

Oct. 17, 1961

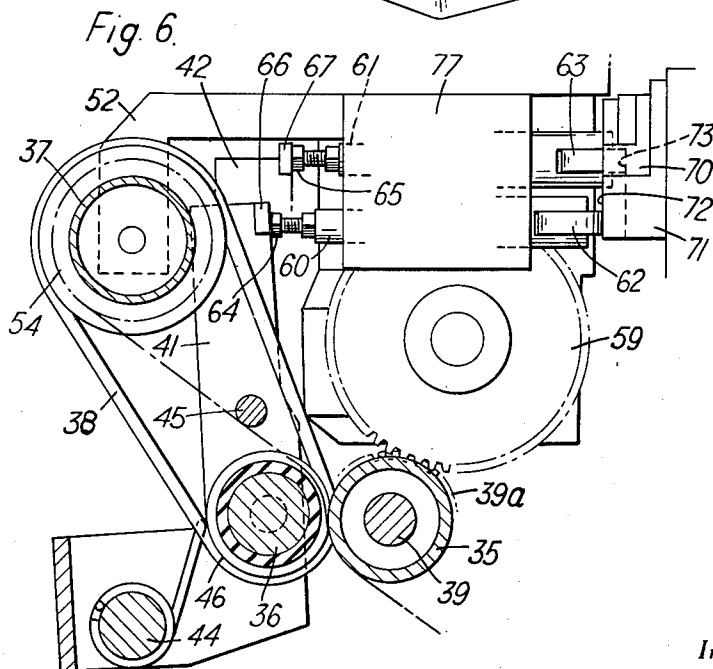
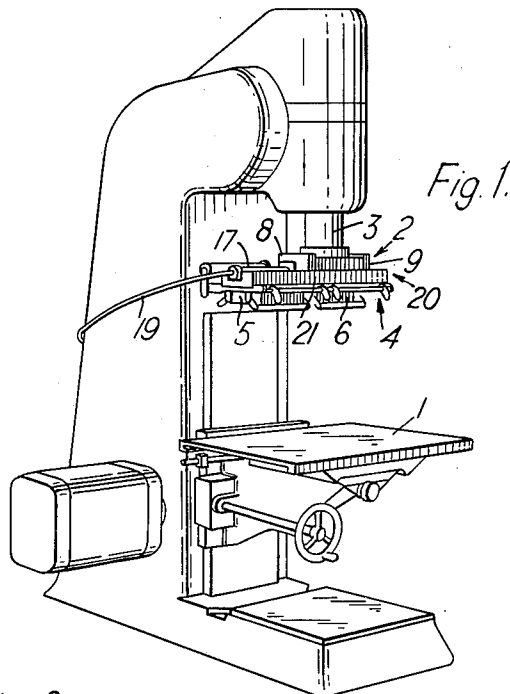
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3,004,486

