July 20, 1965 J. C. JUREIT 3,195,449

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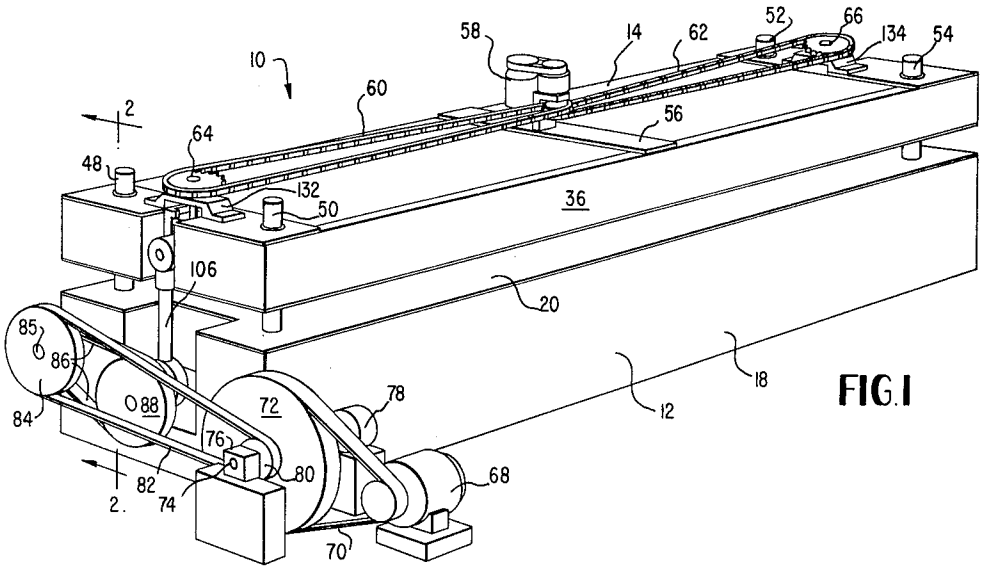


FIG. 1

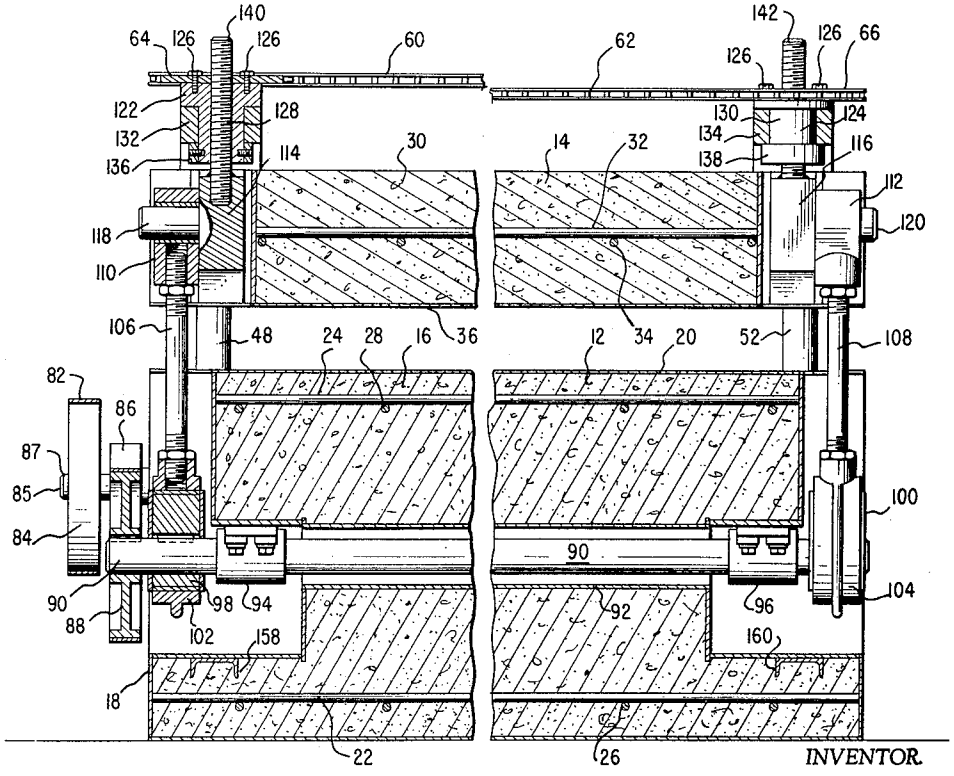


FIG. 2

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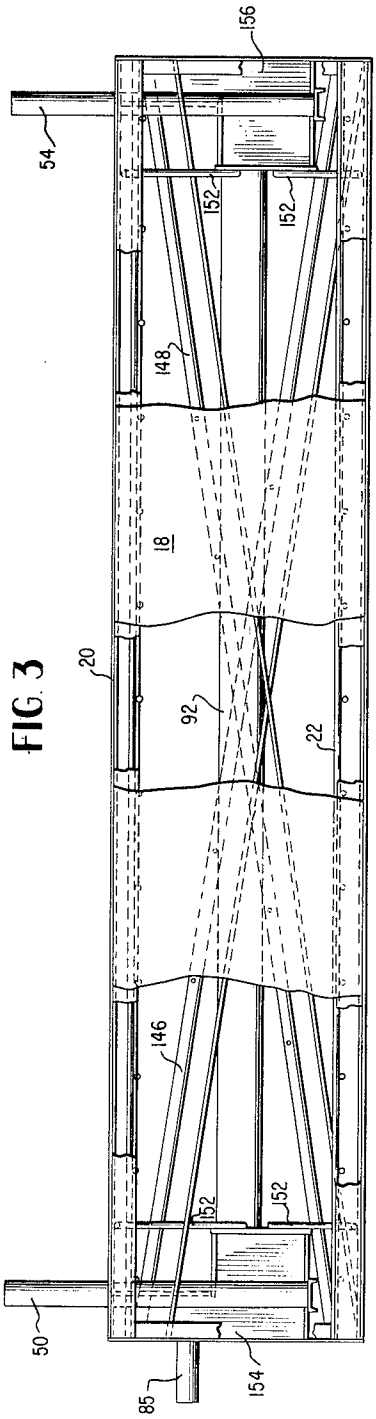


