

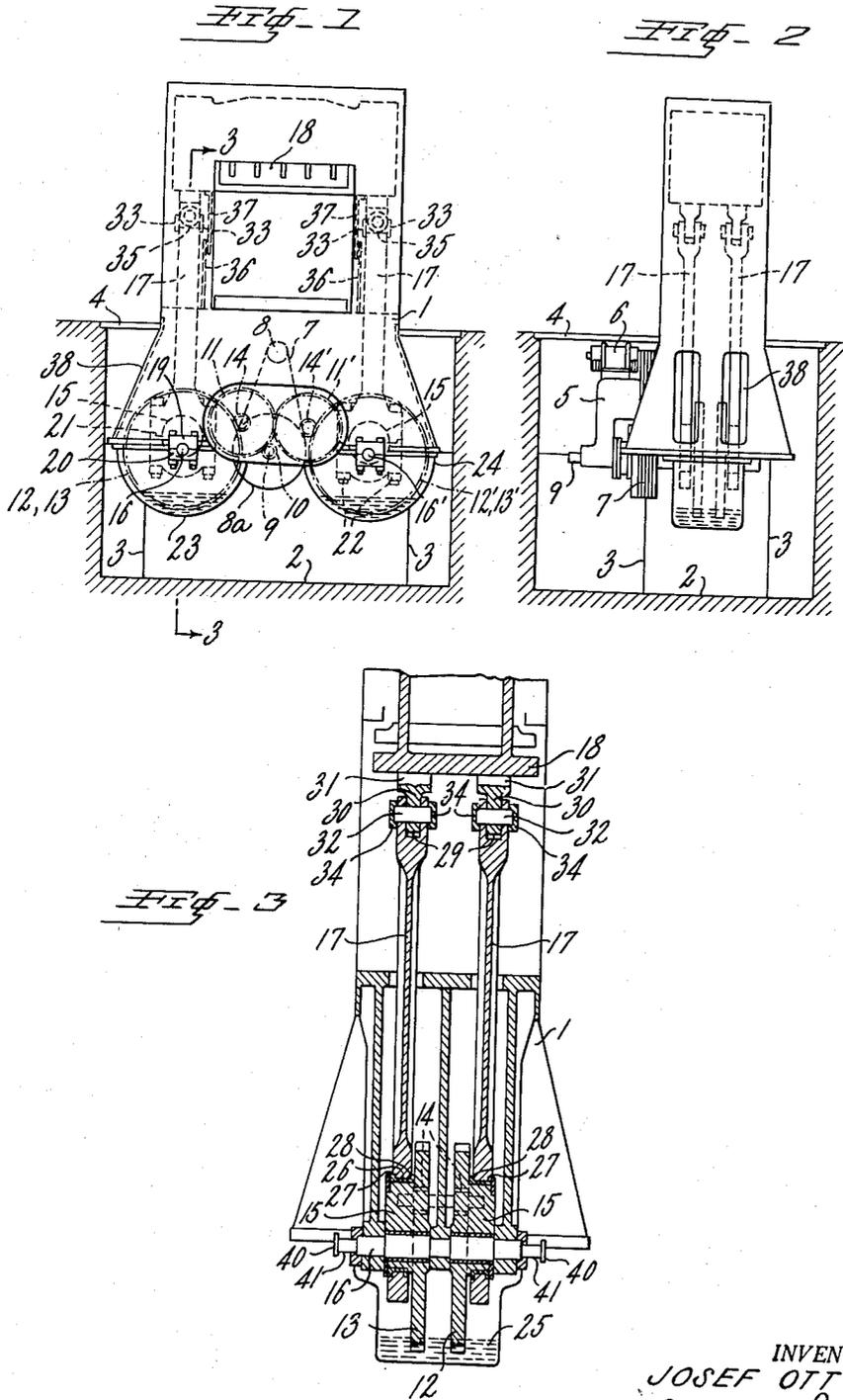
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PRESSES

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PRESSES

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This invention relates to presses, especially eccentric presses, with bottom drive, preferably an under floor drive. Presses with under floor drive are known, and have the advantage that the overall height of the space in which they are erected may be lower than in the case of presses with overhead drive. Generally, in the known bottom drive presses the main drive shaft extends longitudinally of the press, but a construction is known with a bottom drive transverse shaft in which the power transmission from the transverse shaft to the punch is obtained in an awkward manner by means of levers and links whereby the direction of drive is deflected to the point where it would be applied by overhead drive had such been used.

