April 10, 1934. C. F. SHERMAN 1,954,651

MACHINE FRAME

Filed April 10, 1931 2 Sheets-Sheet 1

Fig. 1.

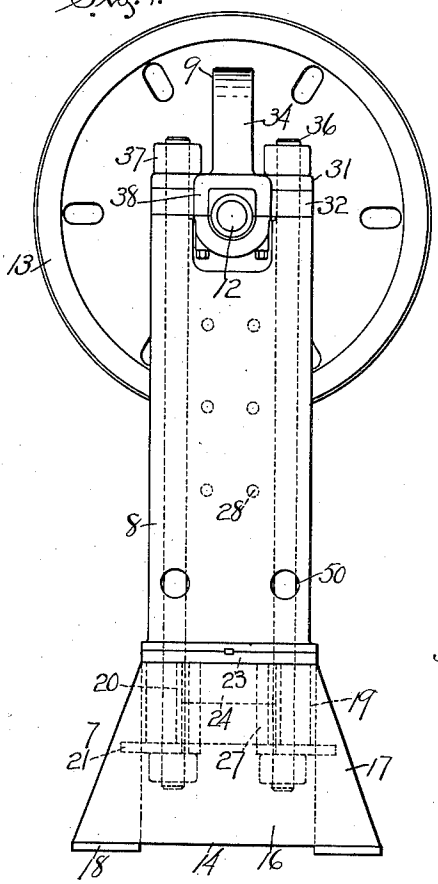



Fig. 2.

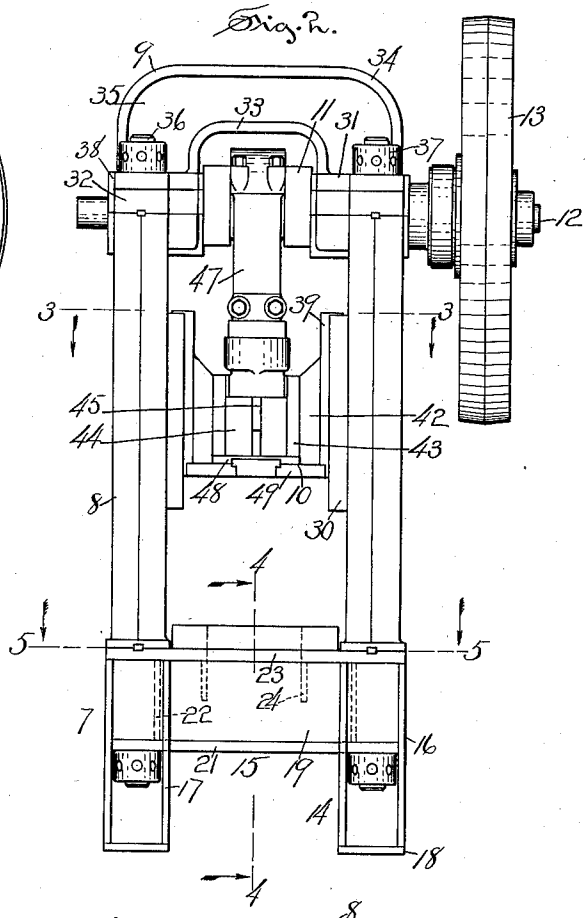



Fig. 3.

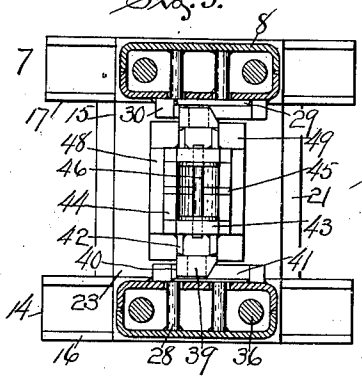



Fig. 4.

