

Oct. 19, 1926.

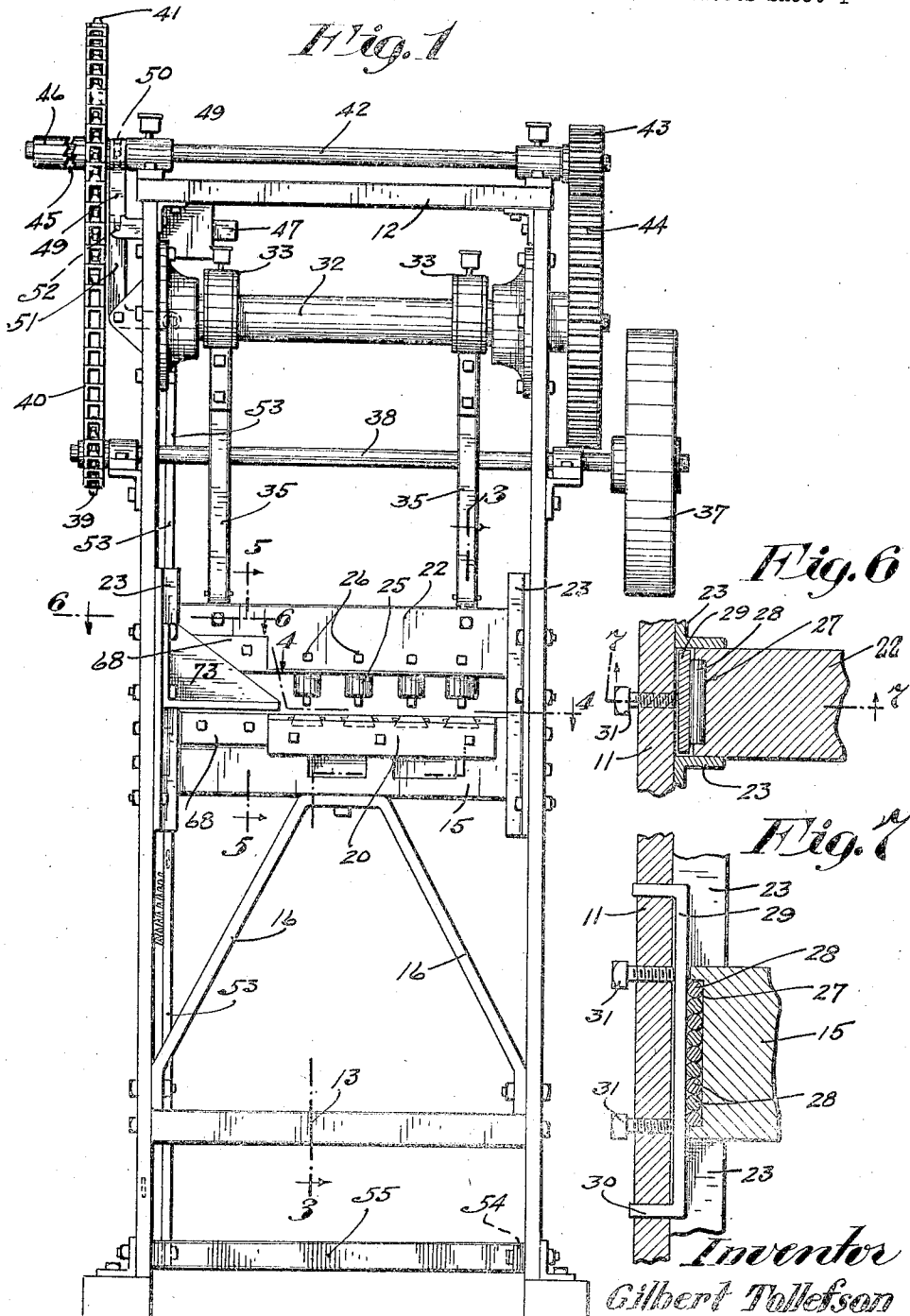
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1,603,428

PUNCH PRESS

Filed July 23, 1925

4 Sheets-Sheet 1



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Oct. 19, 1926.