According to the present invention the press has a bottom drive from a transverse shaft and driving means are provided conveying the drive from transverse shafts to the movable tool carrying press element (punch) without deflection of the drive direction.

Presses with bottom drive and without deflection of the power direction are known, but only with a drive from a longitudinal drive shaft and not with a transverse shaft drive. Compared with the known constructions, that of the present invention, while retaining the advantages of the known bottom drive constructions, achieves the further advantage that the supports, for equal working pressures, can be made substantially lighter. The direct transmission without deflection of the power direction makes possible a construction requiring comparatively few components. Since the power is applied over the shortest paths, the supporting elements, for equal working pressure of the press, can be made of less strength than is possible in the known constructions. Above all, the construction according to the invention requires smaller and shallower foundation wells than those necessary in the known constructions.

In one embodiment of the invention eccentrics are provided on transverse shafts and operating connections between the transverse shafts and the movable press element is obtained by connecting rods, preferably connecting rods with divided heads. Preferably the eccentrics are integral with the gear wheels directly driving them, which increases the rigidity of the assembly.

The use of divided connecting rod heads makes it possible to employ for mounting of the connecting rods on the eccentrics, bearing bushes with reinforced profile at both ends, for example, bushes of U-shape cross-section, which have good resistance to deformation.

A further feature of the invention consists in that the drive gears of a plurality of eccentrics arranged on a transverse shaft, are driven by one common pinion integral with the shaft, whereby a simultaneous gear drive is imposed.

According to a further feature of the invention means transmitting motion from the transverse shafts to the movable press element, may be, for example in the form of connecting rods and are separated by partitions or the

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like from the space enclosed by the press supports. To this end, for example overlapping sheet metal plates may be provided, one of which is attached to the press table and the other to the movable press element. This prevents foreign bodies, such as tools and the like, from falling through the openings of the table traversed by the drive transmitting means, into the gear housing below.

A still further feature of the invention resides in the formation of closable openings in the front of the press table through which the connecting rods can be withdrawn.

A further feature of the invention resides in the enclosure of the lower drive members within a plurality of separably removable housing parts, which makes these members very conveniently accessible.

Further features of the invention will be apparent from the following description of a constructional example, illustrated in the drawings, and from the claims.

In the drawing:

Fig. 1 is a front elevation of a press constructed in accordance with the invention.

Fig. 2 is a corresponding side elevation, and

Fig. 3 is a section on an enlarged scale taken on line 3—3 of Fig. 1.

The table 1 of the press is supported at its four corners in a foundation well or pit 2, on columns 3 and the bottom drive of the press is inside the pit, that is, below the floor level 4. A driving electric motor 6, Fig. 2, is fixed on a convenient part of the press frame, for example a flanged bracket 5, which motor drives through a V belt 7 and grooved pulley 8, a shaft 9 journaled transversely to and in the pit. The shaft 9 carries a pinion 10 meshing with a gear 11 which gear and pinion constitute a speed reduction gear. The shaft of gear 11 forms a pinion 14 common to the eccentric drive gear wheels 12, 13. The gear 11 meshes with a gear 11' of equal diameter whose shaft forms a common drive pinion 14' for the eccentric drive gear wheels 12', 13'. Each of the gear wheels 12, 13 and 12', 13' is integral with an eccentric 15, and the eccentrics and wheels are mounted on shafts 16, 16' supported in the frame. The bearings of the shafts 16, 16' are divided, that is the upper bearing halves are separate members 19 fixed to the frame, and the bearings are completed by lower bearing halves 20 attached to the upper halves. All the aforesaid shafts extend parallel to each other and transversely to the frame of the press.