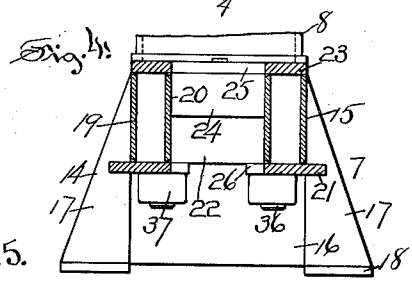
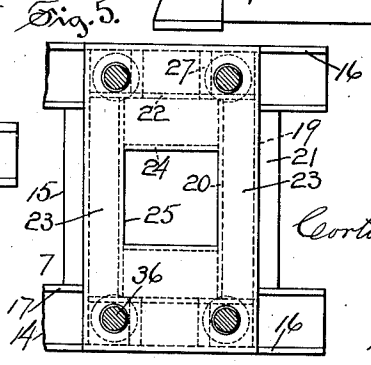



Fig. 5.



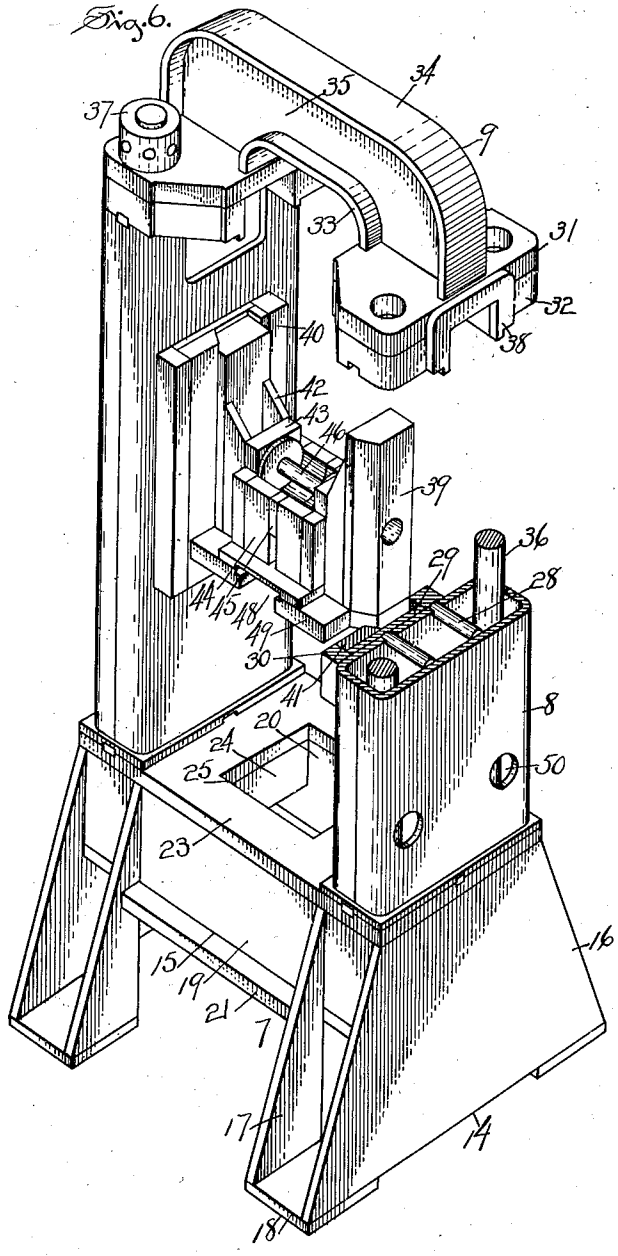

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Fig. 6.




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# UNITED STATES PATENT OFFICE

1,954,651

## MACHINE FRAME

Cortis F. Sherman, Hartford, Conn., assignor to The Henry & Wright Manufacturing Company, Hartford, Conn., a corporation of Connecticut

Application April 10, 1931, Serial No. 529,067

10 Claims. (Cl. 164—86)

My invention relates more particularly to that class of machines known as power presses, and an object of my invention, among others, is the production of a machine frame that, while comparatively light in construction as compared with former machines of this type, yet, shall be extremely strong and adapted to successfully withstand all strains to which it may be subjected in use.

One form of a machine frame embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of my improved machine frame.

Figure 2 is a front view of the same.

