A. N. VERDIN & W. H. KAPPES.

INCLINABLE PUNCHING PRESS.

APPLICATION FILED SEPT. 30, 1910.

1,013,339.

Patented Jan. 2, 1912.

3 SHEETS—SHEET 1.

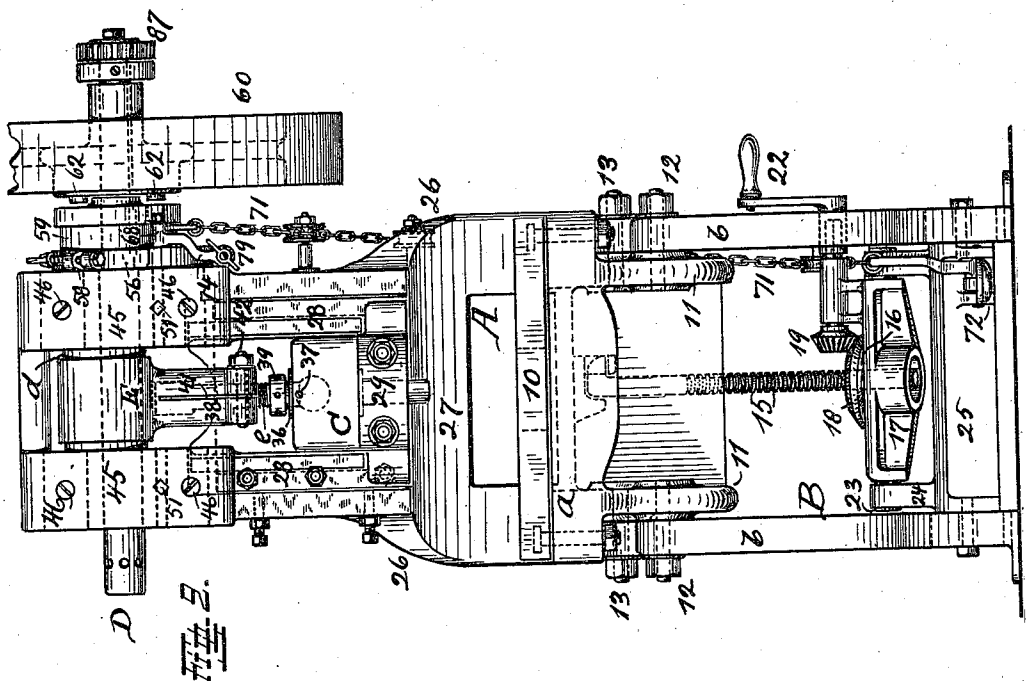

Fig. 2.

