April 17, 1928. 1,666,344

M. OVESTRUD

TIE PLATE PUNCHING AND SHEARING PRESS

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Fig. 1

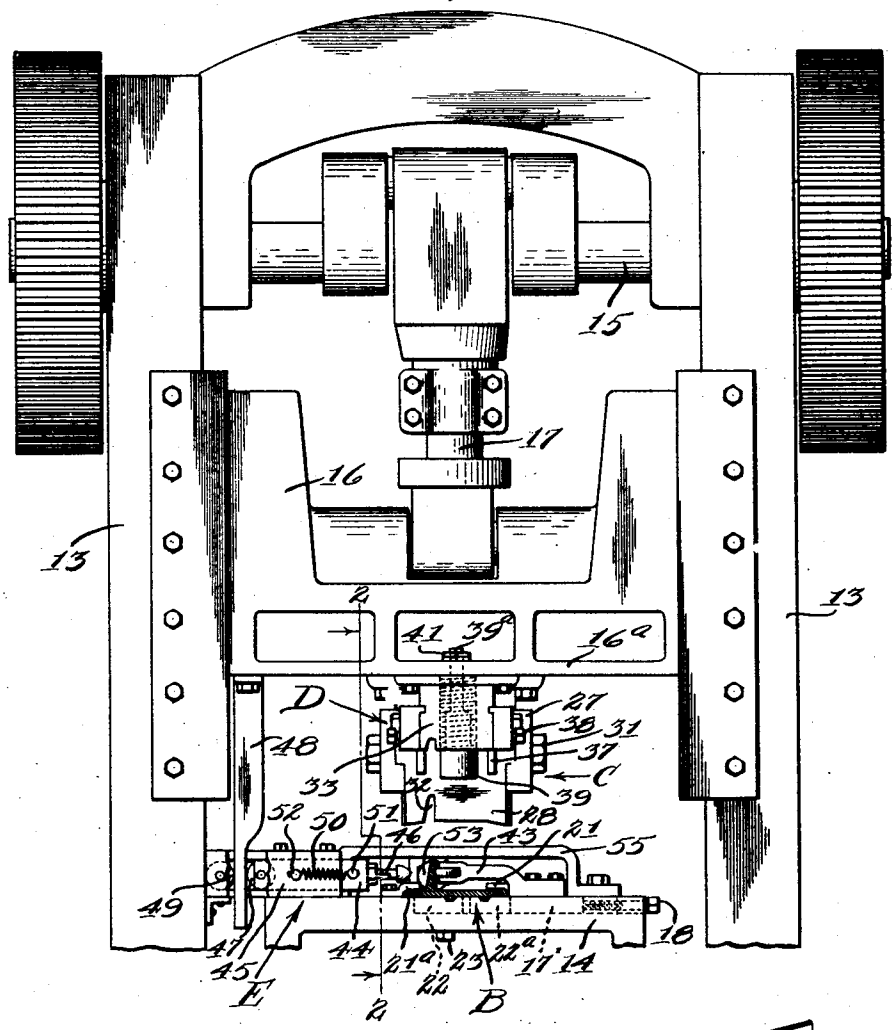
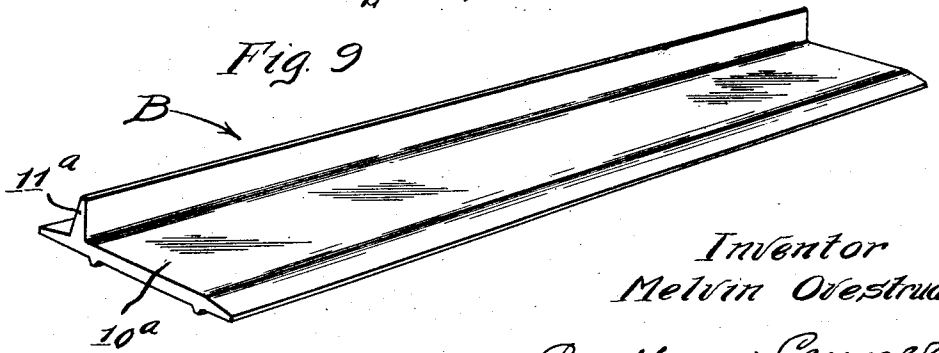