The drive is transmitted from the eccentrics 15 by connecting rods 17, four being shown in the present example, to movable tool carrying press elements (punches) 18 guided in the press uprights, which press elements may be of conventional structure and provided if desired with ejecting means. The lower heads of the connecting rods are divided along joints 21 and the parts connected by bolts 22, an arrangement which makes it possible to remove all the parts from below. The division of the shaft bearings in halves 19, 20, and preferably also of the connecting rod heads, makes it possible to use shouldered shafts 16 with their most highly stressed portions of larger diameter. The ends of the shafts 16 project out and are adapted to be suspended, being provided for this purpose with collars 40 and reduced portions 41. This facilitates erection and dismantling. The housing enclosing the lower drive members is divided into a plurality of units each separately removable, two of which 23, and 24, are shown. These well type housing portions contain oil baths 25 in which run the wheels 12, 12' and 13', 13'. The eccentrics 15 run in bearing bushes 26 having reinforcing ribs 27, 28 at both ends and being U-shaped in cross-section. Since the connecting rods are divided, these bushings can be readily inserted.

The upper ends of the connecting rods 17 are formed as oil baths and also with recesses 29 in which engage

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extensions 30 of bolts 31 fixed, preferably with possibility of adjustment, in the movable press element 18. The extensions 30 are journalled on bearing pins 32 mounted in the connecting rod head. In the present example the recesses 29 are milled through and are closed oil tight at the ends by cover plates 33. Other oil tight cover plates 34 on the connecting rod heads close the bores for the bearing pins 32 from the outside, so that the recesses 29 can receive an oiler 35.

On uprights of the frame are attached sheet metal plates 36 which overlap sheet metal plates 37 fixed to the movable press element 18. The plates 36, 37 constitute walls enclosing the space around the press frame from the vertical space in which the connecting rods 17 move.

Openings 38 are provided in the sloping front wall of the frame, which may be closable, through which the connecting rods 17 can be removed after they are lowered to the bottom of the foundation well.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. A power transmission for a press having a reciprocably movable tool carrying element and a rectangular frame comprising, in combination, substantially centrally arranged drive shaft means extending in transverse direction to the longitudinal axis of said frame and journalled thereon, two pairs of connecting rods attached to opposite ends of said tool carrying element, gear means disposed at opposite sides of said drive shaft means and operatively connected thereto for rotation in opposite directions, eccentric means, gear wheel means in mesh with said gear means, respectively, respective adjacent eccentric means and gear wheel means being connected with each other, said eccentric means being joined to a respective pair of said connecting rods, whereby said gear wheel means are disposed intermediate the connecting rods of each pair, and shaft means for each pair of said adjacent eccentric means and said gear wheel means and extending sub-

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stantially parallel to said drive shaft means and journalled in said frame, whereby a concentrated and balanced drive transmission is afforded to said tool carrying element.

2. A power transmission for a press having a reciprocably movable tool carrying element and a rectangular frame comprising, in combination, substantially centrally arranged drive shaft means extending in transverse direction to the longitudinal axis of said frame and journalled thereon, two pairs of connecting rods attached to opposite ends of said tool carrying element, respective gear means disposed at opposite sides of said drive shaft means and operatively connected to the latter for rotation in opposite directions, gear wheels means in driving connection with said gear means, respectively, eccentric means connected to a respective pair of connecting rods, said gear wheel means being disposed intermediate said connecting rods of said pair thereof and being integral with said eccentric means, and shaft means for each respective pair of said gear wheel means and journalled in said frame substantially parallel to said drive shaft means, said eccentric means and said gear wheel means being positioned on said shaft means and being concentrically rotated from said drive shaft means, whereby a substantially balanced drive transmission is afforded to said tool carrying element.

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