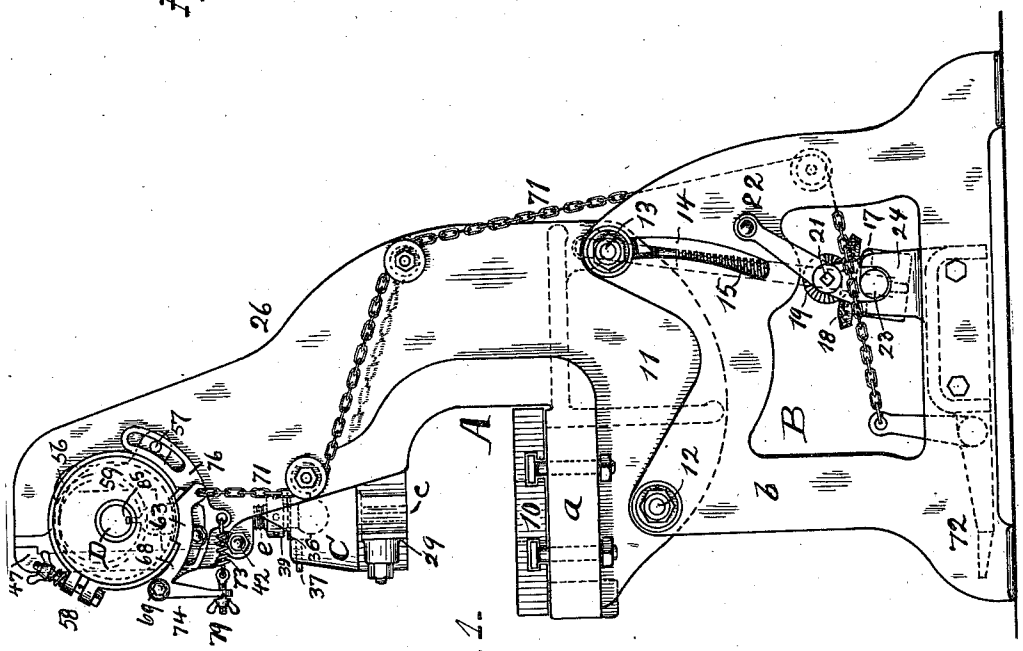

Fig. 1.

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Fig. 3.

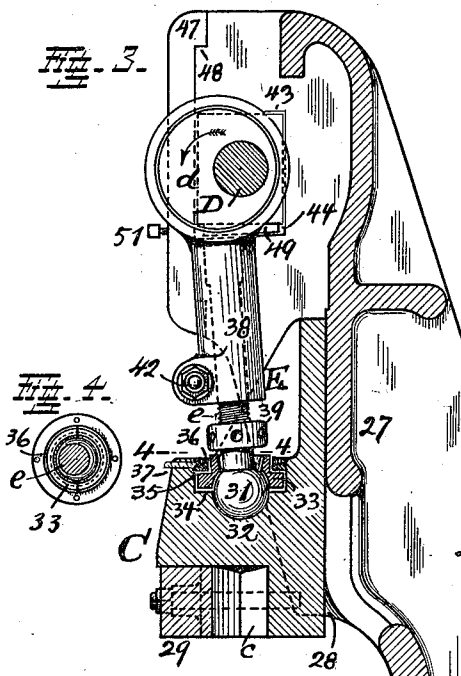


Fig. 4.

Fig. 5.

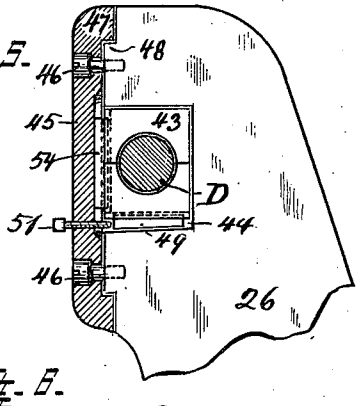


Fig. 6.

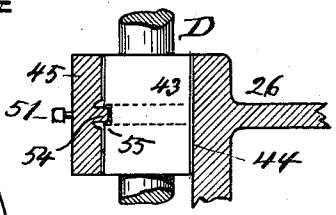
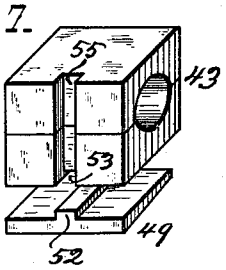


Fig. 7.



Witnesses.
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3 SHEETS—SHEET 3.

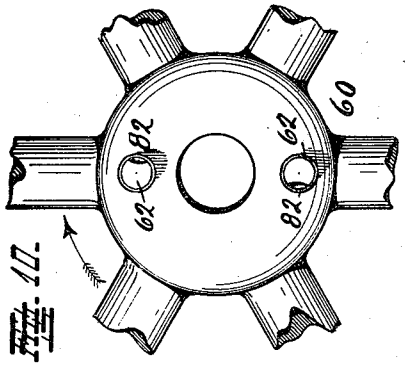

Fig. 10.

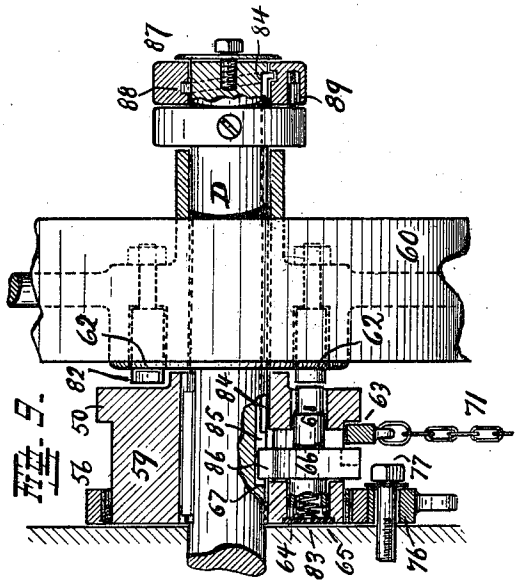

Fig. 9.