Fig. 9



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TIE PLATE PUNCHING AND SHEARING PRESS

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Fig. 2

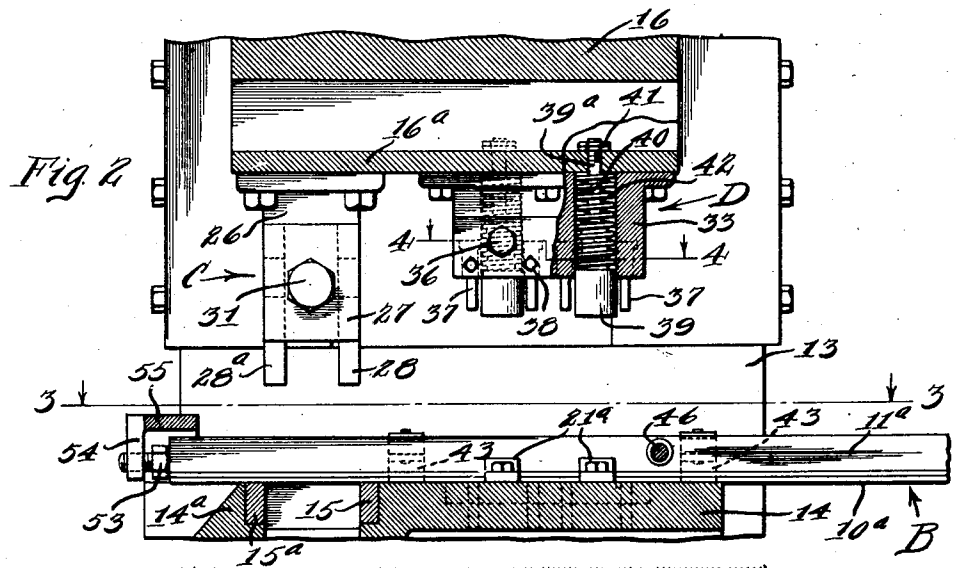
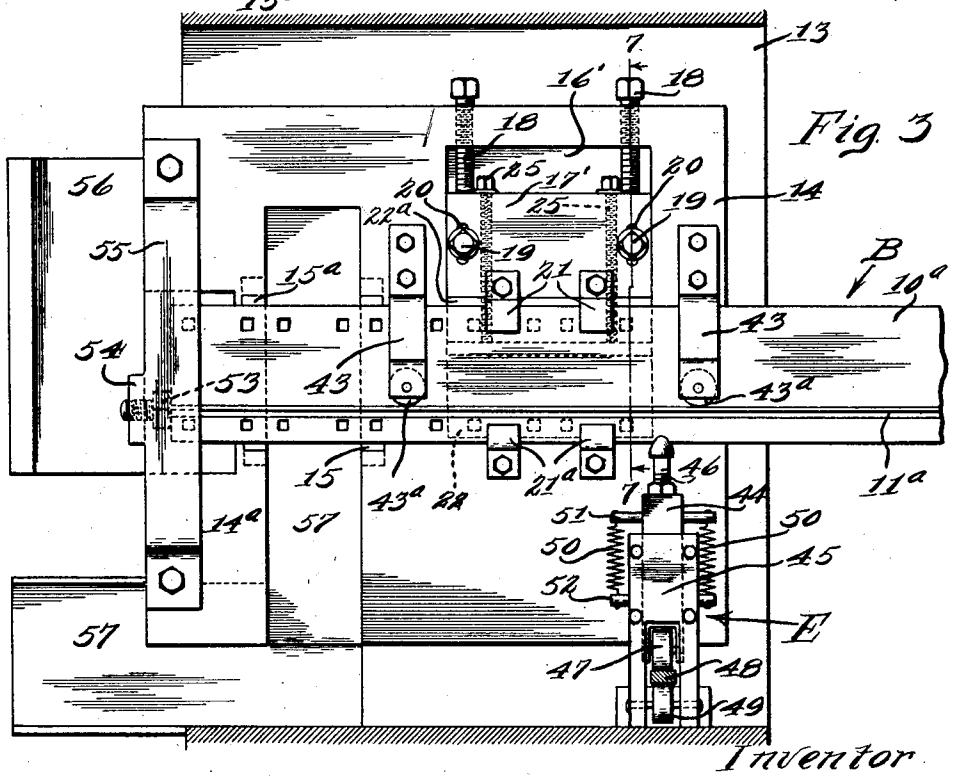