MARKING PRESSES

Filed March 28, 1960

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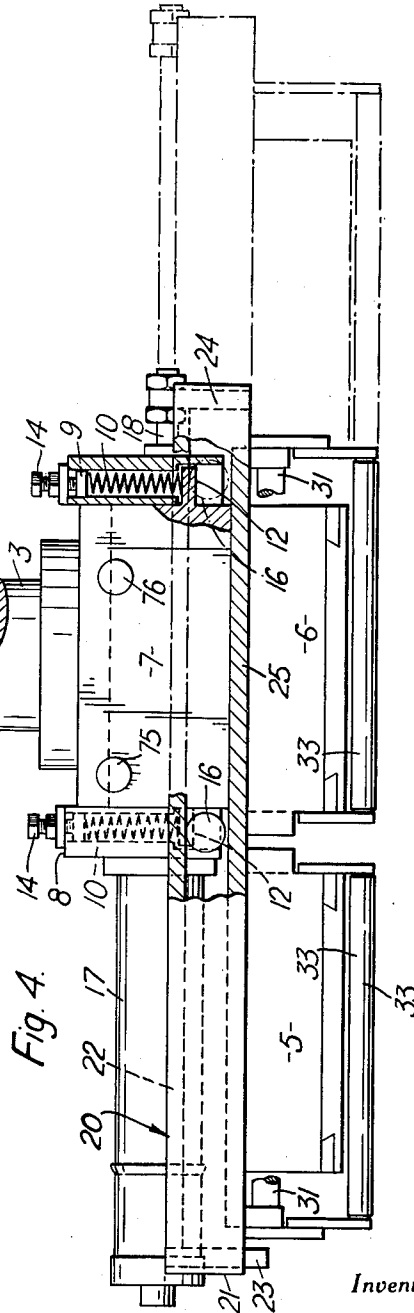
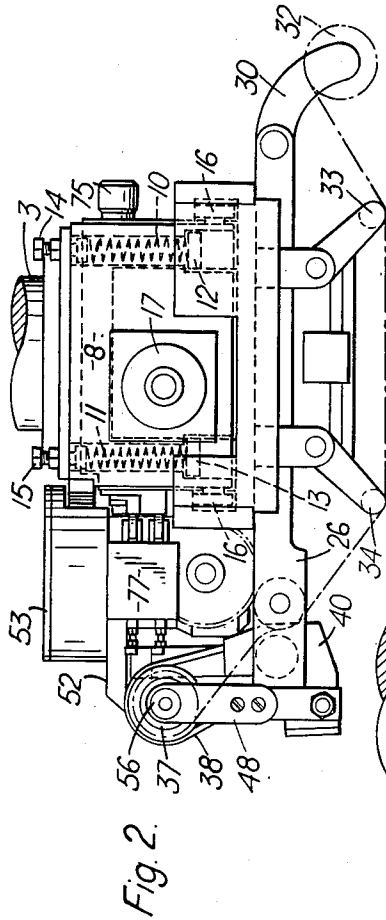
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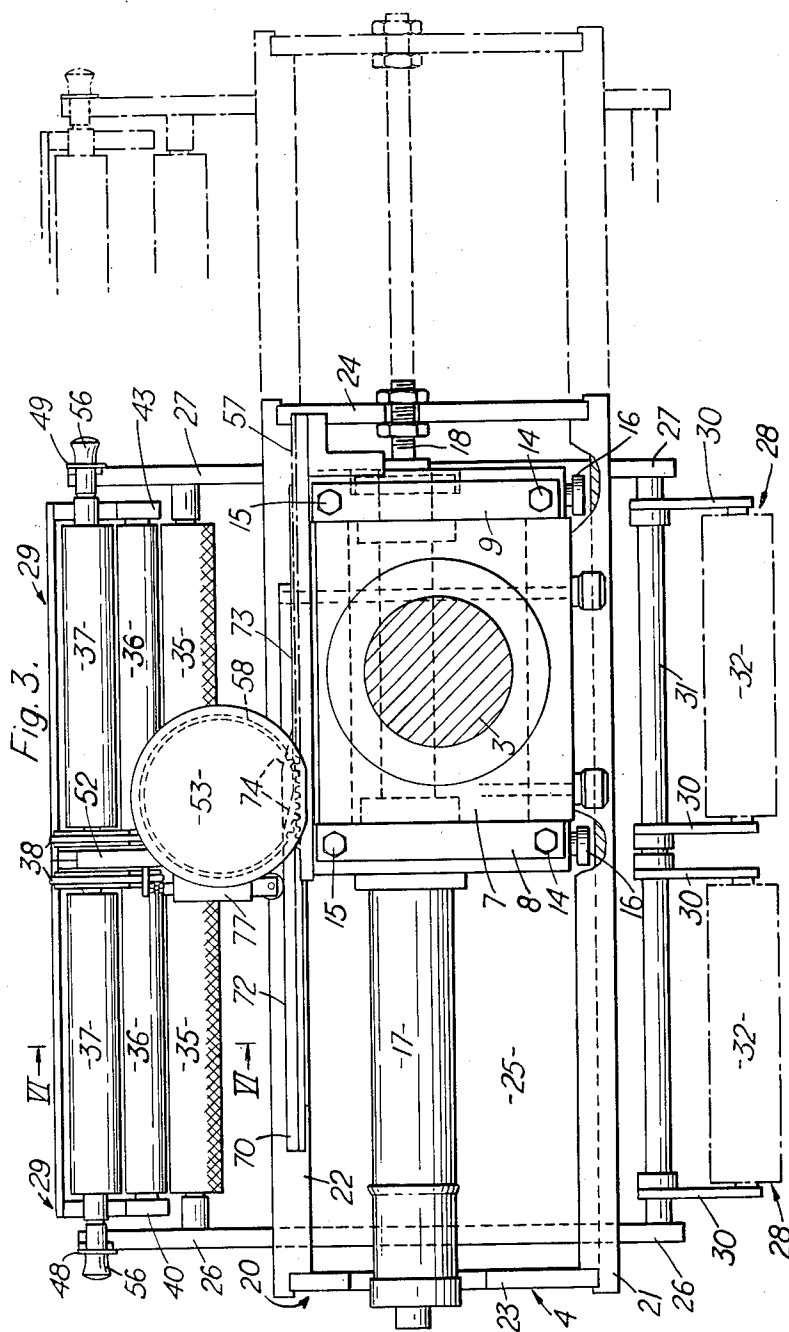
