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3,486,642

MECHANIZED DIE SKID

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2 Sheets-Sheet 1

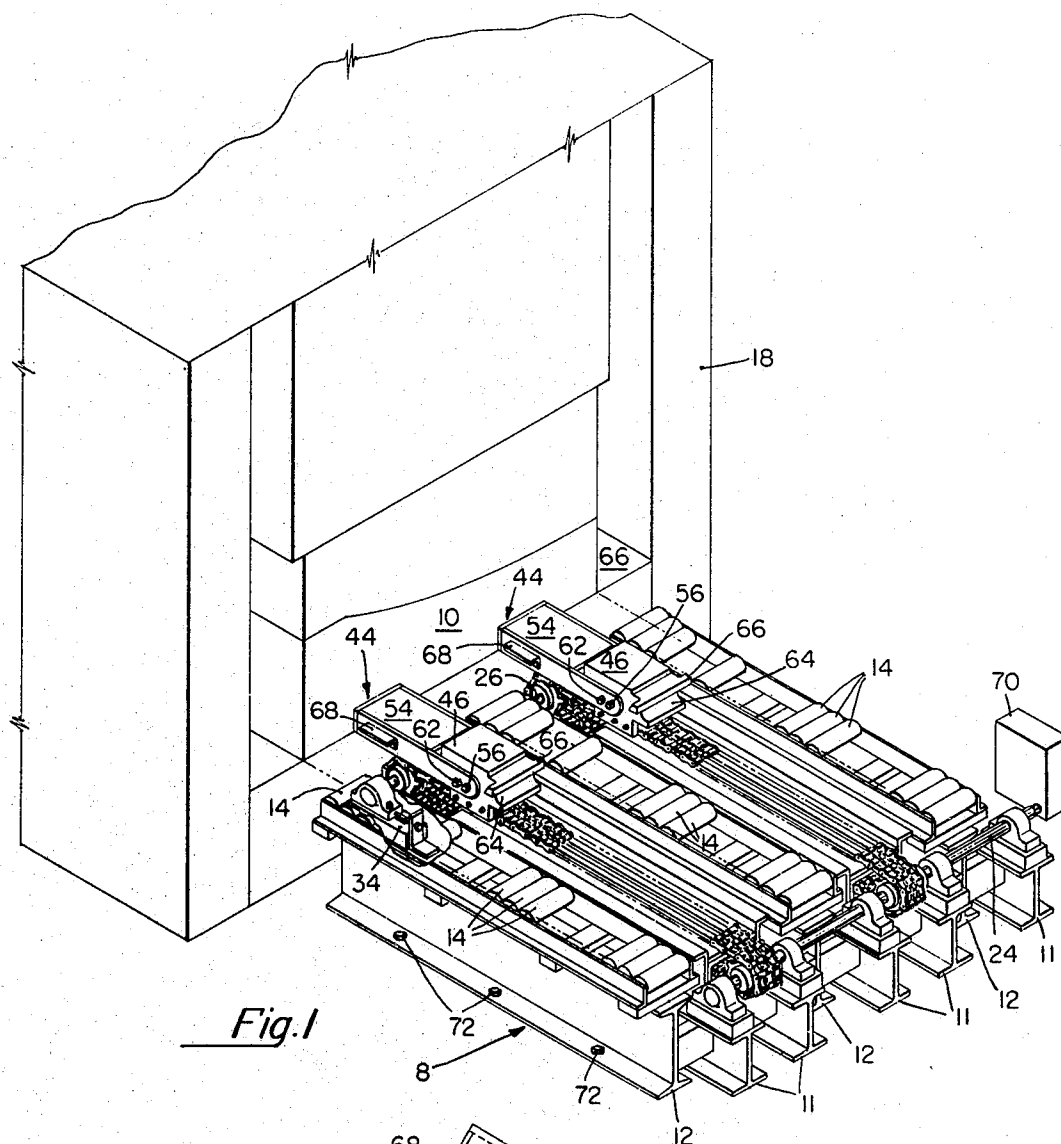


Fig. 1

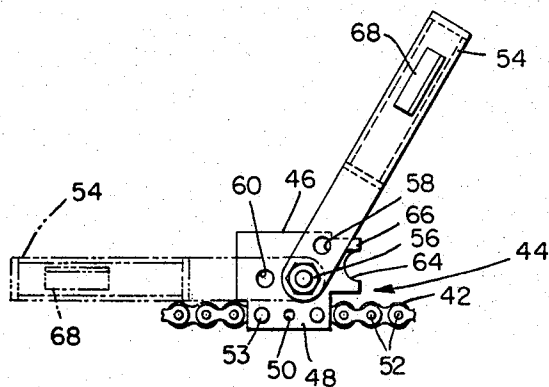


Fig. 4

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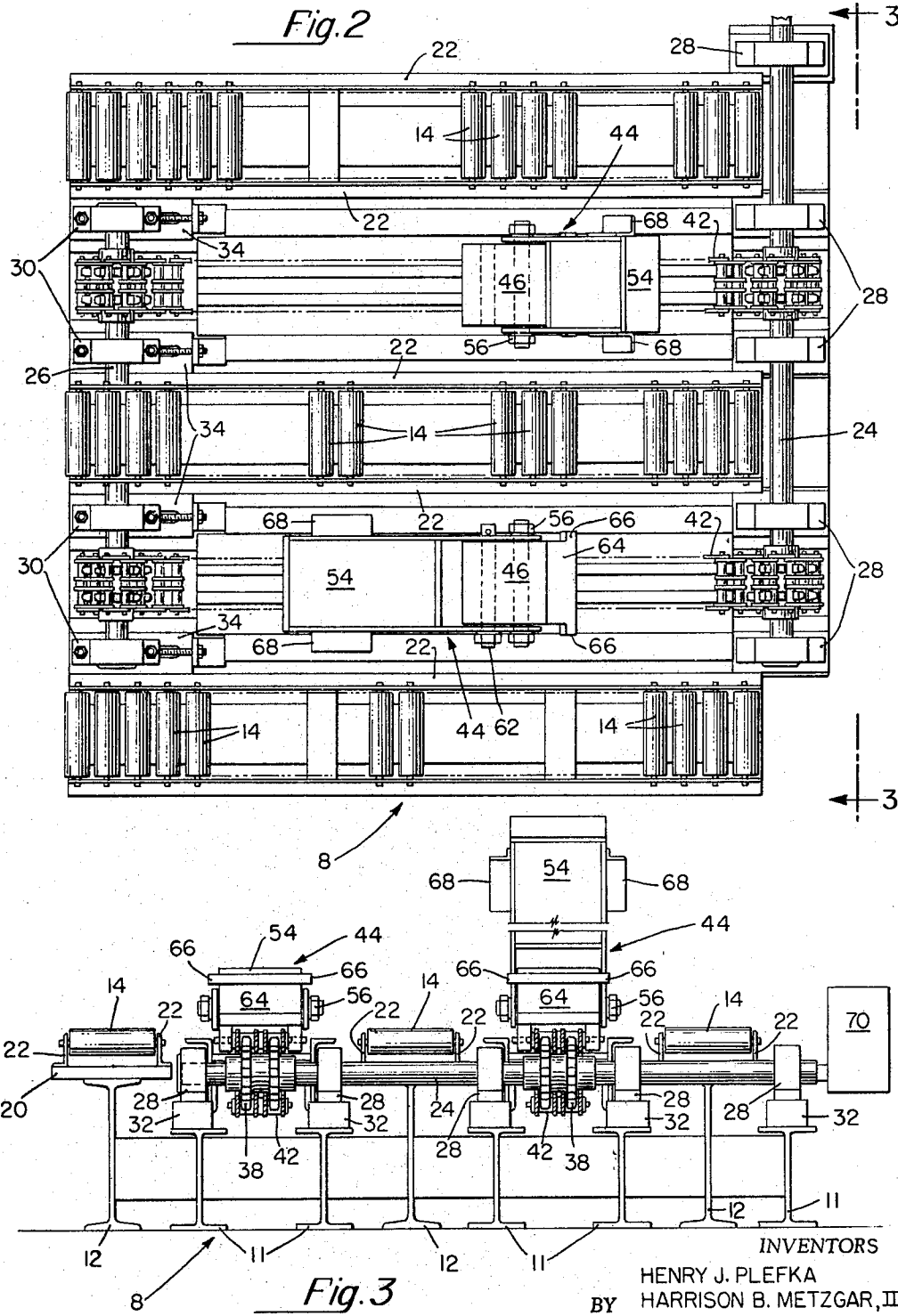
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1

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MECHANIZED DIE SKID

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2 Claims

ABSTRACT OF THE DISCLOSURE

A mechanized die skid for moving a die into position in a press and removing the die therefrom. The die skid having a plurality of rollers positioned adjacent the press bed and in the same plane. A reversible power means is operably connected to a pair of chain driven die pushers which are adapted to push the die positioned on the die skid into the press or remove the die from the press onto the skid.