Fig. 3



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Fig. 4

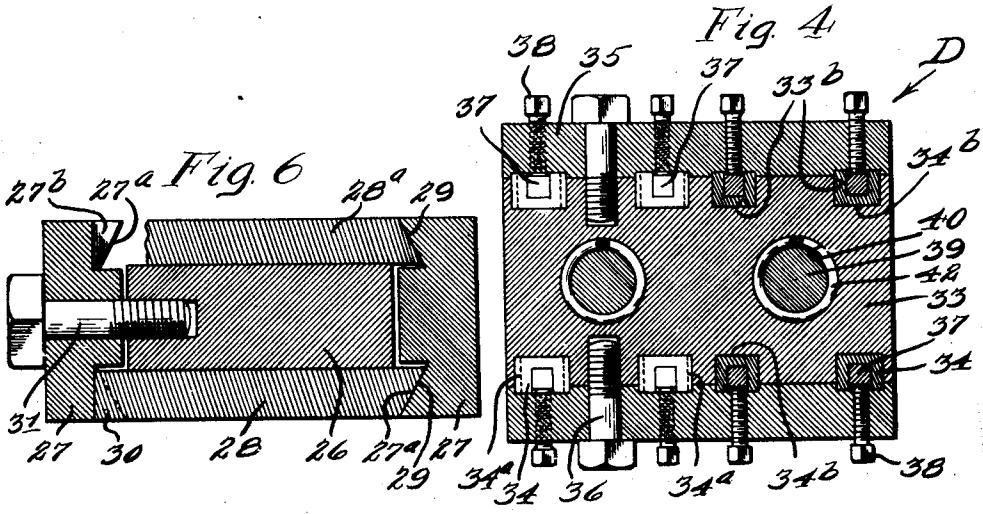


Fig. 6

Fig. 5

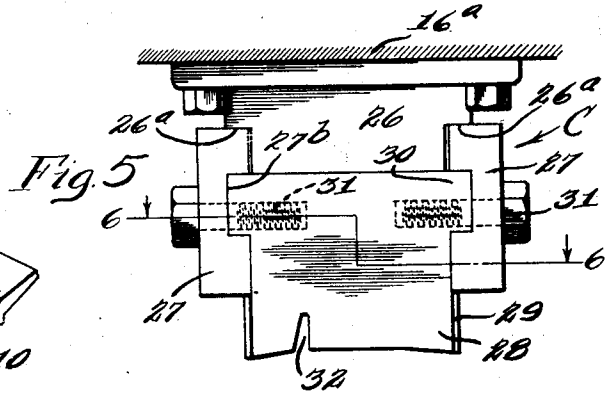


Fig. 8

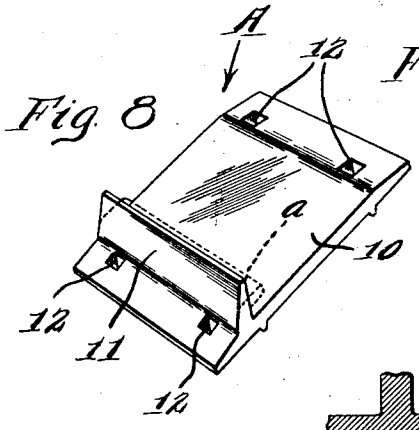
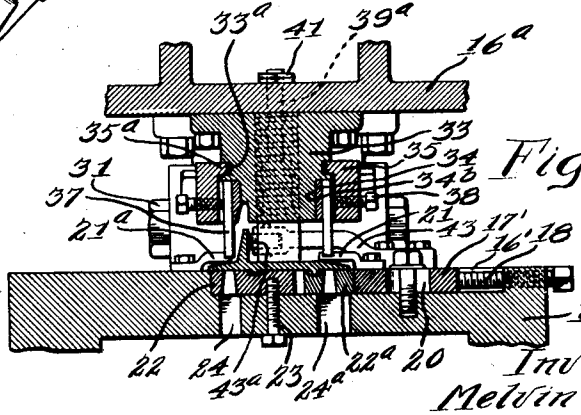


Fig. 7



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Patented Apr. 17, 1928. 1,666,344

UNITED STATES PATENT OFFICE.