Figure 3 is a view in cross section on a plane denoted by the dotted line 3—3 of Figure 2.

Figure 4 is a view in vertical section through the lower portion of the frame on a plane denoted by the dotted line 4—4 of Figure 2.

Figure 5 is a view in cross section on a plane denoted by the dotted line 5—5 of Figure 2.

Figure 6 is an isometric view on enlarged scale looking downwardly at the front and side of the machine, with one of the columns broken off to illustrate construction.

In the accompanying drawings the numeral 7 denotes the base of my improved machine frame, 8 the sides, 9 the crown or yoke that connects the sides at the top, 10 a ram or plunger supported by the sides for vertical reciprocating movement as by means of a crank 11 constituting a part of the driving shaft 12, and 13 a driving pulley secured to the driving shaft, all as shown in Figure 2 of the drawings.

Machine frames heretofore made, and particularly those employed for dieing or punching operations, have commonly been made from cast metal, and in order to provide for the necessary strength to resist the strains to which such frames are subjected without rupture and without springing action under such strains said frames have required to be made of considerable thickness. Cast metal is particularly susceptible to yielding action under severe strain and this heavy construction has therefore been required in punch or stamping presses to maintain the parts supporting the upper and lower dies in rigid alignment so that the dies when they are brought together shall be accurately positioned, as any movement out of such position, no matter how slight, will injuriously affect the dies and materially shorten their life, and such dies being expensive to obtain the cost of production by a machine is seriously affected if the dies do not accurately register when they are closed together.

My invention, illustrated and described herein, enables machine frames of this type to be produced so that the thickness, and consequently the weight of the frame, may be materially reduced, and at the same time, a frame is obtained that is particularly free from yielding qualities so that the dies are most rigidly held in registering positions.

In accomplishing my purpose I construct the base of the frame in sections, these comprising two end sections 14 and a top or table section 15. These sections are made from sheet metal formed to shape in any desired manner and each end section includes a side plate 16 approximately of the size and shape of the section when viewed from the side of the machine, said plates being broader at the bottom than at the top edges and gradually tapering to the smaller dimension in width at the top. Spaced from each of said side plates are two stay plates 17 in each end section, each stay plate having its front and bottom edges conforming in shape to corresponding parts of the side plate, being of triangular shape such as defined by a line drawn vertically from and at right angles to the bottom edge of a side plate 16 to nearly intersect the tapered front edge at the top thereof. These stay plates are joined to the side plates by bottom plates 18, substantially square, and of a width to correspond with the width of the bottom edge of the stay plates, said bottom plates being secured to the bottom edges of the side and stay plates as by welding.

The base top or table 15 comprises in its construction two cross bars or beams each consisting of an outer and an inner plate 19—20 vertically disposed and secured at their bottom edges, as by welding, to bottom plates 21. Each of the plates 19 extends the full length of the table to abut the inner surfaces of both the side plates 16, and the inner plates 20 abut at their ends the sides of end plates 22, and the ends of said end plates abut the inner surfaces of the outer plates 19, the plates 20 consequently being shorter than the plates 19, and as shown by dotted lines in Figure 5 of the drawings.

The top plate or table proper 23 is secured as by welding to the upper edges of the plates 16—19—20—22, the width of this table from front to back being substantially that of the top of the side plates 16 of the bottom section. The ends of the table preferably set upon the upper edges of the side plates 16 and are secured there-

to as above mentioned. Struts 24 extend between the plates 20 and are secured at their ends, as by welding, to the sides of said plates and also at their top edges to the plate 23. These struts are located at the margin of a square hole 25 through the center of the table 23. The bottom plates 21 have, at the opposite ends of each, supporting lips 26 to engage nuts on tie-rods to be hereinafter described. Struts 27 in the form of plates extend across the gap comprising the spaces between the plates 16 and 22, these struts being of a width equal to that of the plates 19. These struts are secured as by welding at their ends to the plates 16 and 22 and at their top and bottom edges to the plates 21 and underside of the table 23.