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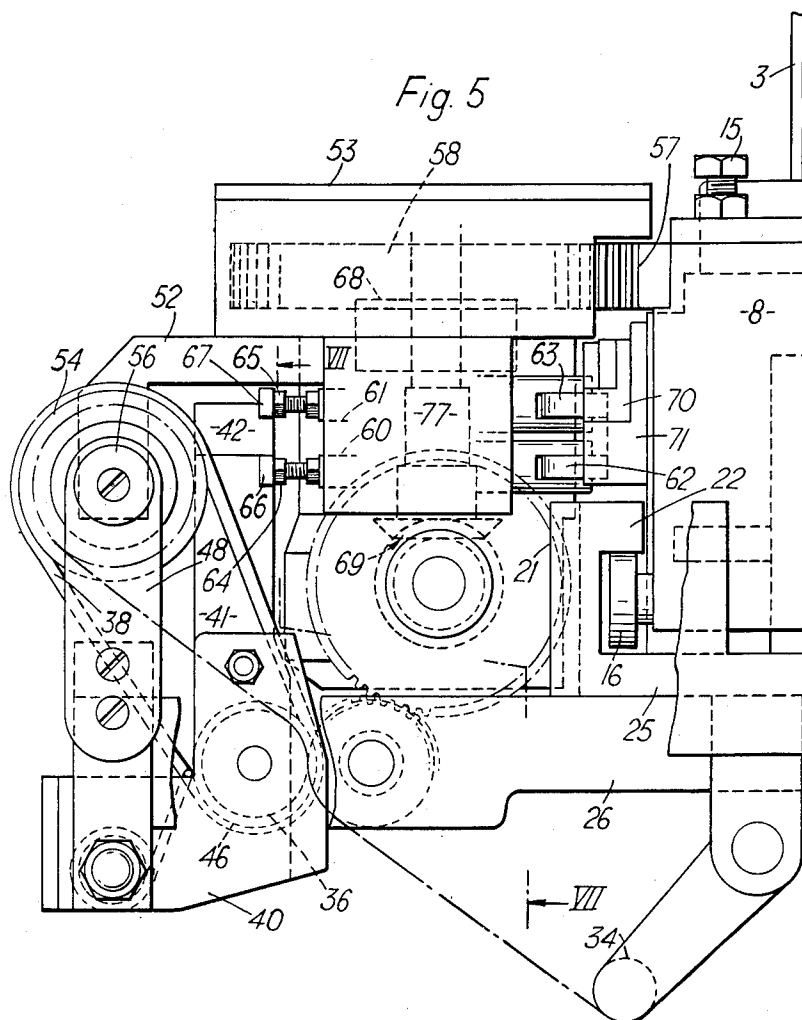
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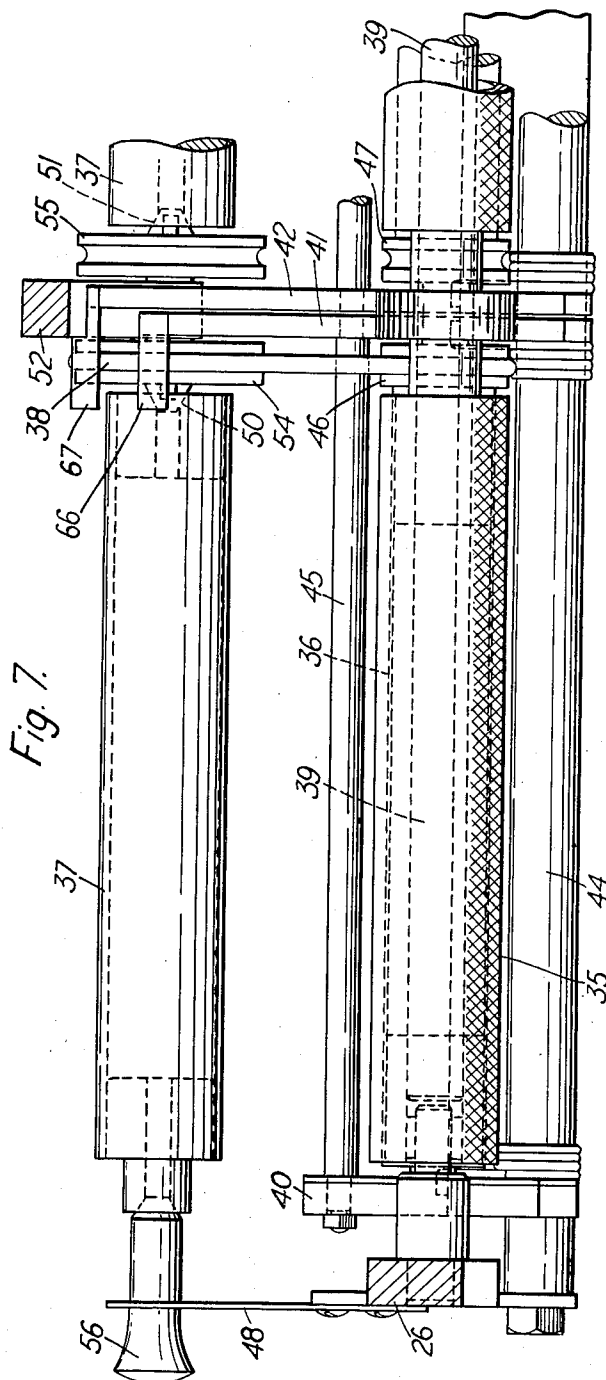
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MARKING PRESSES