MELVIN OVESTRUD, OF STILLWATER, MINNESOTA, ASSIGNOR OF ONE-HALF TO TWIN CITY FORGE & FOUNDRY COMPANY, OF STILLWATER, MINNESOTA, A CORPORATION OF MINNESOTA.

TIEPLATE PUNCHING AND SHEARING PRESS.

Application filed April 29, 1925. Serial No. 26,674.

My invention relates to improvements in presses employed in making tie-plates of the character set out in Letters Patent of the United States, No. 1,171,581, granted Feb. 15, 1916, to E. H. Barrett, the said improvements embodying means for punching steel blanks and shearing punched tie-plate sections therefrom.

An object of the invention is to provide a durable press of the instant nature, whereby the punching and shearing operations, may be performed rapidly and accurately, to the end that quantity production may be attained at minimum cost.

More specifically it is an object of my invention to supply a press adapted to perform the initial operation upon a blank comprising a long body plate formed with a flange longitudinally thereof, said operation including the transverse severance of said blank into tie-plate sections and the punching of apertures in the body plate to provide spike holes in said tie-plate sections.

Another object of the invention is to provide a press of the present character, wherein dual punching and shearing operations are performed upon one thrust of the press ram, one operation following the other, whereby the strain upon the press structure is reduced to a minimum.

A further object of the invention is to provide, in a press of this nature, means for side registering the blank, whereby the apertures punched in the body plate will be accurately located with respect to the flange on said body plate.

An additional object is to fit a press of this kind with means for holding a blank preparatory to the punching of the apertures therein, said means serving to strip the blank from the punches following the punching operation.

With the foregoing and other objects in view, which will appear in the following description, the invention resides in the novel combination and arrangement of parts and in the details of construction hereinafter described and claimed.

In the drawings, Fig. 1 is a front elevational view of a press embodying my invention, the base of the frame being broken away; Fig. 2 is a detail sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is a detail sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a detail sectional view taken through the punch block as on the line 4—4 of Fig. 2; Fig. 5 is a front elevational view in detail of the blade assembly; Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5; Fig. 7 is a vertical sectional view in detail illustrating the punch head and complementary parts in the bed of the press, said view being taken as on the line 7—7 shown in Fig. 3; Fig. 8 is a perspective view of a tie-plate section perforated and struck from a blank as by the instant press and Fig. 9 is a perspective view of a blank from which such tie-plate sections are formed.

Referring to the drawing, and particularly to Fig. 8 thereof, it will be noted that the tie-plate section A, formed by my improved press, includes a body plate portion or platform 10 and a flange portion 11 perpendicular to said platform. In an operation performed by mechanism other than that shown herein, said flange portion 11 is bent into the position shown in dotted lines to form a jaw member *a* for engagement with the upper surface of the base of a rail resting on the platform 10. Apertures 12 punched in the platform 10 by the instant press receive spikes which are driven into a tie, the two spikes in the two apertures remote from the jaw member *a* being adapted to catch over the upper surface of the rail base opposite said jaw member. Said two spikes, owing to the relation of their respective apertures 12 with the jaw member *a* cause the wedging of the rail base under said jaw member as said spikes are driven into the tie, the accurate location of said apertures, therefore, being important. The tie-plate sections A in the form shown in said Fig. 8 are produced in my improved press from a long steel blank B (Fig. 9), the same comprising a body plate 10^a having a flange 11^a longitudinally thereof and perpendicular thereto.

My improvement includes upright frame members 13 rising from a base (not shown), a bed 14 supported by said base, a power crank-shaft 15 journaled in the upper ends of said frame members 13, a ram 16 slidably guided between said frame members and a pitman 17 connecting said ram with said

crank-shaft, all of said parts being common to the conventional heavy duty type of presses.