Several methods are presently used to remove a die from the press or to position a new die on the press bed. One of the common methods is the utilization of a "Dead Man" system. This system involves the use of floor mounted anchors, snatch blocks, eye bolts and chains. With this method every die change requires an extensive set-up period and a removal period for the equipment involved.

Another method for moving dies into and from a press bed consists of the utilization of an overhead crane system whereby the die is physically swung onto the press bed while suspended in a sling from the overhead crane. This method requires skilled crane operators and space availability for the crane to maneuver the die into the proper position.

A third method for installation and removal of dies into and from the press beds utilizes fork lift trucks. The die is lifted on the forks of the truck and moved into the press or from the press when changes are required. This method requires maneuverability space for the fork lift truck and die. The size of dies that can be moved by this method are dependent upon the capacity of the lift trucks and maneuvering space available.

An object of this invention is to provide an economical and rapid means for changing dies in a press.

Another object of this invention is to provide a mechanized die skid having a pushing and pulling means for actuation by a power unit for moving the dies into and out of the bed of a press.

Another object of this invention is to provide a mechanized die skid that may be used to remove a die from a press and insert a new die in the press in the minimum amount of time and with the minimum number of skilled personnel.

The mechanized die skid of this invention is a piece of equipment normally located between the rear of the blanking press and the coil feeding device. The die skid includes means for anchoring the skid adjacent to the press and includes a plurality of heavy duty rollers having their upper surfaces in the plane of the die bed, a plurality of heavy roller chains positioned between the rollers and having pusher devices secured thereto, sprockets mounted on a drive shaft and operably connected to the roller chains, and power means for driving the drive shafts in a forward or reversed direction on command. Upon rotation of the drive sprockets by the power means, the pusher devices move the die placed upon the rollers into the die bed of the press or the die may be removed from the press bed by placing the steel cables about the die and attaching the cables to the pusher blocks and reversing the power source. An overhead crane is required to place the die upon the die skid and remove the used die there-

2

from. By using this mechanized die skid one or possibly two men are required for the operation.

The above and other objects of this invention as well as various novel features and advantages will be apparent from the following description of an exemplary embodiment, reference being made to the accompanying drawings wherein:

FIG. 1 is a perspective view of the present invention, with portions broken away, positioned adjacent a press with the die being pushed onto the bed of the press;

FIG. 2 is a planned view of the mechanized die skid showing the roller beds, the roller chains mounted on the sprockets with the pusher means attached thereto, and the drive shaft connected to the sprockets with the attaching means for the power unit;

FIG. 3 is a view taken substantially along the line 3-3 of FIG. 2, in the direction of the arrows, and illustrating the drive shaft and sprockets with the pusher means attached to the drive chain;

FIG. 4 is a side view of the pusher assembly with the pusher extension in the retracted position and in phantom lines, the pusher extension in the extended position.

Referring now to the drawings, as best seen in FIG. 1, a mechanized die skid indicated generally by the numeral 8 is provided for inserting and removing a die 10. The die skid 8 includes a plurality of interconnected I-beam supports 11 and 12 for supporting the rollers 14 adjacent to and substantially in the plane of the press bed 16 of the press 18. As can be best seen in FIGS. 2 and 3, the rollers 14 are rotatably connected to and supported on the I-beams 12 by a support plate 20 and angle irons 22. The drive shaft 24 and idler shaft 26 are rotatably supported on the I-beams 11 by bearings 28 and 30 respectively. The rear bearings 28 support the drive shaft and are positioned on the I-beam by spacer blocks 32. The front bearings 30 support the idler shaft 26 and are adjustably supported on the I-beams 11 by pillow block mounting plates 34 which permit longitudinal adjustment of the bearing. The adjustment of the bearing is controlled by an adjustment means 36 which consists of an angle iron secured to the I-beam 11 having a bolt and lock nut threadably mounted therein adjacent the bearing for moving the bearing in a longitudinal direction for alignment with the shaft and to maintain proper tension on the roller chains 42.

A pair of drive sprockets 38 are fixedly secured to the drive shaft 24 for rotation therewith. Idler sprockets 40 are aligned with the drive sprockets 38 and secured to the idler shaft 26 for rotation therewith. A roller chain 42 is connected in a continuous loop about each set of drive sprockets and idler sprockets. A pusher assembly 44 is secured to each roller chain 42 between the respective sprockets 38 and 40 in the plane of the rollers 14.