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This invention relates to marking presses, i.e. presses for carrying out marking operations by interposing a marking foil between a die and the work to be marked so that when the press closes material is transferred from the foil to the work under pressure and usually with the application of heat.

The object of this invention is to provide a marking press capable of producing composite marks e.g. two-colour marks, requiring two or more marking operations of the press.

Thus according to the invention there is provided a marking press including a die-mounting assembly capable of mounting at least two dies, said assembly being movably mounted in the press between at least two predetermined positions such that two dies mounted thereon can be positioned in turn in a single working zone of the press within which the work support is to be fixedly located, marking foil supporting and feeding means comprising means for supporting at least two spools of marking foil for use with two dies mounted on said assembly and independent foil guiding and feeding means for each such foil, said foil supporting and feeding means being movably mounted to enable the marking foil appropriate to the die which is positioned in the working zone to be positioned between that die and the work, and drive means operable automatically for intermittently driving said feeding means for said foils to advance each foil stepwise between each marking operation therewith.

With a marking press according to the invention therefore the work is fixedly located in the working zone of the press and the dies and their associated marking foils are moved in turn into that zone for the two or more marking operations required to build up the desired composite mark.

It is to be understood that this invention is equally applicable to hand or power-operated marking presses.

The die-mounting assembly may be mounted in the press to be capable of the required movement thereof in various ways. For example, the assembly may be mounted for linear movement, preferably rectilinear movement, generally at right angles to the direction in which the press opens and closes. Alternatively the said assembly may be mounted for rotational movement e.g. it may take the form of a rotary platform whose axis of rotation is either parallel to or at right angles to the direction in which the press opens and closes.

Likewise various means may be employed to locate the die-mounting assembly in the said predetermined positions in which the dies mounted thereon are positioned in the working zone of the press. The assembly may be locked in these positions while marking takes place e.g. by means of retractable locking pins, spring-detent or latch arrangements and the like, or it may merely be held in position e.g. against fixed or retractable stops. The particular locating means employed will depend both on the number of such predetermined positions and on the means by which the assembly is moved from position to position.

The assembly may be simply movable by hand but preferably it will be power operated by suitable drive means such as electromagnetic means, hydraulic or pneumatic cylinders or through a suitable mechanical connection from the press operating mechanism itself.

Where the die-mounting assembly is power-operated

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it is preferred that the movements thereof shall take place automatically consequent upon the operation of the press. For this purpose an electrical control system may be provided adapted to control the movements of the press and die mounting assembly whereby the assembly is advanced from one predetermined position to the next between each marking operation to effect the required composite mark. Suitable control systems for this purpose can be designed without difficulty.