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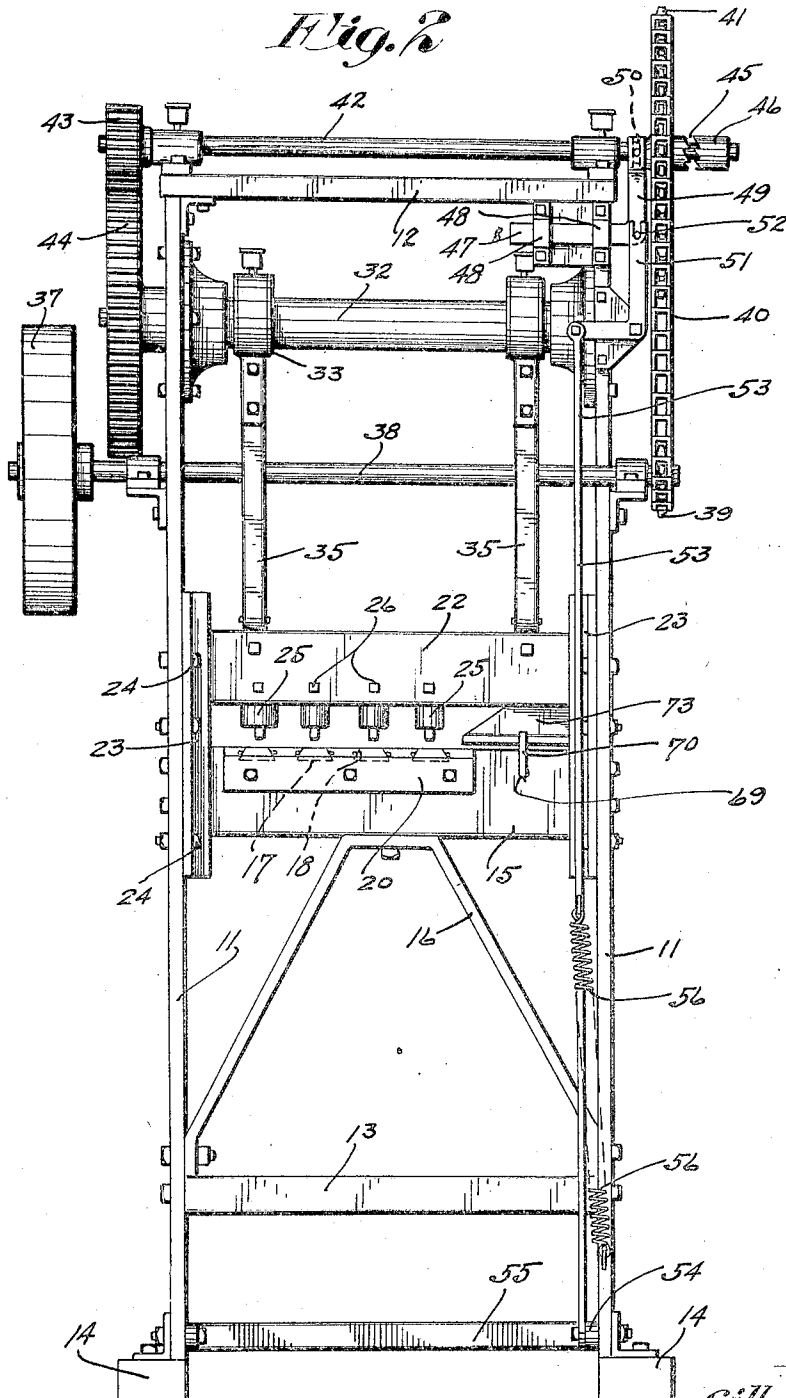
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Fig. 2