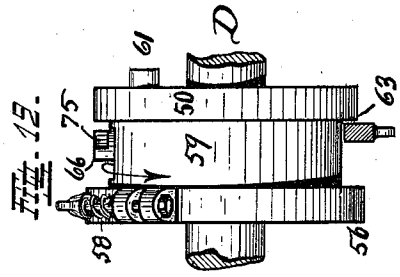

Fig. 12.

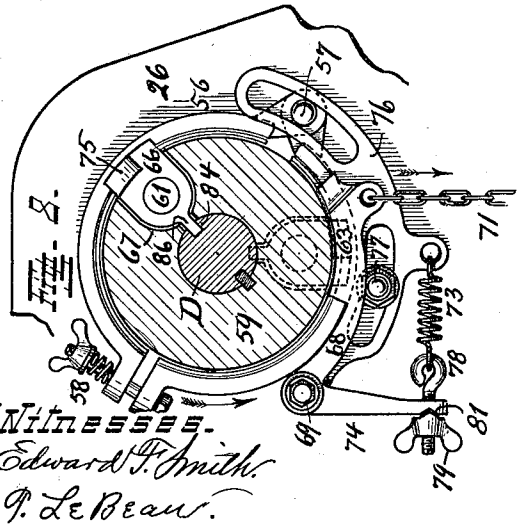

Fig. 8.

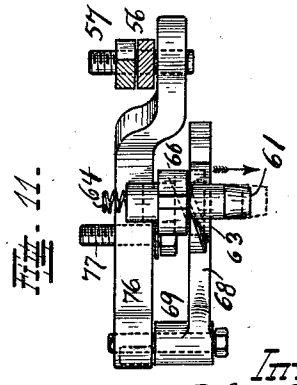

Fig. 11.

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UNITED STATES PATENT OFFICE.

ALOIS N. VERDIN AND WILLIAM H. KAPPES, OF GLENDALE, OHIO, ASSIGNORS TO VERDIN, KAPPES & VERDIN, OF CINCINNATI, OHIO, A FIRM.

INCLINABLE PUNCHING-PRESS.

1,013,339. Specification of Letters Patent. Patented Jan. 2, 1912.

Application filed September 30, 1910. Serial No. 584,618.

To all whom it may concern:

Be it known that we, ALOIS N. VERDIN and WILLIAM H. KAPPES, citizens of the United States, and both residing at Glendale, Hamilton county, State of Ohio, have invented certain new and useful Improvements in Inclinable Punching-Presses; and we do declare the following to be a clear, full, and exact description of the invention, attention being called to the three sheets of drawings which accompany this application and form a part thereof.

This invention relates to inclinable punching presses, operated by power and concerns improvements in the construction of certain parts of such presses, these parts being more particularly the means for supporting and for manipulating the inclinable frame part, the ram, the bearings for the main-shaft and a clutch-device.

In the following specification and particularly pointed out in the claims at the end thereof, will be found a full description of our invention, together with its operation, parts and construction, which latter is also illustrated in the accompanying three sheets of drawings, in which:—

Figure 1, is a side-elevation of the press, the means (pulley) for driving the shaft being omitted. Fig. 2, is a front-view of the press. Fig. 3, is an enlarged, vertical, central cross-section of the same. Fig. 4, is a horizontal section on line 4—4 of Fig. 3. Fig. 5, is a side-view of one of the shaft-bearings partly in section. Fig. 6, is a horizontal section through the bearing. Fig. 7, shows a perspective view of the box forming part of this bearing and an adjusting wedge used in connection therewith. Fig. 8, is an enlarged cross-section of the clutch. Fig. 9, is a longitudinal section of the same, its moving parts being shown in inoperative position. Fig. 10, shows the side of the hub of the driving wheel contiguous to the clutch. Fig. 11, is a top-view of certain parts of the clutch shown in Fig. 8, it being essentially parts provided below the clutch-ring. Fig. 12, is a side-elevation of the clutch as shown in Fig. 9 and in operative condition.