FIG. 3

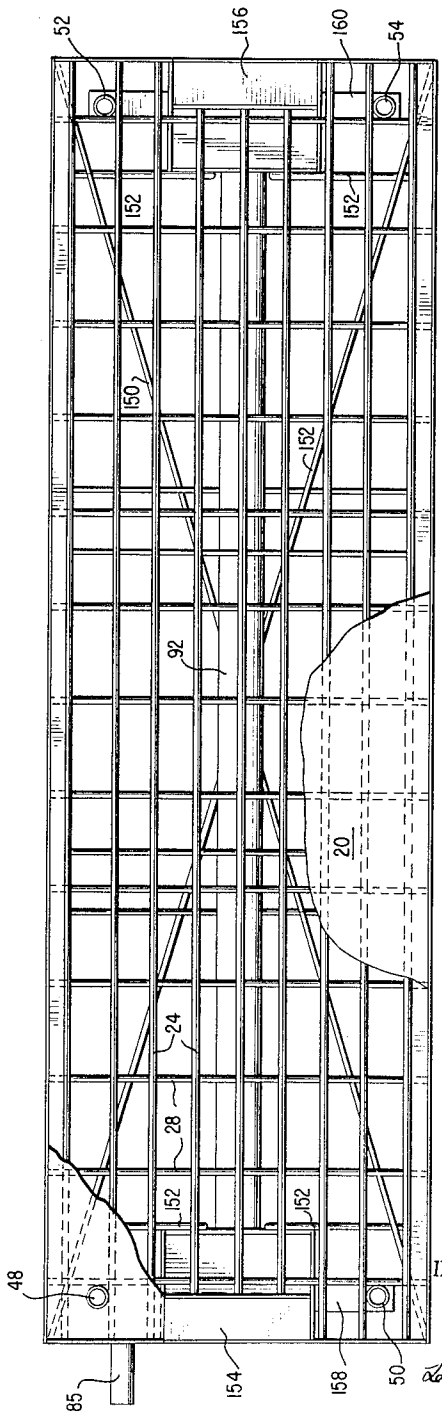


FIG. 4

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FIG. 5

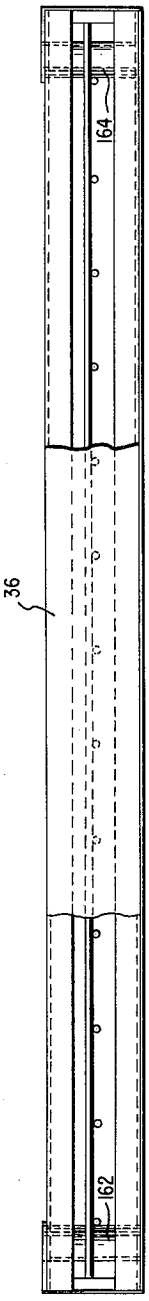


FIG. 7

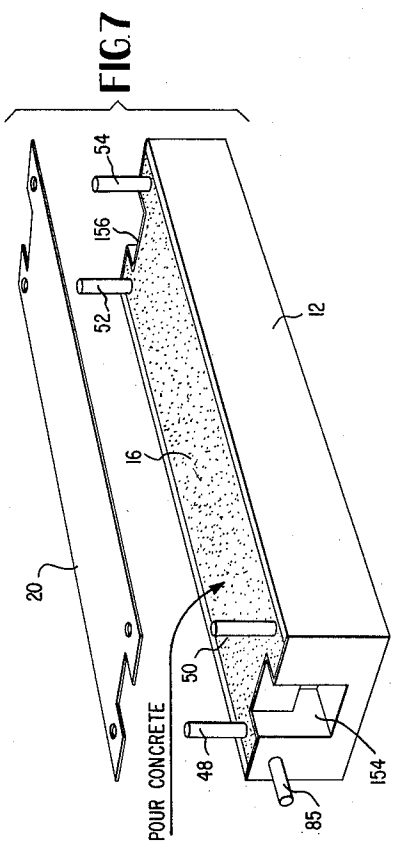


FIG. 8

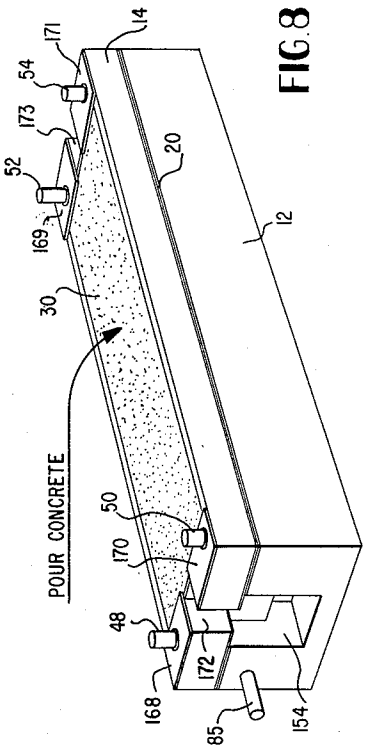
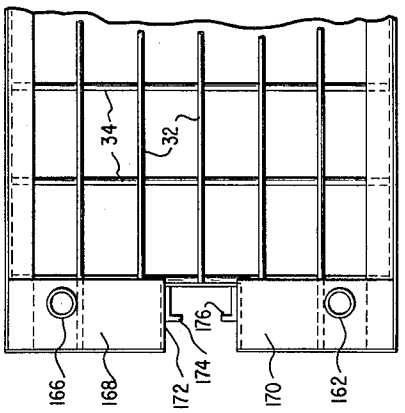