As best seen in FIG. 4, each pusher assembly 44 consists of a pusher block 46 having a pair of depending legs 48 extending downwardly on each side of the chain 42. A series of apertures 50 in the depending legs 48 are spaced so that the apertures are aligned with the pins 52 of roller chain 42. The pusher block 46 is secured to the chain 42 by replacing the regular chain pins 52 with longer pins 53 for extending through the apertures 50 of the depending legs 48 and thus connecting the pusher block 46 to the chain for movement therewith. A pusher extension 54 is pivotally secured to the pusher block 46 by a bolt and nut combination 56. The pusher extension 54 is movable between a stored position as shown in solid lines in FIG. 4 and an extended position as shown in phantom lines in FIG. 4. An aperture 58 is formed in the pusher extension 54 for alignment with an aperture 60 in the pusher block so that pin 62 may pass there-through to secure the pusher extension 54 in the extended position.

A cable recess block 64 extends from the rear of pusher block 46 for receiving and holding a cable or chain positioned about the die when a die is being removed from the press. The cable recess block has a stop arm 66 extending on each side thereof in the pivotal path of the pusher extension 54 for stopping and supporting the pusher extension in its stored position. A pair of handles 68 are secured to the sides of the pusher extension 54 for holding the pusher extension during movement between stored and extended position.

As seen in FIG. 1, a portable, reversible power unit 70, such as an electric or air motor is connected to the drive shaft 24 for powering the die skid to insert or remove a die from the press.

In the embodiment shown, the die skid 10 is secured to the floor or supporting platform by bolts or leg screws 72. However, if required, a portable die skid could be provided with height adjusting means and anchor means for securing the portable die skid to the individual presses. A portable die skid would require slightly more time for set-up in the die changing operation but depending upon the number of die changes required, the economics would dictate whether to use a portable or stationary die skid.

In operation, with no die in the press, a die 10 is placed upon the bed of rollers 14 between the pusher assemblies 44 and the press bed 16. Depending upon the size of the die 10, the pusher extensions 54 may be placed in the stored or extended position. For this description assume they are placed in the stored position when the die is placed upon the rollers. A reversible power means 70 is operably connected to the drive shaft 24. As the drive shaft is rotated to move the roller chains toward the press by the forward rotation of power means, the roller chains 42 with the pusher blocks 46 attached thereto are moved by the drive sprockets 38 into contact with the die 10. Further rotation of the drive shaft causes the die 10 to be moved over and off the rollers 14 onto the press bed 16. When the pusher assemblies 44 reach the idler sprockets 40, the power unit is reversed and the pusher assemblies are moved away from the die far enough to permit the pusher extensions 54 to be moved to their extended position. After the pusher extensions have been secured in the extended position by insertion of pin 62, the power means may then be returned to forward drive so that the pusher extensions move the die further onto the press bed into the desired position.

To remove the die from the press bed, with the pusher assemblies at the forward end of the die skid adjacent the press, a chain or cable (not shown) is placed about the die and extends around the pusher assemblies and rests in the cable recess block 64. Reverse power is applied by the power means and the die is pulled upon the rollers for removal therefrom and insertion of a different die.

We claim:

1. In combination with a reciprocating press having

a die receiving bed spaced above a supporting floor, a die skid secured relative to said die bed, said die skid including a supporting frame, a plurality of rollers rollingly supported on said frame and presenting a surface substantially in the plane of said die bed, a plurality of pusher assemblies extending above the surface of said rollers; each of said pusher assemblies including a pusher block for applying a force to a die for moving the die into and from the press bed, a pusher extension pivotally secured to said pusher block, said pusher extension having an extended position and a stored position and being pivotally movable therebetween, a securing means for locking said pusher extension to said pusher block in the extended position, a stopper on said pusher block for blocking pivotal movement of said pusher extension at said stored position and for supporting said pusher extension in said stored position, said pusher block having a cable recess for receiving and anchoring a cable to said pusher block, a drive shaft and an idler shaft parallelly mounted for rotation on said supporting frame; a plurality of chain means for moving said pusher assemblies, each of said chain means including a drive sprocket secured to said drive shaft for rotation therewith, an idler sprocket secured to said idler shaft for rotation therewith, a continuous roller chain operably mounted on said drive sprocket and said idler sprocket for movement when said drive sprocket is rotated, said pusher block being secured to said chain for movement therewith; and reversible power means operably connected to said drive shaft for rotating said drive shaft in opposite directions upon command.

2. The die skid as claimed in claim 1, including adjustment means attached to said supporting frame for adjusting said die skid on the supporting floor whereby the rollers surface may be adjusted to be substantially in the plane of the press bed when the die skid is moved from one press to another press having a die bed spaced at a different height above said supporting floor.

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