The foil supporting and feeding means may also be mounted in the press in various ways such as for example on a support capable of movement in one of the ways mentioned above in connection with the die-mounting assembly. Clearly however the manner of mounting the foil supporting and feeding means and the die-mounting assembly are interdependent.

It is preferred that the foil supporting and feeding means shall be mounted for movement automatically consequent upon movement of the die-mounting assembly. To this end the die-mounting assembly and foil supporting and feeding means may be both independently power-operated and their movements may be controlled by a suitable control system. Preferably however the foil supporting and feeding means will derive its movement from that of the die-mounting assembly and will move therewith.

The foil supporting and feeding means and the die-mounting assembly need not necessarily be mounted on the same part of the press. The die-mounting assembly will be mounted on one or other part of the press and the foil supporting and feeding means may be mounted on the same part. Preferably however the die-mounting assembly is mounted for movement in a plane generally at right-angles to the direction in which the press opens and closes and the foil supporting and feeding means are fixedly mounted on the die-mounting assembly for movement therewith.

The foil feeding means may be driven in various ways dependent upon the manner of mounting of the foil supporting and feeding means in the press and the number of such means. For example with two such foil supporting and feeding means and a rectilinear movement thereof in the press, known forms of mechanical linkages for deriving the foil feed from the press mechanism could be adapted for this purpose by the provision of some suitable lost-motion connection to accommodate the said rectilinear movement of the foil supporting and feeding means relative to the press body. An independent drive for each foil feeding means, such as a solenoid, under the control of a control system could also be employed. It is preferred however to utilise the actual movement of the foil supporting and feeding means themselves to provide the required drive for the foil feeding means. This can be done in various ways. For example, rotary drives to the foil feeding means can be generated from the relative movement of the foil supporting and feeding means of some other part of the press. One possible drive comprises a cam and cam follower arrangement in which movement of the cam follower serves to drive the foil feeding means. Preferably however a rack and pinion drive arrangement is employed wherein the rack and pinion are mounted on relatively movable parts of the press.

A preferred embodiment of the invention will now be described, by way of example only with reference to the accompanying drawings in which:

FIG. 1 is a front perspective view of a known open-throated type of press embodying this invention which includes a lower platen for mounting the work and a die-mounting assembly mounted on the ram of the press for rectilinear sideways movement;

FIG. 2 is a left-hand side elevation to an enlarged

scale of the die-mounting assembly of the press of FIG. 1; FIG. 3 is a plan view of the die-mounting assembly of FIG. 2;

FIG. 4 is a front elevation of the assembly of FIG. 2;

FIG. 5 is an enlarged view of a part of FIG. 2 illustrating the foil feeding means of the assembly;

FIG. 6 is a fragmentary sectional view to an enlarged scale on the line VI—VI of FIG. 3; and

FIG. 7 is a scrap elevation to an enlarged scale of the foil feeding means taken on the line VII—VII of FIG. 5.

The press shown in FIG. 1 has a fixed lower platten 1 and an upper support 2 mounted on a vertically reciprocable ram 3 which is operated mechanically.

The lower platten 1 constitutes a fixed support for the work support which will be mounted thereon in the working zone of the press immediately beneath the ram 3.

A die-mounting assembly 4 for mounting two dies is movably mounted on the upper support 2 for rectilinear sideways movement, i.e. movement from left to right and vice versa as viewed from the front of the press. The actual mountings for the dies are constituted by two heater boxes 5, 6 of known type each incorporating its own thermostatic control.

The support 2 (FIGS. 2, 3 and 4) comprises a bridge 7 of inverted channel shape in section the base of which is fixed to the ram 3. Two end plates 8, 9 are respectively slidably mounted on the ends of the bridge 7 for small limited movement in a vertical plane. Two compression springs 10, 11 are associated with each end plate, one adjacent each end thereof. The upper ends of the springs engage abutments fixed relative to the end plates and the lower ends engage lugs 12, 13 respectively fixed relative to the bridge 7. The action of the springs 10, 11 is therefore to lift the plates 8, 9 relative to the bridge 7. Screw adjustment means 14, 15 mounted on the plates are provided for adjusting the compression of the springs 10, 11.