In the drawing, A indicates the frame of the press proper, *a* being the bed thereof upon which rests the bolster 10 which supports the lower die (not shown). The bolster is arranged to permit detachable and adjustable connection of this die, to render it interchangeable. From the underside of this bed there project two vertical ribs 11 which are fitted between two opposite, parallel frame-members *b b* of the base-frame B to which latter this frame A is pivotally connected, screws 12 being used for the purpose, which are seated near the front-side of the frames. Toward the rear there are clamping screws 13 seated in ribs 11 and occupying curved slots 14, one in each side of frame B and concentric to pivots 12. These screws serve, when tightened so as to impinge with their heads against ribs *b* of base-frame B, as one of the means to hold the adjustable press-frame to the base-frame in any particular position to which it has been adjusted. A screw 15 which, in conjunction with a nut 16, is used to obtain this adjustment, serves as an additional means to support the adjustable frame, the same resting directly upon the upper end of said screw, which end is hingedly connected. Nut 16 is seated for rotation in a bridge 17 and constructed to form on its outside a bevel-gear-wheel 18, fitted to mesh in another gear-wheel 19, also carried on bridge 17. The free end of shaft 21 of this latter gear-wheel is so arranged and located as to extend into a position which permits removable attachment of a handle 22 in convenient position for manipulation. The ends of bridge 17 form gudgeons 23 and are supported in bearings 24 provided on base-frame B, or on a brace-member 25 which forms a part of this frame. It will now be seen that while screw 15 moves longitudinally in consequence of rotation of nut 16, this latter may also tilt and readily adjust itself to the different axial positions which screw 15 assumes, due to the changing position of the press-frame. Observe dotted lines in Fig. 3. In all these various positions, screw 15 remains radial to the center of its pivotal support. Clamping screws 13 are eased when this screw-mechanism is operated for the purpose of adjusting the position of the press-frame.

Above bed *a* there are two upright side frames 26 connected transversely by a frame-web 27, having on its front-side suitable guide-ways 28 which serve to hold the ram, or slide C, to the path of its reciprocating movement. On its underside this slide is provided with a socket C which

serves to receive and to hold the upper dies or the stem of a punch, (not shown) a cap 29 being used in connection for this purpose. Ram C is reciprocated by a shaft D to which it is connected by a pitman E, the connection at both ends of this latter being an articulated one, and eccentric as to the shaft, a crank or equivalent eccentric *d* being used at the particular end of the pitman. At the other end of this pitman a ball and socket-joint is used, 31 being the ball. The socket is formed by two, transversely divided complementary parts, the lower one of which shown at 32 is contained in the ram, it being in form of a semi-globular recess. The upper part consists of a cap 33, seated upon the upper part of ball 31 to which it is fitted. The apex of this cap is sufficiently open to permit the pitman to pass through. This cap occupies a cylindrical recess 34 provided above the lower socket part 32, this latter above its upper edge, being circumferentially enlarged for the purpose. The cap is in two axially divided sections to permit it to be placed into recess 34 and around the pitman. Its upper part is circumferentially reduced to form a shoulder 35 and to make room for a screw-ring 36, which is threaded into the upper part of recess 34 and serves to hold the cap in socket-forming position. Wear of this joint may be taken up by adjusting this screw ring, after which this latter is secured in adjusted position by a set-screw 37.

The pitman consists of two parts joined to each other with a screw-connection to permit adjustment of its length and of the position of the ram with reference to the lower die. For such purpose the lower part *e* of the pitman above ball 31 is externally screw-threaded and fitted into the upper, tubular part 38. Between the lower end of the screw-thread and the ball the pitman is enlarged to form a turning head 39, which permits application of a suitable tool for rotating this screw-threaded part of the pitman when the length of the same is to be adjusted. The upper part 38 of the pitman has a longitudinal slit 41 extending from its lower end upwardly, so that by means of a clamping-screw 42 the lower part of the pitman may be firmly gripped to hold the adjustment.