The sides of columns 8 are each formed in halves of substantially the same shape from sheet metal, each half being of substantially U-shape in cross section. These halves are welded together at the front and back edges of the columns and struts 28 in the form of pins spaced at suitable intervals extend through holes in the inner part of each column, said struts being secured at their opposite ends as by welding. A guide plate 29 is secured to the inner face of each column and guide bars 30 are also secured to said faces at opposite edges of each guide plate, said guide plates and bars preferably overlying the ends of the struts 28.

The crown or yoke is also formed of sheet metal, the ends of the yoke comprising base plates 31 underlaid by supporting blocks 32 forming flanges at the ends on opposite sides of each supporting plate. An inner arch plate 33 and an outer arch plate 34 are joined by a web 35, the latter extending lengthwise along the center of the arches, and as shown in Figure 6 of the drawings, said web being secured as by welding along its edges to the two arches.

The columns 8 are each square at their opposite ends so that they set squarely upon the base 7 and also squarely receive the yoke 9. Tie-bolts 36 extend lengthwise through the columns, through the base top or table 15 and through the flanges of the yoke 9, nuts 37 being secured to the ends of the bolts to fasten the base, columns and yoke tightly together, the nuts at the bottom of the tie-bolts being partially supported by the lips 26 projecting from the bottom plates 21. A U-shaped plate 38 is secured to the outer edges of each of the plates 31 and the blocks 32 thereunder to surround an opening between the blocks and form a boss around such opening.

The ram or plunger 10 is made up of separate pieces as hereinbefore described with respect to the base, columns, and the crown or yoke, said plunger comprising guides 39 formed to fit in guide-ways between gibs secured between each pair of guide bars 30, said gibs 40—41 being secured as by means of bolts or screws.

A pair of strut plates 42 are set on edge against each of the guides 39 and are secured in place as by welding. A wrist pin supporting plate 43 is secured, as by welding, to the edges of each pair of said strut plates and a filling block 44 is secured to each of said supporting plates. A filling plate 45 is secured to and between said filling blocks, as by welding, as shown in Figure 6 of the drawings. Said blocks and plate 45 are recessed on their upper edges to receive a wrist pin 46 secured at its ends in the supporting plates 43, the lower end of a pitman 47 engaged with said wrist pin and connected to the crank 11 also operating in said recess, the end of the pitman being forced against the bottom of said recess in the downward movement of the plunger or ram. A reinforcing plate 48 is secured between the supporting plates 43 at the bottom thereof and against the bottoms of the plates 43 and blocks 44, thereby leveling the bottom of the ram to receive a die plate 49 that is secured in place, as by welding.

The metal of which the base 7, the columns 8 and the crown or yoke 9 is made is such that said three units are substantially the same both as to compressive and tensile strength. In making up the frame the parts are joined by the tie-bolts and nuts as hereinbefore described. The tie-bolts are then shrunk to finally secure the parts together. In this operation holes 50 are formed in the sides of the columns 8 for the application of heat to the tie-rods as by means of a torch or other heating implement. As the rods are heated and expand thereby the nuts 37 are turned to set them firmly in place, and after the rods have contracted by cooling the units are secured in such manner that they will be substantially inelastic and practically free from any springing action under such strains as may be applied to the machine within the limits for which said machine is constructed.

While I have shown and described herein a yoke in the form of an arch and of I-shape in cross section, it is not intended to limit the invention to such form so long as the yoke is constructed of sheet metal.

I claim:

1. A machine frame including a base comprising end sections each composed of an outside plate of sheet metal and sheet metal stay plates spaced from the side plate and from each other, a sheet metal bottom plate joining the stay plates and side plates, all of said plates being joined together by edge welding, a table section composed of sheet metal plates secured together by welding, said table extending between said stay plates and being secured at its ends to said outside plates and to the inner edges of the stay plates by welding, columns mounted on and rising from said table, a yoke extending across from one column to the other and supported thereon, and tie-bolts extending through said yoke, columns and base to secure said parts together.