The bed 14 is supplemented with an additional bed member 14ª, which is spaced to the rear of the bed proper, the adjacent upper corners of said bed 14 and bed member 14ª being fitted with hardened shearing dies 15, 15ª for co-operation with shearing blades soon to be described. In the upper face of said bed is a depression 16′ in which a mounting block 17′ is received for sliding adjustment laterally of the press. Screws 18, threaded in the bed 14 and abutting at their ends against the outer edge of the mounting block 17′, serve to thrust the block inwardly of the bed 14, while bolts 19, received in slots 20 in said block and threaded in said bed, serve to clamp said mounting block 17′ in fixed positions on the bed 14.

An inturned pair of clips or guides 21, secured to the mounting block 17′, co-operate with similar opposing guides 21ª mounted on the face of the bed 14. Said opposed guides 21, 21ª are arranged to loosely embrace the edges of the body plate of a blank B and roughly direct the blank into position laterally of the bed 14, when such blank is introduced to the press. The depression or recess 16′, in which the mounting block 17′ is slidable, extends inwardly of the bed and beneath the position occupied by a blank B between the guides 21, 21ª. In said inner part of said recess 16 are seated two female punch dies 22, 22ª, each formed with four punch receiving apertures aligned longitudinally thereof. The punch die 22 is suitably secured to the bed 14 as by a bolt 23, said bed being supplied with punching outlets 24 registering with the apertures in said punch dies 22, 22ª. The punch die 22ª is apertured like said punch die 22, its apertures registering with punching outlets 24ª in the bed 14, said punch die 22ª being bound edge-to-edge with the slidable mounting block 17′, by means of bolts 25 reaching through said block and threaded in said die 22ª.

Co-operating with the shearing dies 15, 15ª and with the punch dies 22, 22ª are shearing and punching members carried by the ram 16, the lower portion of said ram being cored out in the usual manner (Fig. 1) to provide a tool attaching plate 16ª. The shearing member comprises a blade assembly C including a hanger-block 26 depending from the ram plate 16ª, blade clamps 27 bolted to said block, and blades 28, 28ª held in said clamps 27. The hanger-block 26, oblong in horizontal cross section, hangs laterally of the ram 16, the blades 28, 28ª being disposed face to face with the front and back of the block respectively. The clamps 27, placed at the opposite edges of the hanger-block 26, bear at their upper ends beneath shoulders 26ª (Fig. 5) on said block 26. These clamps 27 are formed with beveled surfaces 27ª (Fig. 6) complementing beveled edges 29 of the blades 28, 28ª and are also formed with recesses 27ᵇ to accommodate shoulders 30 at the upper portions of said blades 28, 28ª. Bolts 31, passing through the clamps 27 and threaded into the block 26, draw the former against the beveled edges of the blades 28, 28ª with the result that said blades are rigidly tightened against the faces of the hanger-block 26. Being thus bound and backed at their upper ends against the block 26 through the medium of the clamps 27, the blades 28, 28ª are held securely to the ram 16. The cutting edge of each of the blades 28, 28ª is shaped to conform with the upper surface of the body plate 10ª of a blank B and is recessed as at 32 to accommodate the upstanding flange 11ª on said blank. The combined thickness of the blades 28, 28ª and hanger-block 26 is slightly less than the distance between the cutting edges of the shearing dies 15, 15ª, said blades being arranged on the ram 16 so that they will co-operate with said shearing dies 15, 15ª, whereby a blank placed upon the bed 14 will be sheared transversely on two lines of severance. The punching member D includes a pendant punch block 33 hanging from the plate 16ª of the ram 16. This punch block 33 is oblong in horizontal cross section and disposed at right angles to the hanger-block 26 for the shearing blades 28, 28ª. Each side of the punch block 33 is formed with a horizontal groove 33ª therein and also with four upright grooves 33ᵇ (Fig. 4). The latter grooves receive hardened, open sided chucks 34, said chucks being clamped in their respective slots 33ᵇ at either side of the punch block 33 by means of clamping bars 35 secured to said block 33 by bolts 36 passing through said bars 35 and threaded in the block 33. Retaining flanges 34ª (Fig. 4) at the upper end of each chuck 34 fit in complementing enlargements of its respective groove 33ᵇ and support the chuck 34 in place in said groove preparatory to the binding of a clamping bar 35 thereagainst. Each clamping bar 35 is also supplied with a retaining flange or lip 35ª (Fig. 7) adapted to fit in its corresponding groove 33ª in the punch block 33, said flange serving to support the clamping bar during the fitting of the bolts 36 to said block. Punches 37, one for each chuck 34, are inserted in said chucks and held, with their upper ends abutting the punch block 33 at the tops of the grooves 33ᵇ, by means of set screws 38 threaded in the clamping bars 35 and reaching said punches through the open sides of said chucks 34. The eight punches 37 provided constitute two groups of four each, two punches on one side of the punch block 33 pairing with two laterally aligned