Shaft D is supported in cubical boxes 43 contained in recesses 44, one in the front-side of each of the upright frame-parts 26 and near their upper ends. These recesses are closed after the boxes are in position by caps 45, held in place by screws 46. The caps serve also as ties by bonding the metal together on both sides of the recesses above and below the boxes therein, they being provided for such purpose at each end with a hook 47, which hooks engage shoulders 48, one formed on each side of each recess. In this function, these caps counteract any tendency of the metal around the recesses to spread, due to the stress to which the side-frames are subjected in resisting the thrust of the ram. In height, recesses 44 exceed the boxes, the excess being occupied by a wedge 49 which may be manipulated by a set-screw 51 and whereby wear in the shaft-bearings may be compensated. Lateral displacement of these wedges is prevented by a key 52 and groove 53, one on each wedge and the other in each box. Lateral displacement of the boxes is likewise prevented by a key 54 and groove 55, one on each cap 45 and the other in each box. In addition to the advantage of thus off-setting the stress which the thrust of the ram creates in these side-frames, this manner of constructing the shaft-bearings is also of advantage in attaining perfect accuracy in building and assembling these presses. One of the sides in a recess, either below or above the boxes therein may be planed in perfect alinement with the corresponding side in the opposite recess, and also parallel to the bed of the press, all of which may be done with one continued operation without shifting the frame-casting on the machine-tool (planer). The result is that two perfectly alined surfaces are obtained on which the shaft-bearings may be alined in trueness to each other and parallel to the bed of the press.

Tendency of the ram-operating shaft to vibrate when the press does heavy work is counter-acted by a leather-lined friction brake 56, consisting of two, semi-circular sections, hingedly connected to each other and at their hinged ends also connected to the press frame to be held against rotation. One screw 57 serves for both purposes. At their free ends they are held to each other by a spring-yielding, adjustable screw-connection 58. By means of this connection the degree of frictional contact of the brake may be adjusted. This contact may be with the shaft direct or with an interposed element rigidly connected to the shaft. The latter construction is preferred, since thereby also a larger contact is obtained and accordingly ring 59 of the clutch device is used for this purpose, said ring being rigidly connected to the shaft so as to rotate with the same.

60 is the driving-wheel loosely mounted upon the shaft and close to the clutch-ring, it being a belt-pulley and fly-wheel combined. Operative connection between the clutch-ring and the pulley is had by pins, there being one 61 carried by the clutch ring and one or more 62 in the contiguous side of the hub of the driving-wheel, all these pins being equidistant from the center of the shaft so that, when one projects into the