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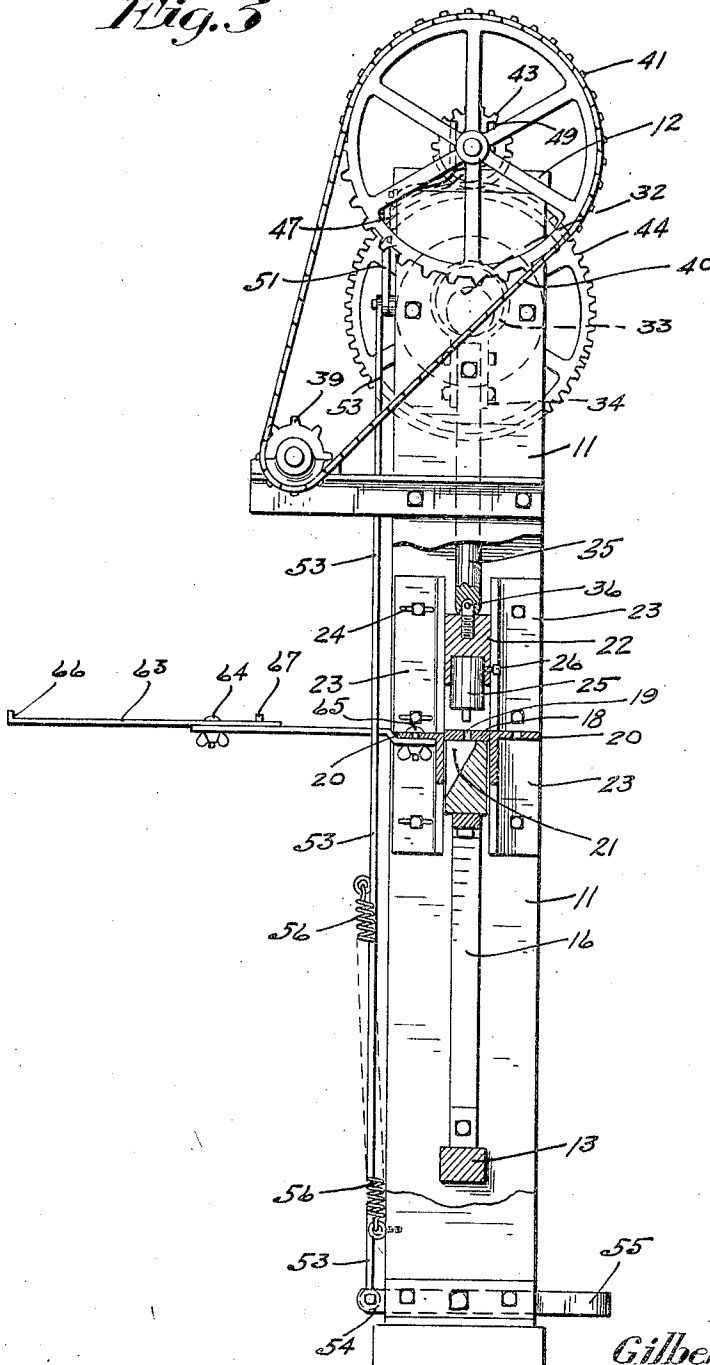
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Fig. 3



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UNITED STATES PATENT OFFICE.

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PUNCH PRESS.

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My present invention has for its object to provide a highly efficient punch press, and to this end it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a front elevation of the punch press;

Fig. 2 is a rear elevation of the same;

Fig. 3 is a view partly in left-side elevation and partly in vertical section taken on the irregular line 3—3 of Fig. 1;

Fig. 4 is a fragmentary view partly in plan and partly in horizontal section taken on the line 4—4 of Fig. 1, on an enlarged scale;

Fig. 5 is a fragmentary detail view principally in section taken on the line 5—5 of Fig. 1, on an enlarged scale;

Fig. 6 is a fragmentary detail view in section taken on the line 6—6 of Fig. 1, on an enlarged scale;

Fig. 7 is a vertical section taken on the line 7—7 of Fig. 6;

Fig. 8 is a perspective view of the gig shown in Fig. 4;

Fig. 9 is a fragmentary plan view showing the inner end portion of the stop illustrated in Fig. 5; and

Fig. 10 is a transverse section taken on the line 10—10 of Fig. 9.

The numeral 11 indicates a pair of laterally spaced upright frame bars rigidly connected by a top cross tie bar 12 and a bottom cross tie bar 13 and which bars are supported on rigidly secured heavy floor beams 14. A bed 15 in the form of a heavy horizontal beam extends between the frame bars 11 and is rigidly secured thereto at its ends. This bed 15 is further supported on a yoke-like brace 16 the legs of which diverge and are bolted to the frame bars 11 and supported on the bottom cross tie bar 13.