Each of the end plates 8, 9 mounts two rollers 16 adjacent the bottom of the two ends thereof for rotation about a common axis which extends from front to rear of the press. Corresponding rollers 16 of the two plates are aligned and the two corresponding pairs of rollers serve to support the assembly 4 thereon for movement from side to side of the press under the control of a double-acting pneumatic cylinder 17 mounted on the end plate 8 with its axis extending horizontally. The piston rod 18 of the cylinder 17 is connected to the assembly 4 and a flexible pipe 19 supplies compressed air to the cylinder 17.

The die-mounting assembly 4 comprises a cradle 20 which is shaped like a rectangular tray. The sides 21 of the cradle 20 have an inturned flange 22 along their upper edges which flanges respectively engage corresponding pairs of rollers 16. End members 23, 24 interconnect the sides 21 and the said piston rod 18 of the pneumatic cylinder 17 is secured to end member 24. A base plate 25 secured between the sides 21 of the cradle 20 serves as a mounting plate for the heater boxes 5, 6.

The springs 10, 11 in lifting the end plates 8, 9 act through the rollers 16 mounted on plates 8, 9 to lift the cradle 20 until the base plate 25 thereof abuts the end faces of the legs of the inverted U-shaped bridge 7 in contact with which it slides during movement of the cradle from side to side.

Two frame members 26, 27 extending from front to rear of the press and mounted on the underside of the cradle 20 respectively adjacent the ends thereof serve to mount between them marking foil supporting and feeding means 28, 29 for each die (FIGS. 5, 6 and 7) which serve to feed the foil from front to rear of the press, i.e. at right angles to the direction of movement of the die-mounting assembly 4. Each foil supporting and feeding means 28, 29 is of conventional construction in so far as it comprises pairs of brackets 30 adjustably mounted at the front of the press on a rod 31 mounted between the members 26, 27, which brackets 30 support between them supply spools 32 of foil, guide rollers 33, 34 for guiding

the foil beneath the heater box and feeding means 29 mounted at the back of the press and comprising a knurled driven roller 35 having a rubber roller 36 biased into contact therewith (FIG. 5) and also including a take-off roller 37 for the used foil which is driven by a slipping belt 38 from the rubber roller 36.

The two knurled rollers 35 for the two dies are mounted upon a common shaft 39 journaled between the members 26, 27. A gear wheel 39a is mounted on the shaft 39 between the rollers 35.

The two rubber rollers 36 are independently rotatably mounted between pairs of arms 40, 41; 42, 43 which are pivotally mounted on a rod 44 mounted between the rear ends of the frame members 26, 27. Torsion springs at each pivotal connection between the arms 40, 41; 42, 43 and the rod 44 bias the two rollers 36 into contact with their respective knurled rollers 35. Tie bars 45 interconnect the free ends of the arms 40, 41; 42, 43. At the inner ends of each rubber roller 36, respectively adjacent arms 41, 42, pulleys 46, 47 are mounted for rotation with the rollers 36.

The take-off rollers 37 are respectively rotatably supported between retractable end supports 56 mounted in vertical extensions 48, 49 of the rear ends of members 26, 27 and stub shafts 50, 51 journaled respectively in opposite sides of a rearwardly extending arm 52 mounted on a gear box 53 secured to the cradle 20. The stub shafts 50, 51, which make a driving connection with rollers 37, respectively mount pulleys 54, 55. The two aforementioned slipping belts 38 run around the pairs of pulleys 46, 54; 47, 55.

The said gear box 53 is secured to the rear side member 21 of the cradle for movement therewith. A horizontally-extending toothed rack 57 is secured between the rear ends of the plates 8, 9 and engages gear 58 of the gear box 53 mounted for rotation about a vertical axis. The drive from gear 58 is transmitted through a ratchet free-wheel mechanism 68 and a pair of bevel gears 69 to a gear 59 mounted for rotation about a horizontal axis and which engages the said gear 39a on the shaft 39 carrying the knurled rollers 35.

Two push rods 60, 61 are slidably mounted the one vertically above the other in a block 77 fixed to the side of the gear box 53. The push-rods 60, 61 slide along parallel horizontal axes extending from front to rear of the press and at their front ends mount rollers 62, 63 which serve as cam followers. Their rear ends 64, 65 are able to engage abutments 66, 67 respectively carried by vertical extensions of the arms 41, 42.

