the die and exerting its pressure against the blank on one side of the center of the punch, substantially as set forth.

Witness my hand this 11th day of March, 75
 1893.

THOMAS A. DICKS.

Witnesses:

JNO. J. BONNER,
 EMIL NEUHART.