In the top of the bed 15 is a plurality of seats 17 which extend completely through said beam transversely thereof and in each thereof is removably mounted a plate 18 having a die seat 19. These plates 18 having dove-tailed interlocking engagement with the bed 15 and are held against endwise removal in their seats 17 by a pair of horizontal an-

gle bars 20 bolted to opposite faces of the bed 15. Escape passageways 21 are formed in the bed 15 under the seats 17 for the escape of material punched through said seats.

A cross head 22 in the form of a heavy beam is mounted for parallel raising and lowering movements over the bed 15, and is guided for such movements by pairs of laterally spaced upright angle bars 23 bolted to the inner faces of the frame bars 11. These angle bars or guides 23 extend below the beam 15 and the rear angle bars 23 have horizontal slots 24 for the bolts which secure the same to the frame bars 11, whereby they may be adjusted to take up wear on the crosshead 22 and securely hold the same against lateral movement.

A plurality of hole-punching dies 25 are removably secured to the crosshead 22 for co-operation with the die seats 19. These dies 25 have cylindrical bodies of the same diameters and are mounted in correspondingly formed seats in the under side of the crosshead 22 and detachably held therein by set screws 26. It will thus be seen that different sized dies 25 may be interchangeably mounted in the seats in the crosshead 22, and it may be here stated that the plates 18 are all of the same width so that they may be interchangeably mounted in the seats 17.

To cause the crosshead 22 to freely move vertically between the frame bars 11, the ends thereof are recessed at 27 to afford cages in which are mounted a multiplicity of vertically spaced rollers 28 which have direct contact with track bars 29 at the inner faces of the frame bars 11. These track bars 29 have laterally projecting end portions 30 slidably mounted in seats formed in the frame bars 11 and support said track bars 29 for adjustment toward and from the rollers 28. Pairs of set screws 31 have screw-threaded engagement with the frame bars 11 and impinge against the track bars 29 to hold and adjust said track bars 29 in their proper relation to the roller 28 and to take up wear.

For raising and lowering the crosshead 22 to operate the punches 25 or other tools, as will presently appear, there is journaled in bearings on the frame bars 11 a heavy horizontal shaft 32 having a pair of eccentrics 33 to which is applied eccentric straps 34 bolted to the upper ends of a pair of up-

right connecting rods 35, the lower ends of which are connected to said crosshead by hinge-acting joints 36.

The following connections are provided for driving the shaft 32:

A pulley 37 over which runs a driving belt, not shown, is keyed to one end of a shaft 38 journaled in bearings on the frame bars 11 below the shaft 32, and keyed to the other end of said shaft 38 is a small sprocket wheel 39. A sprocket chain 40 runs over the sprocket wheel 39, and a large sprocket wheel 41 loosely journaled on one end of a countershaft 42 journaled in bearings on the top cross tie bar 12. On the other end of the countershaft 42 is a spur pinion 43 which meshes with a spur gear 44 keyed to the shaft 32. The sprocket wheel 41 is connected to the countershaft 42, at will, by a clutch 45 one member of which is formed with a collar 46 secured to said shaft, and the other member of which is formed with the hub of said sprocket wheel.

The following connections are provided for sliding the sprocket wheel 41 axially on the countershaft 42 to set or release the clutch 45:

A bar 47 is mounted for horizontal sliding movement in bearings 48 on one of the frame bars 11 and is provided at its outer ends with an upstanding arm 49 having a shipper fork, the prongs of which extend into an annular groove 50 in the hub of the sprocket wheel 41.

A bell crank 51 is pivoted to a bearing on one of the frame bars 11, and has one of its arms connected to the bar 47 by a notch and pin connection 52 and its other arm is connected to the upper end of a long connecting rod 53. The lower end of the connecting rod 47 is attached to an arm extension 54 on one of the arms of a U-shaped foot treadle 55 pivoted to the frame bars 11 with its transverse portion extending forward thereof.

A long coiled spring 56 anchored to one of the frame bars 11 is attached to the intermediate portion of the connecting rod 53 and under strain to move the bell crank 51, arm 49 and sprocket wheel 41 into positions to release the clutch 45.

A stop 57 is mounted on the front angle bar 20 for adjustment longitudinally thereof to be positioned in front of any one of the die seats 19. This stop 57 is adjustably secured to the front angle bar 20 by a thumb nut-equipped bolt 58 that extends through said stop and a longitudinal slot 59 in said angle bar.