path of one opposite it, driving contact results and operative connection is established. For such purpose the pin in the clutch-ring is supported to be movable longitudinally and may occupy either a position in which it is out of contact with the pins on the driving-wheel as shown in Figs. 2 and 9, or one in which it projects into the rotary path of these pins as shown in Figs. 8 and 12, the former position being its normal one. This normal position is a restrained one, a wedge-shaped clutch-dog 63, holding pin 61 out of contact with pins 62 and against the expansive action of a compression spring 64 which occupies a recess 65 in the clutch-ring and back of the inner end of pin 61. This clutch-dog acts upon pin 61 by engaging a slide-block 66 which forms a lateral enlargement of pin 61, occupying a recess 67 in the clutch-ring and beyond the periphery of which it projects. Therefore if dog 63 is moved away from in front of the slide-block, spring 64 becomes active and by expelling pin 61 causes the same to project into the path of the pins on the driving-wheel as shown in Figs. 8, 11 and 12. For such purpose dog 63 forms a part of an arm 68 pivotally supported at 69 and connected by means of a chain 71, directed by suitable guide-pulleys to a conventional treadle 72. A spring 73 acting upon an arm 74 which extends angularly from arm 68 restores this arm dog 63 and the treadle to their respective normal positions. This occurs as soon as action on treadle 72 ceases, after which the wedge-shaped dog moves against the periphery of the clutch-ring, in which position it comes to lie in the path of a complementary, inclined surface 75 on the slide-block, which in due time and as illustrated in Figs. 8 and 11 encounters this wedge on the dog. This contact causes the slide-block to recede and to move pin 61 on it out of engagement with the pins on the driving-wheel. Immediate stoppage of rotation of shaft D is the result of this contact and the consequent disengagement of the pins. The clutch-dog is backed against the contact which causes this disengagement, by means of a flange 50 on clutch-ring 59 and against the inside of which it is positioned and which takes off any lateral strain upon the pivotal connection of arm 68 on which this dog is carried and due to such contact. For obvious reasons such stoppage of shaft-rotation should be so as to leave the ram in its high position and therefore the position of the clutch-dog is so located with reference to the position of shaft-eccentric *d* that this object is attained, due regard being also had to render convenient connection of the treadle-chain possible. Difference in the kind of work performed, variation in the speed of the driving-wheel, etc., as well as convenience in constructing, assembling and adjusting of the press make it desirable that this position of the clutch-dog is adjustable within certain limits and therefore pivot 69, which supports arm 68, is carried on a bracket 76 which is adjustably connected to the press-frame. This bracket is preferably shaped to form substantially a fragment of a circle concentric with the clutch-ring, so as to permit it to be fitted closely against the circumference of the same without waste of space. It has slots concentric with this clutch-ring to receive the attaching means, they being screws 57 and a clamping-screw 77. By loosening this latter, the bracket with the clutch-dog may be shifted circumferentially with reference to the face of the clutch-ring so that the clutch-dog may meet within limits any position of the slide-block where the same projects from this face. As will be seen in Fig. 11, this bracket, near one end, is bent outwardly to extend over the hinged ends of the brake-sections, it serving in this connection also as a means to hold the brake against lateral displacement. One end of spring 73 also connects to this bracket, so that this entire clutch-dog mechanism is self-contained on this bracket and all parts move with it during its adjustment. The other end of spring 73, connects to a screw 78, loosely seated in the end of arm 74. By means of a nut 79 mounted on said screw, the tension of spring 73 may be adjusted to regulate the treadle-action. The base of this nut is pointed as shown, so that when turned into a notch 81 in arm 74 it becomes locked. Pins 62 on that side where they come in contact with pin 61 are flattened concavely as shown at 82, so as to increase the contact with pin 61 in the clutch-ring. When worn on one side these pins may be turned, additional concaves being provided. The free end of pin 61 is slightly reduced in diameter as shown so that in case it is battered out of shape, it will still freely move in and out of the clutch-ring without sticking. Recess 65 back of pin 61 is air-vented by means of an opening 83 to prevent air-resistance from interfering with the prompt movement of the clutch-pin. Re-adjustment of the length of the treadle-chain becomes necessary when the press is tilted and which may be done in any obvious manner.

It becomes frequently necessary to move shaft D by hand, for setting and adjusting of dies, for which purpose one end of this shaft is extended at one side of the press, the left one as shown, to permit application of a turning implement (lever). In order to render such rotation possible without making it necessary to stop the driving-wheel, yet preventing at the same time this wheel from acting upon the shaft which would occur as soon as such hand-manipu-

lated rotation of shaft D carries the restrained slide-block with the clutch-pin beyond the clutch-dog which holds it back, we provide a safety hold-out device which consists of a push-rod 84 fitted into a guide-way 85, cut into shaft D. It extends at its inner end into recess 67 and reaches clear out to the end of the shaft. A tongue 86 on slide-block 66, projects into this guide-way 85, so as to be within reach of the end of push-rod 84 and subject to possible actuation of the same. Normally, the position of the push-rod is as shown in Fig. 9, in which position it has no effect upon the clutch. When it is desirable to kill the action of the clutch, this rod 84 is moved in against tongue 86, whereby the clutch-pin is positively held out of reach of pins 62, no matter whether slide-block 66 is opposite clutch-dog 63 and restrained by it or not. For this movement of rod 84 we use a knob-wheel 87, which has an internal cam-groove 88 into which the end of rod 84 is hooked. It is mounted to rotate on the end of shaft D and according to the direction of its rotation, acts either upon slide-block 66 by means of rod 84, or does not affect the same. A frictional locking-pin 89, spring-actuated, holds this wheel in either position.