punches on the other side of said block. These two groups of punches operate simultaneously upon a blank, one group punching four apertures in the black B for one tie-plate section A and the other group punching four apertures in said blank for a second tie-plate section. In this connection it will be observed that the apertures in the punch dies 22, 22ª complement said two groups of punches 37. Arranged centrally of each group of punches 37 is an upright plunger 39, the same being slidable up and down in a vertical bore 40 in the punch block 33. The two plungers 39 are identical, each including a foot portion snugly slidable in its respective bore 40 and also including a stem 39ª rising from the foot and slidable at its upper end in a bore in the ram plate 16ª. Fitted on said stem 39ª, above the plate 16ª is an adjustable stop nut 41 which limits the depression of the plunger 39 with respect to the ram 16, under the action of an expansion spring 42 encircling the plunger 39 and backed at its upper end against the lower side of the ram plate 16ª and at its lower end against the plunger foot. The bottom of the foot of each plunger 39 is normally in a plane beneath the lower extremities of the punches 37. With said parts thus related, the plungers 39 engage a blank B on the bed 14 before the same is reached by the punches 37. Giving way under the downward pressure of the ram 16, the plungers 39, yieldingly impinged against the blank, hold the same down against the bed 14 as said blank is struck and perforated by the punches 37. Upon the upward or return stroke of the ram 16, the plungers 39, acting under the force of the springs 42 keep the blank down against the bed 14 until the punches 37 are stripped therefrom, after which time, the stop nuts 41 engage the plate 16ª and cause the plungers 39 to rise with the ram.

The shearing edges of the blades 28, 28ª rest sufficiently beneath the lower ends of the punches 37 so that the shearing of a blank precedes the punching thereof. This arrangement saves the press structure against the combined strains in shearing and punching that would otherwise occur were the two operations to be effected simultaneously.

It being essential that the apertures 12 in the body plate 10 of a tie-plate section remote from the flange 11 be accurately disposed with respect to said flange, I have provided a device for side registering a blank B on the bed 14 of the press. This device includes two spaced guide brackets 43, anchored at their ends on the bed 14 and transversely overreaching the greater part of the body plate 10ª of a blank B roughly guided between the clips 21, 21ª. Each guide bracket 43 has a roller 43ª journaled at the end thereof and providing a rolling abutment for the inner side of the flange 11ª on the blank B. Opposed to the rollers 43ª and arranged to impinge against the opposite side of said flange 11ª between said rollers 43ª is a plunger E, the same including a carriage block 44 slidable horizontally in a frame 45 supported on the bed 14 and one of the frame members 13 of the press. At the inner end of the carriage block 44 is an adjustable head 46 and at the outer end of said carriage block 44 is an anti-friction roller 47, which is actuated by a cam-like arm 48 depending from the ram 16. Urged inward by the action of said arm 48 against said roller 45, the head 46 is brought to bear against the outside of the flange 11ª of the blank B with sufficient pressure to slide the blank sidewise against the guide rollers 43ª. With the head 46 properly adjusted, the blank is accurately side registered thereby by the bringing of the inner side of the flange 11ª closely against said two guide or registered rollers 43ª. A roller 49 journaled in the frame 45 provides an anti-friction brace for the back of the arm 48 and prevents it from springing away from the roller 47 on the carriage block 44, when the head 46 thereon engages a blank B. Springs 50 stretched between lugs 51, 52 respectively fixed to the carriage block 44 and guide frame 45 retract the former when the cam-like arm 48 is carried upward by the ram 16. This retracting throw of the carriage block 44 removes the pusher head 46 out of the way of a blank B whereby the same may be freely introduced to the press and fed thereinto following each working thrust of the ram 16.