FIG. 6



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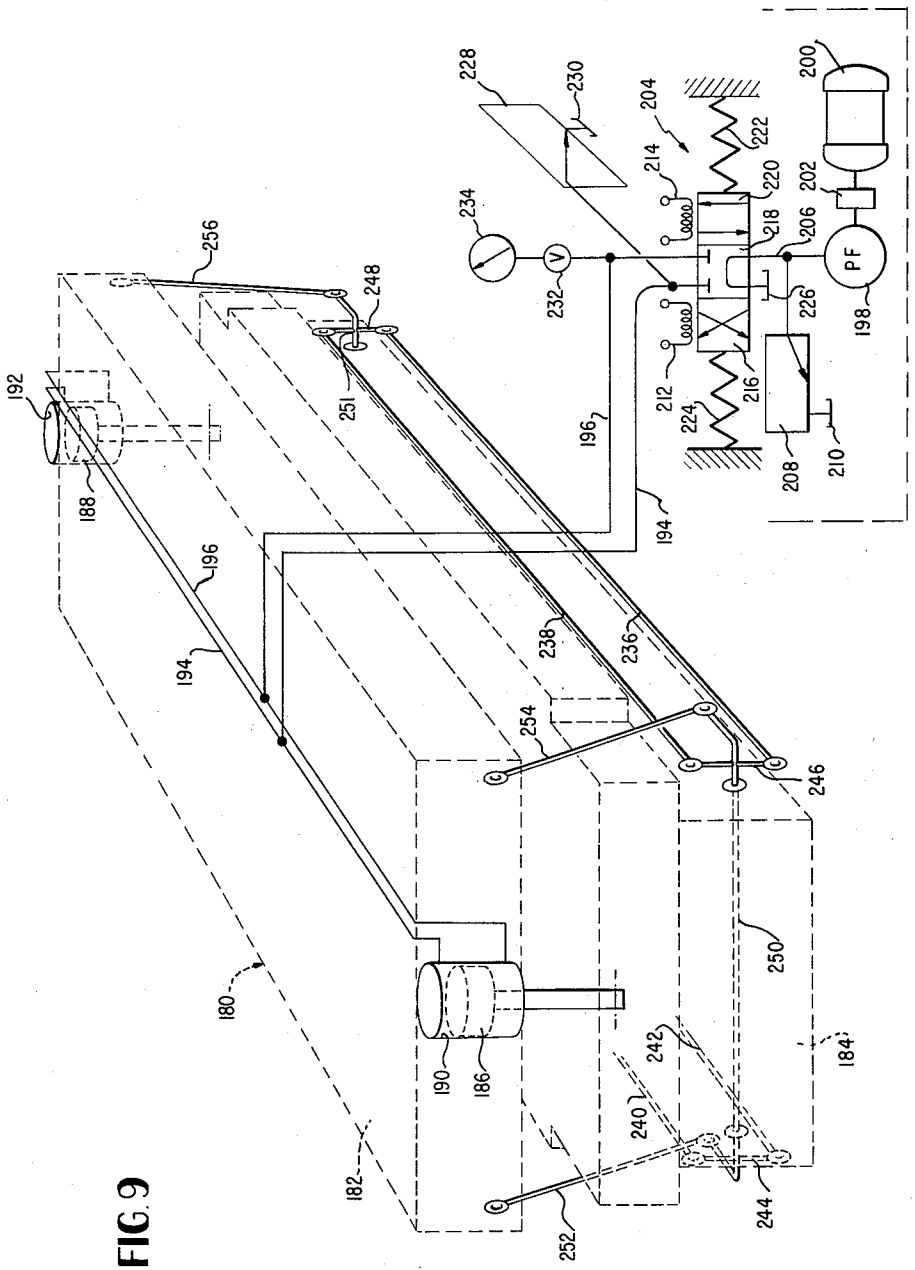


FIG. 9

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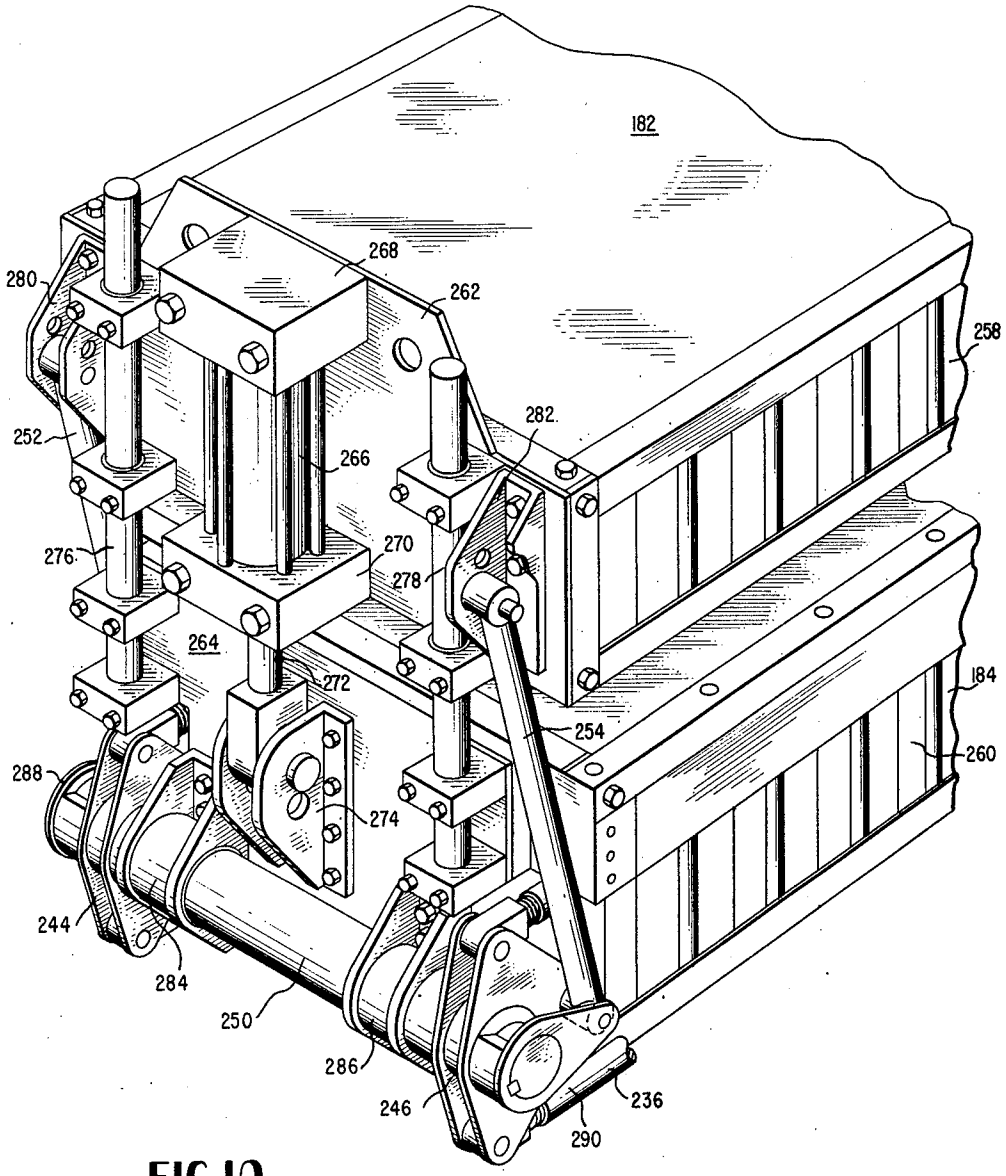