2. A machine frame including a base section composed of plates of sheet metal stamped to shape and welded together, said base comprising a table, columns composed of sheet metal disposed in hollow form and supported on said base section, a yoke formed of two pieces of sheet metal stamped and bent into arch shape and spaced apart by a web secured along its edges to the flat sides of said arch shaped members intermediate their edges, and tie-bolts extending through said yoke, columns and base to secure said parts together.

3. A machine frame including a base section composed of plates of sheet metal stamped to shape and welded together, said base comprising a table, columns composed of sheet metal disposed in hollow form and supported on end on said base section, a yoke including base plates at opposite ends thereof formed from sheet metal, two arch shaped members formed from sheet metal of material width with their flat faces facing each other and disposed substantially parallel and secured at their ends by welding to said plates, a web formed from sheet metal and secured between and to said arch shaped members along its opposite edges and intermediate the edges of said

arch-shaped members, and tie-bolts extending through said yoke, columns and base to secure said parts together.

4. A power press comprising a frame including a base, upright columns and a yoke, said members being composed of pieces of sheet metal of substantially uniform thickness, which pieces all have substantially the same compressive and tensile strength, said pieces being cut or bent to shape and secured together by welding, and shrunk tie-rods engaged with said base and yoke and extending through said columns to secure said parts together.

5. A power press comprising a frame including a base, upright columns and a yoke, said members being composed of pieces of sheet metal of substantially uniform thickness, which pieces all have substantially the same compressive and tensile strength, said pieces being cut and bent to shape and secured together by welding the edges of some plates against the flat surfaces of other plates, shrunk tie-rods engaged with said base and extending through said columns to secure said parts together, a sliding ram supported by said columns, an actuating shaft supported by said columns, and an operative connection between said shaft and ram for operating the latter.

6. A power press comprising a frame including a base, upright columns and a yoke, said parts being composed of pieces of sheet metal, which pieces all have substantially the same compressive and tensile strength, said pieces being cut and/or bent to shape and secured together by welding the members of some plates against the flat surfaces of other plates, shrunk tie-rods engaged with said base and yoke and extending through said columns to secure said parts together, an actuating shaft journaled in bearings at the upper end of the frame, a ram slidably mounted on said columns and composed of pieces of sheet metal formed to shape and secured together by welding, and an operative connection between said shaft and ram for operating the latter.

7. A power press comprising a base formed from pieces of sheet metal welded together, columns supported on said base, each of said columns being composed of sheet metal bent to shape and having their edges secured together by welding, a yoke to connect the upper ends of said columns, tie-rods engaged with said yoke and base and extending through said columns to secure said parts together, a shaft mounted in said frame, a ram composed of guides, spacing plates and filling blocks secured together by welding, a die plate secured to the ends of the spacing plates by welding, and a pitman operatively connecting said shaft and ram for operation of the latter.

8. A power press comprising a frame including a base formed from pieces of sheet metal welded together, columns supported on said base and each composed of sheet metal bent to shape to form a hollow structure, a yoke to connect the upper ends of said columns, rods extending through said yoke and columns and base for securing said parts together, said frame having openings through which to heat the rods to shrink them to withstand a predetermined force applied to said frame.

9. A power press comprising a base including end sections and a table section including hollow rectangular shaped beams located at opposite edges of said table section and extending across and supported by the end sections, a table plate supported on said beams, columns rising from said base, a yoke extending across the upper ends of the columns and resting thereon, and means for securing the columns, base and yoke together.

10. A frame for a power press comprising a base consisting of ends and a table, said ends each being composed of plates spaced apart and resting on edge with plates uniting them to form the bottom and said table comprising two hollow bars located at the front and rear edges of said table, each bar consisting of two plates spaced apart and resting on edge with a bottom plate connecting the members of each bar, said bottom plates being spaced apart, and a table plate extending across the said hollow bars on the top thereof and mounted on the upper edges of said ends, columns rising from each end of said table, and a crown mounted upon the ends of each column and secured thereto.

CORTIS F. SHERMAN.