As the press is operating, the advance end of a blank B is thrust against an abutment preparatory to the descent of the ram 16. Said abutment comprises a screw 53, threaded in a lug 54 depending from a bracket 55 traversing the supplementary bed member 14ª and anchored at its ends to said member. The distance between the face of said screw 53 and the cutting edge of the shearing die 15ª on the bed member 14ª is equal to the distance between said cutting edge and the cutting edge of the shearing die 15 on the bed 14. Thus, it will be understood that the two blades 28, 28ª will sever two identical sections from the blank B. The shearing blades 28, 28ª and their complementary dies 15, 15ª have that relation with respect to the punches 37 and their complementary punch dies 22, 22ª wherein the lines of severance of the blank B fall between the grouped apertures made by the punches 37. In starting a blank B into the press, the foremost group of punches 37 are first permitted to punch the blank at the end thereof. Said blank is then shifted forwardly to position barely out of the path of the forward blade 28,

whereupon the two groups of punches operate upon the blank. Thereafter, the feeding of the blank is carried out in the normal manner, the end thereof being thrust against the abutment screw 53 following each working thrust of the ram 16.

The tie-plate section severed from the foremost end of a blank B, falls into a chute 56 leading to one side of the press, while the companion tie-plate section falls into a chute 57 leading to the opposite side of the press. This feature of opposite delivery of the two tie-plate sections, severed from the blank B on each stroke of the ram, facilitates the handling of said tie-plate sections in a subsequent operation wherein they are taken from spaced locations. Tie-plate blanks vary in width to provide tie-plates to suit rails of different weights and, in handling such variously proportioned blanks, it is desirable not only that the space between the guide clips 21, 21^a be adjustable, but that the punches 37 for perforating the body plate 10^a furtherest from the flange 11^a be adjustable to properly form said perforations with respect to said flange 11^a. Since the clips 21 are anchored on the adjustable block 17' and since the punch die 22^a is attached to said block, said parts may be adjusted upon adjustment of the block 17'. To properly locate the punches 37 complementing the adjustable punch die 22^a, I form differently proportioned chucks 34 in which the inner walls 34^b (Fig. 4) thereof vary as to thickness.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a press of the class described, a frame, a bed thereon, a vertically reciprocable ram above said bed, shearing and punching elements carried by the ram, means on the bed complementing the shearing and punching elements, said elements being arranged in tandem in the direction of feed to said press, the shearing element comprising a pair of blades for severing two sections from a blank transversely thereof, the punching element comprising spaced punches for perforating two zones in the blank to be severed by said blades on a subsequent stroke of the ram, and a pair of oppositely arranged delivery chutes, each disposed to receive one of the sections severed from the blank on each stroke of the ram, one chute leading to one side of the press and the second chute to the other side of said press.

2. In a press of the class described, a frame, a bed thereon, a vertically reciprocable ram above said bed, shearing and punching elements carried by the ram, means on the bed complementing the shearing and punching elements, said elements being arranged in tandem in the direction of feed to said press, the shearing element comprising a plurality of blades for severing sections from a blank transversely thereof, the punching element comprising spaced punches for perforating zones in the blank to be severed by said blades on a subsequent stroke of the ram.

3. In a press of the class described, a frame, a bed thereon, a vertically reciprocable ram above said bed, shearing and punching elements carried by the ram, means on the bed complementing the shearing and punching elements, said elements being arranged in tandem in the direction of feed to said press, the shearing element comprising a plurality of blades for severing sections from a blank transversely thereof, the punching element comprising spaced punches for perforating zones in the blank to be severed therefrom by said blades on a subsequent stroke of the ram, a plurality of delivery chutes, one for each section cut from a blank on one stroke of the ram, said chutes being arranged to receive their respective ssections and convey them to various selected points of delivery.