FIG. 10

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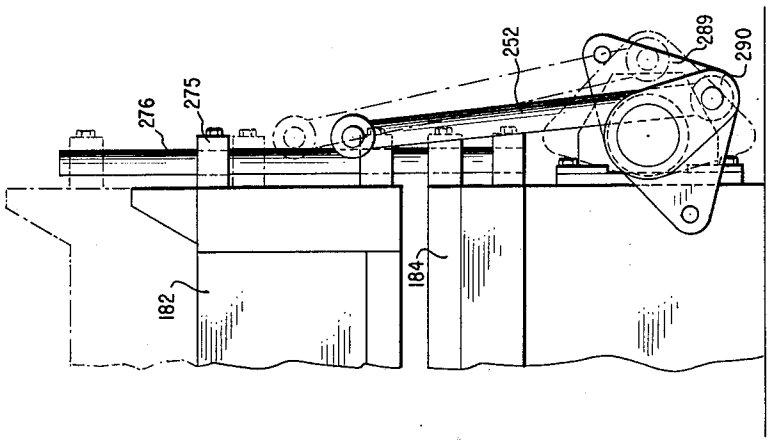


FIG. 12

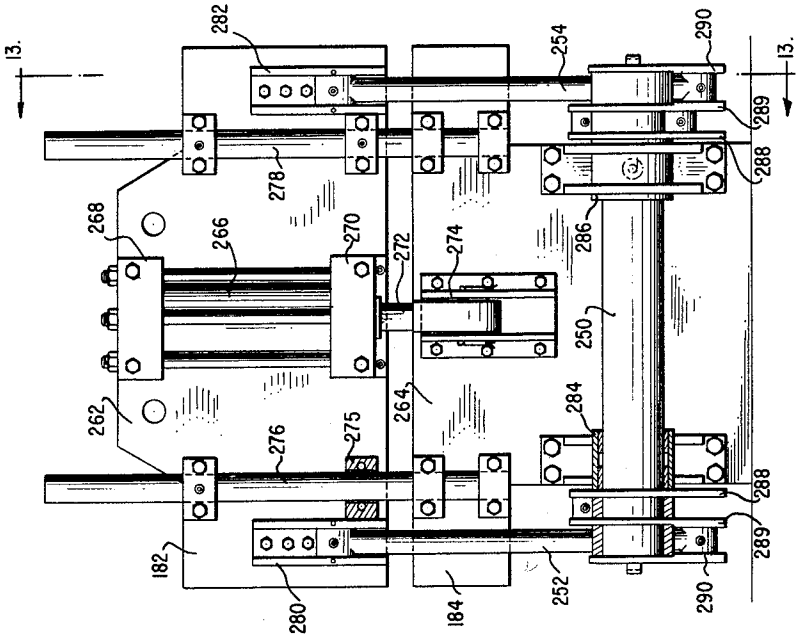


FIG. 11

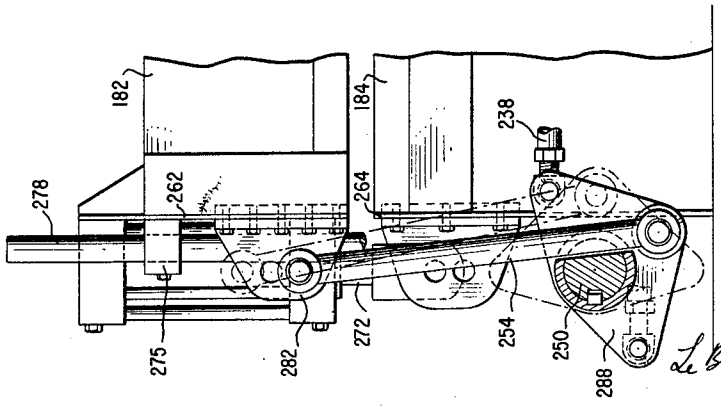


FIG. 13

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United States Patent Office 3,195,449 Patented July 20, 1965

3,195,449

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Filed May 15, 1963, Ser. No. 280,616
19 Claims. (Cl. 100—257)

This invention relates to concrete presses and more particularly to a method and apparatus for manufacturing concrete presses.

Punch presses for performing a wide variety of operations are well-known. However, insofar as applicant is aware, the present invention is the first to provide a simplified punch-type press having a movable head wherein both the base and head are formed of concrete.