Two trip bars 70, 71 are mounted on the bridge 7 at the rear thereof and have cam surfaces disposed respectively for engagement by rollers 63, 62. Each bar has two straight parallel cam surfaces 72, 73 in stepped relationship and interconnected by an inclined surface 74. The one surface 72 of each bar is disposed more rearwardly of the press than surface 73 so as when engaged by the respective roller 62 or 63 to cause the push rod 60 or 61 to be displaced rearwardly.

The trips bars 70, 71 are L-shaped in section and fit one within the other and both are independently adjustable horizontally relative to the bridge 7 upon release of locking bolts 75, 76 which extend from front to rear of the bridge 7.

Displacement of the push rods 60, 61 rearwardly by the action of the trip bars 70, 71 serves pivotally to displace arms 41, 42 respectively and hence the interconnected pairs of arms 40, 41; 42, 43 respectively mounting the rubber rollers 36 thereby disengaging the rubber rollers 36 from the knurled rollers 35.

In operation of the press the work support is located beneath the ram 3. The travel of the said pneumatic cylinder 17 is such that in each limiting position of the die-mounting assembly 4 one of the two heater boxes 5, 6 carried thereby is vertically above the work support

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(not shown) which will be mounted on the lower platten 1. The dies will be mounted on the heater boxes 5, 6 so that in the said limiting positions they are in register with the work support.

Movement of the assembly 4 from left to right as viewed in FIG. 3 i.e. from one limiting position in which the right hand heater box 6 is below the ram 3 to the other position in which the left hand heater box 5 is below the ram, results in the gear 58 of gear box 53 being rotated by virtue of its translation from left to right relative to the rack 57. Rotation of gear 58 is transmitted via free wheel mechanism 68, bevel gears 69, gear 59 and gear 39a to shaft 39 and thus serves to rotate the knurled rollers 35 in the sense required to advance the foil through the press. Movement of the assembly 4 in the reverse direction also rotates gear 58 but the free-wheel mechanism 68 prevents rotation of the rollers 35 in the reverse sense.

It will also be seen from FIG. 3 that over the major part of the travel of the assembly from left to right the rollers 62, 63 on push rods 60, 61 will run on cam surfaces 73 of the trip bars 70, 71 when the rubber rollers 36 engage the knurled rollers 35 so that the foil is pulled through the press as the assembly moves from right to left. By adjustment of the trip bars 70, 71 to vary the distance travelled by the rollers 62, 63 in contact with cam surfaces 73 upon movement of the assembly 4 from left to right the increment of feed of the foils can be varied.

Whilst the rubber rollers are being driven, the slipping belts 38 drive the take-off rollers 37 and the used foil is thus wound thereon.

The operation of the press and the movement of the die-mounting assembly is preferably under the control of an electrical control system which is effective upon actuation automatically to bring about a complete cycle of operations involving two marking operations, one with each die. After each marking operation the die-mounting assembly 4 is moved from one limiting position to the other, the movement of the assembly from right to left being effective through the rack and gear arrangement described above to advance both foils, each by a predetermined amount. An electrical control system capable of controlling the operation of the press in the above

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manner can be readily designed and will not therefore be further described.

I claim:

1. A marking press including a die-mounting assembly, at least two relatively fixed dies mounted on said assembly, said assembly being movably mounted in the press between at least two predetermined positions such that two dies mounted thereon can be positioned in turn in a single working zone of the press within which the work support is to be fixedly located, marking foil supporting and feeding means comprising means for supporting at least two spools of marking foil for use with two dies mounted on said assembly and independent foil guiding and feeding means for each such foil, said foil supporting and feeding means being mounted on said assembly for movement therewith to enable the marking foil appropriate to the die which is positioned in the working zone to be positioned between that die and the work, and drive means operable automatically for intermittently driving said feeding means for said foils to advance each foil stepwise between each marking operation therewith.

2. A marking press as claimed in claim 1 in which the die-mounting assembly is mounted in the press for rectilinear movement generally at right angles to the direction in which the press opens and closes.

3. A marking press as claimed in claim 1 including power operated means for moving said assembly between said predetermined positions.

4. A marking press as claimed in claim 1 in which said drive means comprises means operable in response to movement of said assembly between said two predetermined positions.

5. A marking press as claimed in claim 4 in which said drive means includes a rack and pinion arrangement wherein the rack and pinion are, respectively, mounted on relatively movable parts of the press and said assembly.

6. A marking press as claimed in claim 5 including independently adjustable means to vary the increment of feed of each foil.

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