Having described our invention, we claim as new:

1. In an inclinable punching press, the combination of a base-frame, a press-frame provided with the press-operating parts pivotally connected near the front of its lower part to said base-frame, a screw hingedly connected to this lower part of the press-frame and depending therefrom rearwardly of the pivotal connection of said frame, a nut mounted on said screw, a tiltable support on which this nut is supported for rotation and means to rotate this nut to adjust the position of the press-frame on its hinged connection by means of said screw, after which the press-frame, when adjusted, rests on its hinged connection and on said screw.

2. In an inclinable punching-press, the combination of a press-frame, a ram and its operating mechanism mounted on it, a base-frame to which the press-frame is pivotally connected, a screw hingedly connected to the press-frame, a nut mounted on it, a frame-member having gudgeon-journals and on which this nut is seated for rotation, supports for the journals of this frame-member, a gear-wheel provided on the nut, another gear-wheel intermeshing therewith and means to rotate this latter gear-wheel.

3. In a punching-press, the combination of a die-supporting press-bed, spaced, upright frame-parts above this press-bed and disposed with their front sides at right angles thereto, ram-guide ways provided on these frame-parts and recesses formed in their front-sides with a projecting shoulder above and below each recess, boxes forming shaft-bearings fitted to these recesses, a ram-operating shaft mounted in these boxes, a ram operatively connected to this shaft and fitted to the guide-ways mentioned and caps secured against the front-sides of the upright frame-parts to close the recesses therein and to hold the boxes in position and having hooks formed on them adapted to engage the shoulders above and below the recesses to tie the upright frame-parts above and below the boxes in the direction of the thrust of the ram.

4. In a punching-press, the combination of a die-supporting press-bed, spaced upright-members thereon each provided with a recess in its front-side, the lower and upper sides of one recess being alined with the corresponding sides of the other recess and all being planed parallel to the press-bed, boxes divided parallel to this latter and forming shaft-bearings occupying these recesses and fitted to their alined sides, a ram-operating shaft mounted in these boxes and caps to hold these boxes in these recesses.

5. In combination with the frame of a press, a ram-operating shaft supported thereon, a driving-wheel loosely mounted on this shaft, a clutch-ring rigidly mounted on said shaft and adjacent to the wheel, a friction brake fitted around the clutch-ring to regulate rotation of the ram-operating shaft, complementary clutch-pins carried on this latter and on the driving wheel, the pin on the clutch-ring being adjustable and spring-actuated, a clutch-dog which controls the action of the adjustable clutch-pin and a bracket secured to the press-frame on which the clutch-dog is supported and which also confines the friction-brake in position.

6. In combination with the ram-operating shaft of a press, a driving-wheel and a clutch-ring, both adjacently mounted on said shaft, the former loosely and the latter rigidly, complementary clutch-pins on wheel and ring, the pin on the latter being spring-actuated and adjustable with reference to the pins on the former and adapted to be engaged by them, treadle-operated mechanism which controls the spring-imparted movement of this adjustable pin and means to positively hold this pin out of engagement with the pins on the driving-wheel and independent of the treadle-operated mechanism to positively prevent operation of the shaft during setting and adjusting of the press dies.

7. In combination with the ram-operating shaft of a press, a driving-wheel and a clutch-ring both adjacently mounted on said shaft, the former loosely and the latter rigidly, this latter having also a recess, and a groove being provided in the side of the shaft which communicates with this recess

and extends past the hub of the driving-wheel to the end of the shaft, clutch-pins on the driving-wheel, a spring-actuated clutch-pin carried in the recess of the clutch-ring capable of engaging the pins on the driving-wheel and provided with a lateral projection which extends through said recess in the clutch-ring and into the groove mentioned in the shaft, treadle-operated mechanism which controls the spring-actuated movement of this pin, a push-rod fitted into said groove in the shaft and adapted to engage with one end the projection on the movable pin and means on the other end of this rod to move it against said projection to positively hold the movable pin out of engagement with the pins on the driving-wheel and independent of the treadle-operated mechanism to positively prevent operation of the shaft during setting and adjusting of the press dies.

In testimony whereof, we hereunto affix our signatures in the presence of two witnesses.

ALOIS N. VERDIN.
WILLIAM H. KAPPES.

Witnesses:
C. SPENGEL,
T. LE BEAU.