In Patent No. 3,079,607, issued March 5, 1963, there is disclosed a concrete press useful in the construction of prefabricated wooden panels or trusses for use in assembling complete buildings or other structures. The present invention relates to a novel punch type concrete press, also particularly suited for use in the prefabrication of wooden panels or trusses.

In the formation of wooden structures, it has been found that one of the simplest of procedures is to lay out the timber to be used in the desired pattern, place fasteners or connectors such as that disclosed in applicant's U.S. Patent No. 2,877,520 at the junction of the timber members and then drive the fasteners into the timber members by means of a press to form rigid and solid joints. In this method, the timbers are laid out in the desired patterns and the entire timber pattern and adjacent connectors are placed in a jig which is inserted between the head and base of a large press. The head of the press moves downwardly into engagement with the assembly and drives the connectors into the timber to form the desired structure.

As is well known, the cost of transporting prefabricated and preassembled units over large distances is substantial. Because of the cost of transportation, a fairly large number of local fabricators presently supply the prefabricated building units to localized users. The raw lumber is processed and fabricated at a plant or shop reasonably near the locale of the ultimate user so as to avoid long distance hauling of the rather large prefabricated units. If time consuming and expensive hand labor is to be avoided, these local fabricators must be provided with suitable press equipment for rapidly and economically assembling the trusses, panels and the like.

An important feature of the present invention is the provision of a concrete press wherein all the mechanical parts of the press can be completely fabricated at a single central plant in the form of a relatively light framework and associated drive equipment and transported in that form to the local fabricators who may then assemble and form the complete press with a minimum of time and effort. The press is formed of a lightweight metal framework which may, if desired, be completely pre-assembled and transported to the fabricator who then need only fill the framework and surrounding metal skin with concrete to have a finished press. This results in a tremendous savings in transportation costs and further enables the more intricate mechanical work and assembly to be done at the main plant, freeing the local fabricators from the technical concern for properly assembling the parts.

A further important feature of the present invention is the provision of the novel method for forming presses which completely eliminates the necessity of planing the press surfaces in order to obtain perfectly flat surfaces as in the more conventional punch presses.

It is therefore one object of the present invention to provide a novel concrete press.

Another object of the present invention is to provide a novel framework for concrete presses.

Another object of the present invention is to provide a lightweight frame for heavy presses.

Another object of the present invention is to provide a lightweight frame assembly for simplifying the on-site construction of heavy presses.

Another object is to provide a novel method of forming presses which eliminates the necessity of planing the press surfaces to obtain uniformly flat pressure faces.

These and further objects and advantages of the invention will be more apparent upon reference to the specification, claims and appended drawings wherein:

FIGURE 1 is a perspective view of a novel press constructed in accordance with the present invention.

FIGURE 2 is a partial vertical section taken along line 2—2 of FIGURE 1.

FIGURE 3 is a front elevation with parts broken away showing the metal framework for the base of the press shown in FIGURE 1.

FIGURE 4 is a plan view of the metal framework of FIGURE 3.

FIGURE 5 is an elevation with parts broken away showing the metal framework for the head of the press of FIGURE 1.

FIGURE 6 is a partial plan view of the metal framework of FIGURE 5.

FIGURE 7 illustrates one step in forming the concrete press of the present invention.

FIGURE 8 illustrates a further step in forming the novel concrete press of the present invention.

FIGURE 9 is a diagrammatic view of a hydraulically-driven concrete press constructed in accordance with the present invention.

FIGURE 10 is a detailed perspective view of one end of the hydraulic press of FIGURE 9.

FIGURE 11 is an end view of the hydraulic press structure of FIGURE 10.

FIGURE 12 is a partial side view of the press; and

FIGURE 13 is a partial cross section taken along line 13—13 of FIGURE 11.

Referring to the drawings and particularly to FIGURES 1 and 2, there is shown a mechanically driven punch type press constructed in accordance with the present invention generally indicated at **10**, comprising a stationary base **12** and movable head **14**. As best seen in FIGURE 2, the base **12** is formed of concrete **16**, surrounded on the bottom and sides by a relatively thin metallic skin **18**. Once the concrete **16** has hardened and cured, the top of the base is covered by a thin metal sheet **20** welded or otherwise suitably secured to the sides of skin **18**. Imbedded in the concrete center of the base are lower longitudinal reinforcing rods **22** and similar upper rods **24**. A plurality of corresponding lower transverse reinforcing rods **26** and upper rods **28** are similarly imbedded in the concrete **16** of the base.

The head likewise comprises a central filler **30** of concrete in which are imbedded a plurality of longitudinal reinforcing rods **32** and corresponding transverse reinforcing rods **34**. Concrete filler **30** is surrounded on the bottom and sides by a metallic skin **36** similar to the skin **18** of the base.

Four guide posts **48**, **50**, **52** and **54** extend upwardly from the four corners of the base **12** and the head **14** is slidably received over these four posts to move upwardly and downwardly over the stationary base **12**. A transverse plate **56** across the top of the head supports an electric motor **58** which in turn drives a pair of silent chain-type belts **60** and **62** to rotate a corresponding pair of pulleys **64** and **66** which act to adjust the shut height of the press.

The press is driven by a suitable motor **68** which by

way of example only may be a three horsepower electric motor. The motor **68** drives a belt **70** again preferably of the silent chain type which is reeved around a flywheel **72**. The flywheel **72** is mounted on a suitable hollow shaft coupled in a conventional manner through a clutch and brake assembly indicated at **78** to coaxial inner shaft **74** journalled in bearing **76**. Mounted on the shaft **74** is a small pulley **80** over which passes a silent chain belt **82** which is in turn connected to a larger pulley **84** rotatable on stub shaft **85**. A further decrease in rotational speed is obtained by means of an additional belt **86** received around a smaller wheel mechanically linked with the wheel **84** by rotatable sleeve **87**, which belt passes around a further larger wheel **88**.