A guide 60 is mounted on the rear angle bar 20 for adjustment longitudinally thereof and extends forward over the bed 15 for positioning a piece of work in respect to any one of the die seats 19. This guide 60

is adjustably secured to the rear angle bar 20 by a thumb nut-equipped bolt 61 that extends through said guide and a longitudinal slot 62 in the rear angle bar frame.

Various different gigs may be provided for holding work to be operated on by the punch press, and in Figs. 4 and 8 one form of gig is illustrated which comprises a jointed bar 63 the sections of which have their inner ends overlapped and connected by a thumb nut-equipped bolt 64. The outer end of the inner section of the bar 63 is downwardly offset to receive the horizontal flange of the rear angle bar 20, and which section is detachably secured to said angle bar by a bolt 65 which extends through the slot 62 and thereby detachably secures the bar 63 to the bar 20 with freedom for adjustment opposite any one of the die seats 19. The outer section of the bar 63 has on its outer end an outturned stop lug 66, and on its inner end an upstanding pin 67 adapted to extend through a hole in a link or other piece of work for positioning the same a predetermined distance from one of the die seats 19 before punching a hole therein.

Co-operating shearing blades 68 are secured, one to the outer face of the bed 15 and the other to the outer face of the crosshead 22. To cut a piece of work by the shearing blades 68, a horizontally disposed rod 69 is secured to the bed 15 by having one of its ends screwed into the back thereof, and on the other end is a work-engaging stop 70. This rod 69, near the bed 15, has a joint 71 which permits the long outer section of said rod to be turned down into an inoperative position where the same is out of the way. To hold the outer section of the rod 69 in an operative or horizontal position, there is secured thereto a spring clip 72 adapted to interlock with the short section of said rod, as shown in Fig. 9.

To prevent a loose piece of material cut by the shearing blades 68 from flying there is secured to one of the frame bars 11 a guard 73 that projects in front of the movable shearing blades 68 and above the work.

What I claim is:

1. The combination with a frame, of a bed on the frame, a crosshead mounted on the frame for raising and lowering movements over the bed, means for operating the crosshead, co-operating tool elements carried by the bed and crosshead, the tool elements on the bed being in the form of plates removably mounted in seats in the bed by endwise sliding movement, and a pair of angle bars secured to the bed and holding said plates against endwise sliding movement, at least one of said angle bars being removable from the bed.

2. The structure defined in claim 1 in further combination with a stop adjustably mounted on one of the angle bars, and a

guide adjustably mounted on the other of said angle bars.

3. The structure defined in claim 1 in further combination with a gig attached to one of the angle bars.

4. The combination with a frame, of a bed on the frame, a crosshead mounted on the frame for raising and lowering movements over the bed, means for operating the crosshead, co-operating tool elements carried by the bed and crosshead, the tool elements on the bed being in the form of plates removably mounted in seats in the bed by endwise sliding movement, a horizontally disposed rod having one of the ends attached to the bed and having on its other end a work-positioning stop, said rod having a hinge joint, permitting the outer section of said rod to be moved into an inoperative position, and a clip for holding the outer section of the rod in an operative position.

5. The combination with a frame, of a bed on the frame, a crosshead mounted on the frame over the bed for raising and lowering movements, a shaft journaled on the frame, eccentrics on the shaft, and having eccentric straps, rods connecting the crosshead to the

eccentric straps, means for driving the shaft, including a clutch, yielding means under strain to release the clutch, connections including a treadle for setting the clutch, co-operating tool elements on the bed and crosshead, anti-friction rollers mounted in seats in the ends of the crosshead, and adjustable track bars on the frame for the rollers.

6. The combination with a frame, of a bed on the frame, a crosshead mounted on the frame over the bed for raising and lowering movements, a shaft journaled on the frame, eccentrics on the shaft, and having eccentric straps, rods connecting the crosshead to the eccentric straps, means for driving the shaft, including a clutch, yielding means under strain to release the clutch, connections including a treadle for setting the clutch, co-operating tool elements on the bed and crosshead, anti-friction rollers mounted in seats in the ends of the crosshead, track bars for the rollers, having laterally projecting ends slidably mounted in seats in the frame, and set screws for adjusting the track bars in respect to the rollers.

In testimony whereof I affix my signature.
GILBERT TOLLEFSON.