4. A press of the class described, adapted to punch holes in the body plate of a blank at a given distance from an upright flange on said body plate, said press including a frame, a bed thereon for said blank, a ram reciprocable in the frame above said bed, a punch carried by the ram, a member on the bed complementing said punch, means for registering the blank with respect to the punch, said means including a bracket fixed to the bed and overreaching a portion of the body plate of the blank, said bracket forming an abutment for one side of said flange, a pusher member opposing said bracket and means operated by the ram for moving said pusher member against said flange and pushing the blank into position with the flange against said bracket.

5. A press of the class described for punching holes in an object, the same including a frame, a bed for the object, a ram reciprocable in said frame above said bed, a punch carried by the ram, a member mounted on the bed and complementing said punch, means for registering the blank with respect to the punch, said means including an abutment for said blank and a device for pushing the blank against said abutment, and mechanism operated by the ram for shifting said device.

6. A press of the class described including a frame, a bed thereon, a ram reciprocable in said frame above said bed, a punch block depending from said ram, laterally spaced punches carried in said block, one of said punches being adjustable laterally of the

punch block to vary the distance between said punches, members on the bed complementing said punches, the member companion to said adjustable punch being adjustable to accord with the various positions of said punch.

7. A press of the class described including a frame, a bed thereon, a ram reciprocable in said frame above said bed, a punch block depending from said ram, laterally spaced punches carried by said ram, one of the punches being adjustable laterally on the punch block to vary the distance between said punches, members on the bed complementing said punches, a block slidably adjustable on the bed, a guide clip fixed to the bed, an opposed guide clip fixed to said adjustable block, said clips forming guides for a blank to be punched, the member complementing said adjustable punch being fixed to said block, the movement whereof permits of the widening and narrowing of the space between said clips to accommodate blanks of different dimensions and the corresponding variance between the members complementing said punches.

8. A press of the class described including a frame, a bed thereon, a vertically reciprocating ram, a punch block depending from the ram and formed with upright grooves therein, open-sided chucks, one fitted in each groove, a clamping bar traversing the open sides of the chucks and binding said chucks in place within their respective grooves, punches fitted in said chucks, set nuts, one for each chuck, said set nuts being threaded in the clamping bar and each adapted to be turned into the open side of its respective chuck against the punch therein for securing said punch in said chuck, and means on the bed complementing said punches.

9. A press of the class described including a frame, a bed thereon, a vertically reciprocating ram, a punch block depending from the ram and formed with upright grooves therein, open sided chucks, one fitted in each groove, said chucks co-operating with said block to prevent them from falling from said grooves, a clamping bar hung on the block and traversing the open sides of said chucks, bolts threaded in the punch block and operating to draw the clamping bar against said chucks and bind the same in their respective grooves, punches fitted in said chucks, set nuts, one for each chuck, said set nuts being threaded in the clamping bar and each adapted to be turned into the open side of its respective chuck against the punch therein, and means on the bed complementing said punches.

10. A press of the class described including a frame, a bed thereon, a reciprocating ram, a punch block carried by the ram and formed with a groove therein, an open sided chuck applicable to said groove and adapted to co-operate with the punch block and be thereby stationed in place with respect to said block, means for clamping the chuck in its place in the punch block, a punch applicable to said chuck, clamping means for engaging with the punch through the open side of said chuck, said clamping means being adapted to bind the punch in place within said chuck, and means on the bed complementing said chuck.

11. A press of the class described including a frame, a bed thereon, a reciprocating ram, a block carried by the ram and formed with shoulders, blades abutting said shoulders at the butts thereof and disposed each with the inner face thereof against a face of said block, said blades having oppositely beveled edges, blade clamps complementing said beveled edges of said blades, clamping means co-operating with the blade clamps and with said block for securing the blades face to face against the block, and means on the bed complementing said blades.

12. A press of the class described including a frame, a bed thereon, a reciprocating ram, a block carried by the ram and formed with a shoulder thereon, a blade abutting said shoulder at the butt thereof and disposed face to face against said block, said blade having a beveled edge, clamping means co-operating with said edge of said blade and with said block for securing the blade against the block, and means on the bed complementing said blade.

In testimony whereof, I have signed my name to this specification.

MELVIN OVESTRUD.