Wheel **88** is keyed to an elongated central shaft **90** passing longitudinally through the middle of the base **12**. The shaft **90** passes through in a central circular sleeve **92** and is rotatably supported by two or more bearings **94** and **96**. A pair of eccentric cams **98** and **100** are keyed to the opposite ends of shaft **90** and rotate in their respective housings **102** and **104**. Threadably received in the top of housings **102** and **104** are drive rods **106** and **108**, the other ends of which are threadably received in pivot blocks **110** and **112**.

Slidably received in a pair of rectangular channels at each end of the head **14** are rectangular guide blocks **114** and **116**. Formed integral with the guide blocks are stub shafts **118** and **120** pivotally received through the pivot blocks **110** and **112**. Pulleys **64** and **66** are rigidly connected to rotors **122** and **124** by means of screws **126**. Each of the rotors is provided with a shank **128** and **130** rotatably journalled in brackets **132** and **134** secured to suitable plates on top of the head. Secured to the lower ends of the rotor shanks by set screws are bearing rings **136** and **138**. Each of the rotors **122** and **124** threadably engages a screw **140** and **142** each of which is rigidly secured at its lower end to one of the guide blocks **114** and **116**.

In operation, the flywheel **72** is continuously driven by the electric motor **68**. Suitable actuation of the clutch-brake mechanism **78** causes the clutch to engage so as to drive shaft **74** and through the pulley end belt system, the elongated central shaft **90**. This causes the eccentric cams to move from the uppermost or rest position illustrated in FIGURE 2 so as to draw the drive rods **106** and **108** downwardly to pull the head **14** of the press towards the base **12**. Downward movement of the rectangular guide blocks **114** and **116** with respect to the head **14** is resisted by the brackets **132** and **134** so that the entire head moves downwardly with the drive rods **106** and **108**. Upon completion of a revolution of the eccentric cams **90** and **100**, the head is returned upwardly to the rest position illustrated in FIGURE 2, the clutch disengaged and the shaft **74** braked to a halt. The clutch and brake mechanism automatically gives one revolution and disengages itself at the top of the stroke after making one pressing cycle. The operation of the flywheel drive in conjunction with the clutch and brake mechanism is conventional in punch press drive operation and further description of these elements is deemed unnecessary.

In order to adjust the shut height of the press, electric motor **58** on top of the head is actuated and rotates the pulleys **64** and **66** simultaneously in the same direction so as to move the brackets **132** and **134** and hence the entire head upwardly or downwardly along screws **140** and **142** as desired with respect to the now stationary guide blocks **114** and **116**. In this way it is possible to adjust the rest position distance between the head and base and hence adjust the minimum clearance or shut height of the press by means of the electric motor **58**.

FIGURES 3 and 4 are side elevation and plan views respectively with parts broken away showing the lightweight framing structure for the base **12** of FIGURE 1. The entire framework is formed of angle irons along

the top and bottom edges as well as the end edges with the bottom and four sides covered by the metal skin **18**. FIGURE 3 illustrates the top metal sheet **20** in place. In addition to the longitudinal upper and lower reinforcing bars and the upper and lower transverse reinforcing bars previously described, the base framework includes a pair of criss-crossing angle irons along each side of the base, two of which are illustrated at **146** and **148** in FIGURE 3. In addition, a pair of diagonal rods **150** and **152** are provided which extend from one lower corner of the framework to adjacent the diagonally opposite upper corner. These two diagonal reinforcing rods cross just below the central sleeve **92**. Supporting bars **152** are welded to the sides of the framework and support housings **154** and **156** at each end of the base for housing the eccentric cams and central shaft bearings. A pair of channels **158** and **160** are secured to the underside of the housings **154** and **156** and these channels support the corner posts **58**, **50**, **52** and **54**.

FIGURES 5 and 6 are a similar side elevation and partial plan views respectively with parts broken away showing the light metal framework for the head **14** of FIGURE 1. Again the structure is formed from edge and corner angle irons covered on the bottom and four sides by a metal skin **36**. Longitudinal reinforcing rods **32** and transverse reinforcing rods **34** serve to act as reinforcing for the concrete and also strengthen the framework. The framework is provided with four sleeves, two of which are indicated at **162** and **164** in FIGURE 5 for receiving the respective corner posts of the base. A third sleeve **166** can be seen in FIGURE 6 and the four sleeves are supported from four plates secured to the upper four corners of the head framework, two of the plates being illustrated at **168** and **170** in FIGURE 6. Each end of the head is provided with a large slot such as **172** including a pair of elongated angle members **174** and **176** for guiding and retaining the guide blocks such as guide block **114** of FIGURE 2.

Referring to FIGURES 7 and 8, these two figures show the successive steps for pouring the concrete **16** of the base and the concrete **30** of the head. In FIGURE 7 the hollow framework of the base **12** is filled with concrete **16** which surrounds and encases the imbedded reinforcing members previously described. After the concrete has hardened metal plate **20** is slipped over the guide posts **48**, **50**, **52** and **54** and secured to the top angle irons of the base by any suitable means such as welding. Referring to FIGURE 8, the head **14** is then slipped over the guide posts **48**, **50**, **52** and **54** and lowered into position to rest against the top plate **20** of the base. The head **14** is then filled with concrete **30** and this concrete is hardened and cured. The head and base of the press are then complete and the actuating equipment is then attached.

An important feature of the method illustrated in FIGURES 7 and 8 is the fact that the concrete of the head being separated from the base only by the thin metal skin of the head is effectively cast against the top of the base so as to automatically result in parallelism between the adjoining surfaces of the head and base. This parallelism is not to be confused with flatness and the base may have slight curvature and some waves to it, but any such waviness is cast into the head as well and automatically gives parallelism. This parallelism is all that is required to be able to place and properly form a connector joint at two or more places in the press covering different areas at the same time.

The importance of the above parallelism can be appreciated when it is understood that it is usually necessary in making steel ribbed plate for conventional steel presses to plane these after welding to get parallelism. Of course, in the planing process, flatness as well as parallelism is obtained, but as pointed out above, it is not necessary in the concrete press to obtain flatness since in driving connector plates into lumber to form a truss or the like the

jig can distort slightly to accommodate for the lack of flatness as the jig moves through the press and the lumber of the truss will stand a slight deformation to accommodate this slight lack of flatness. The elimination of planing for parallelism constitutes a substantial economy in the manufacture of the presses of the present invention.

FIGURE 9 shows in schematic form a modified embodiment of the novel concrete press of the present invention wherein the press is hydraulically actuated. In FIGURE 9 the press indicated generally by dashed lines at **180** comprises a head **182** and a base **184**. The head and base both comprise a light metal framework filled with concrete and assembled in the manner of the mechanically actuated press previously described. The head **182** is movable with respect to the base **184** by means of a pair of hydraulic pistons **186** and **188** slidably received in the movable piston chambers **190** and **192** formed in opposite ends of the head **182**. A pair of hydraulic lines **194** and **196** alternately supply pressurized fluid to opposite sides of the pistons **186** and **188**.

Hydraulic fluid from a suitable source is pressurized by a pump **198** driven from electric motor **200** by way of a variable speed gear box **202**. Fluid from the pump outlet passes to a four-way, three-position control valve **204** by way of hydraulic line **206**. The pump output is also connected to a high pressure relief valve **208** having a relief outlet **210** connecting either to a suitable sump or to the input side of the pump **198**.

Control valve **204** is a solenoid valve having two actuating coils **212** and **214** and is made up of three sections **216**, **218**, and **220**. The valve is biased to its center or neutral position as shown by a pair of springs **222** and **224**. Section **220** is the forward or press section, section **216** is the reverse or return section and the center **218** is a neutral position where the input line **206** is connected directly to the sump or return outlet **226**.

The output side of the control valve **204** connects to extensions of the hydraulic lines **196** and **198**. Line **196** is also coupled to a low pressure relief valve **228** having a sump or return outlet **230** while line **196** is connected through a manual valve **232** to a pressure indicator **234**.

When one of the windings **212** or **214** is energized the solenoid valve **204** moves to the left, compressing spring **224** and bringing the forward section **220** between the inlet and outlet so that high pressure fluid is supplied through line **196** to the underside of the pistons **186** and **188** driving the head downwardly towards the base **184** to produce a pressing operation. Conversely, when the other winding is energized the solenoid valve **204** moves to the right compressing spring **222** and bringing the reversing section into communication with the valve inlet and outlet so that high pressure is now supplied through line **194** to the areas of chambers or cylinders **190** and **192** above the piston causing the head to rise and return to its uppermost rest position.

In order to keep the press head **182** parallel to the base **184** at all times, a mechanical linkage between the base and head is provided and includes parallel tension rods **236** and **238** extending along one side of the base and similar parallel tension rods **240** and **242** extending along the opposite sides of the base. These tension rods are pivoted to the opposite ends of four vertical levers at the four corners of the base, three of which are indicated at **244**, **246**, and **248**. These levers form part of a bell crank lever arrangement including a pair of transverse shafts extending through opposite ends of the base, one of which is indicated at **250**. These shafts are rotatably journalled in the base and pivoted to four drive rods, three of which are indicated at **252**, **254** and **256**. These drive rods are pivoted at their other ends to the head **182** and the entire mechanical linkage acts to keep the press head **182** parallel to the base **184** at all times.

FIGURE 10 is a perspective view of one end of the hydraulically driven press of FIGURE 9 and shows the details of the mechanical linkage. FIGURES 11–13 are end, side and cross sectional views of the press structure shown in FIGURE 10. It is understood that the opposite end of the press is of similar construction to that illustrated in FIGURES 10–13. The head **182** and the base **184** is of a light metal framework construction filled with reinforcing and concrete in the manner previously described. In the press of FIGURE 10 the side skins, rather than being flat, are formed with rectangular corrugations illustrated at **258** and **260**. The base is slightly undercut on each side to provide clearance for the tension rods and end plates **262** and **264** are secured to the ends of the head and base respectively. Hydraulic cylinder **266** is mounted on the head end plate **262** by means of blocks **268** and **270** and slidably receives the piston carried by piston rod **272**. The other end of the piston rod is pivoted to the base end plate **264** by means of a mounting bracket **274**. A pair of guide posts **276** and **278** are slidably received in guide blocks such as **275** secured to the end plate **262**. These posts are rigidly secured to the base end plate **264**.

The upper ends of drive rods **252** and **254**, forming a part of the mechanical linkage are secured to the head end plate **262** by U-shaped brackets **280** and **282**, a portion of the latter being broken away in FIGURE 10 to illustrate the pivotal connection. Rotatable horizontal shaft **250** is journalled in bearings **284** and **286** secured to the base end plate **264**. Levers **244** and **246** take the form of three spaced flat plates **288**, **289** and **290**, all keyed to the shaft **250** and rotatable therewith. Plates **289** and **290** are pivotally connected to the lower ends of the drive rods **252** and **254** and plates **288** and **289** are similarly connected to the tension rods.

In operation, when the head **182** is driven downwardly by the hydraulic fluid in cylinder **266** the drive rods **254** are placed in compression and cause the shaft **250** to rotate. The corresponding shaft **251** at the opposite end of the base rotates in the same direction and the tension rods in conjunction with the levers being pivotally connected at four corners act as a parallelogram linkage to maintain parallelism between the base and head. Any tendency for the head to be thrown out of parallelism during the press operation throws either the upper or lower tension bar, such as bar **236** or **238** into tension acting in a direction to restore parallelism. Because of the fact that one of the bars always acts in tension to resist tilting, these elongated bars need not be unusually heavy, but only sufficient to resist substantial tension forces along the length of the press. Of course, when one of the bars is placed in tension due to the parallelogram nature of the construction, the other bar is placed in compression, but the bars have sufficient length and flexibility so that the bar under compression is free to bow slightly without in any way adversely affecting the restoring action of the bar under tension.

Upward movement of the head during the return portion of the cycle causes both shafts **250** and **251** to rotate in the opposite direction simultaneously and likewise during this portion of the press cycle operation, the mechanical linkage acts to maintain balance through the tension bars extending along the sides of the base and the drive rods such as rods **252**, **254** and **256**. During the return stroke these latter rods are under tension and since these rods must withstand not only tension but compression, they are substantially thicker and stronger than the tension bars along the sides of the base.

It is apparent from the above that the present invention provides a novel concrete press of relatively simple inexpensive construction and one that may be fabricated at a main plant and completed by simple attachment of a package type drive apparatus and the pouring of concrete near the site of the ultimate user. In this way, the component parts may be shipped independent of the concrete which makes up the bulk of the material and weight of the press. In one form, the drive mechanism for the

punch type press takes the form of a mechanical drive while in a second embodiment the press is hydraulically driven. However, in each case, both the head and base of the press are made of a light metal framework surrounding concrete and in each case the concrete of the head is poured with the head resting on the base so that the adjacent surfaces of the press in each embodiment need not be planed for parallelism. By this method of assembly and construction parallelism is automatically obtained. Concrete presses exerting forces of as much as forty tons or more can be constructed according to this invention.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A press for use in fabricating wooden structures comprising a head and base each formed of relatively light framework filled with concrete, and means for moving said head relative to said base.

2. A press for use in driving connectors into wooden structures comprising a base, a head operatively connected with said base for pressing an article therebetween, said base and head each being formed of relatively light metal framework filled with concrete, and means for moving said base toward and away from said base.

3. A press according to claim 2 wherein said moving means comprises a mechanical punch press drive.

4. A press according to claim 2 wherein said moving means comprises a hydraulic punch press drive.

5. A press for use in fabricating wooden structures comprising a base, a head operatively connected with said base for pressing an article therebetween, said base and head each being formed of a light metal framework surrounded on the bottom and sides by a metal skin and filled with concrete, and punch press drive means coupled to said head for reciprocating said head toward and away from said base.

6. A press according to claim 5 including a thin metal plate covering the top of said base.

7. A press for driving metal connectors into wooden structures comprising a reinforced concrete base and head each surrounded by a relatively thin metal skin, said head being operatively connected with said base for pressing an article therebetween and punch press drive means coupled to said head for reciprocating said head toward and away from said base.

8. A press according to claim 7 including motor means for adjusting the shut height of said press.

9. A press for use in fabricating wooden panels or trusses comprising a hollow metal base filled with concrete, a plurality of guide posts projecting upwardly from said base, a hollow metal head filled with concrete and slidably received over said posts, and drive means coupled to said head for reciprocating said head toward and away from said base.

10. A press according to claim 9 wherein said drive means includes an elongated rotary shaft passing longitudinally through said base and mechanically coupled to opposite ends of said press.

11. A press according to claim 9 including a mechanical linkage coupled to said base and head for maintaining said head parallel to said base.

12. A press for use in fabricating wooden panels comprising a base including a reinforced metal framework surrounded on the bottom and sides by a metal skin and filled with concrete, a metal plate covering the top of said base, a head including a reinforced metal framework surrounded on the bottom and sides by a metal skin, guide posts extending upwardly from the four corners of said base, sleeves in said head slidably received over said guide posts, a rotatable shaft passing longitudinally through said base, drive means coupled to said shaft, eccentric cam means carried by the opposite ends of said shaft, and drive rods pivotally connecting said cam means to said head whereby rotation of said shaft acts to reciprocate said head towards and away from said base.

13. A press according to claim 12 wherein said drive rods are pivotally connected to guide blocks slidably mounted in said head, screw means connected to said guide blocks, a pair of brackets rigidly mounted on opposite ends of said head, pulley means rotatably mounted in said brackets and threadably receiving the upper ends of said screw means, an electric motor mounted on said head, and belt means coupling said electric motor to said pulley means whereby rotation of said pulley means about said screw means acts to raise and lower said head with respect to said base.

14. A press for use in fabricating wooden panels comprising a base including a reinforced metal framework surrounded on the bottom and sides by a metal skin and filled with concrete, a metal plate covering the top of said base, a head including a reinforced metal framework surrounded on the bottom and sides by a metal skin, guide posts extending upwardly from the four corners of said base, means on said head slidably received over said guide posts, a hydraulic chamber mounted on each end of said head, hydraulic pistons coupled to said base and slidably received in said chambers, and means for alternately supplying pressure fluid to opposite sides of said pistons to reciprocate said head toward and away from said base.

15. A press according to claim 14 including end plates mounted on said head and base, said hydraulic chambers being secured to said head end plates, a mechanical linkage for maintaining said head paralliel to said base comprising rotary shafts mounted on said base end plates, drive rods coupling the opposite ends of said rotary shafts to said head, and a parallelogram mechanical coupling extending along the sides of said base and joining the respective ends of said rotary shafts.

16. A press according to claim 15 wherein said parallelogram coupling comprises a pair of elongated tension bars on each side of said base, said tension bars being pivotally coupled to the opposite ends of levers carried by said rotary shafts.

17. A method of forming the head of a press including a base and head comprising providing a hollow head structure and filling said head structure with concrete while said head rests against said base.

18. A method of forming a press comprising providing a hollow base structure, filling said base structure with concrete, providing a hollow head structure, filling said head structure with concrete, and causing the concrete filling said head structure to be cured with said head structure resting against said base structure.

19. A method of forming a press comprising pouring concrete into the open top of a hollow base, covering the top of said base with a thin metal plate, resting a hollow head on top of said plate, filling said head with concrete, and causing said concrete in said head to cure and harden with the bottom of said head resting on said plate.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,195,449 July 20, 1965

John C. Jureit

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 70, for "plate" read -- platen --.

Signed and sealed this 26th day of April 1966.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents