July 30, 1940. H. B. LINDSAY ET AL 2,209,407

STRIP PUNCHING MACHINE

Filed Jan. 20, 1940

Fig. 1

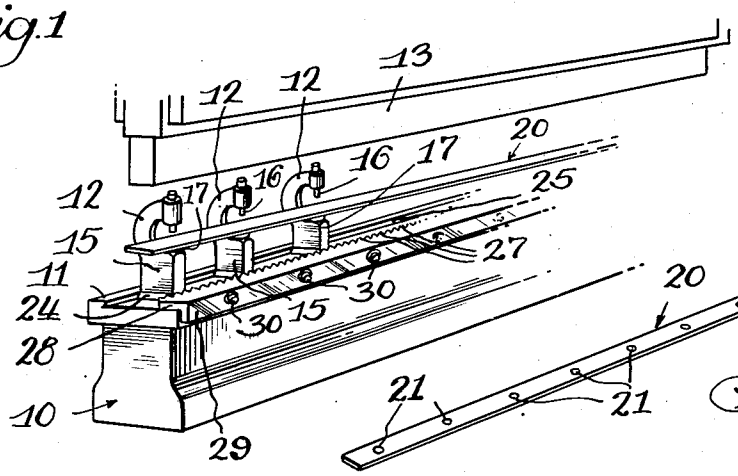


Fig. 2

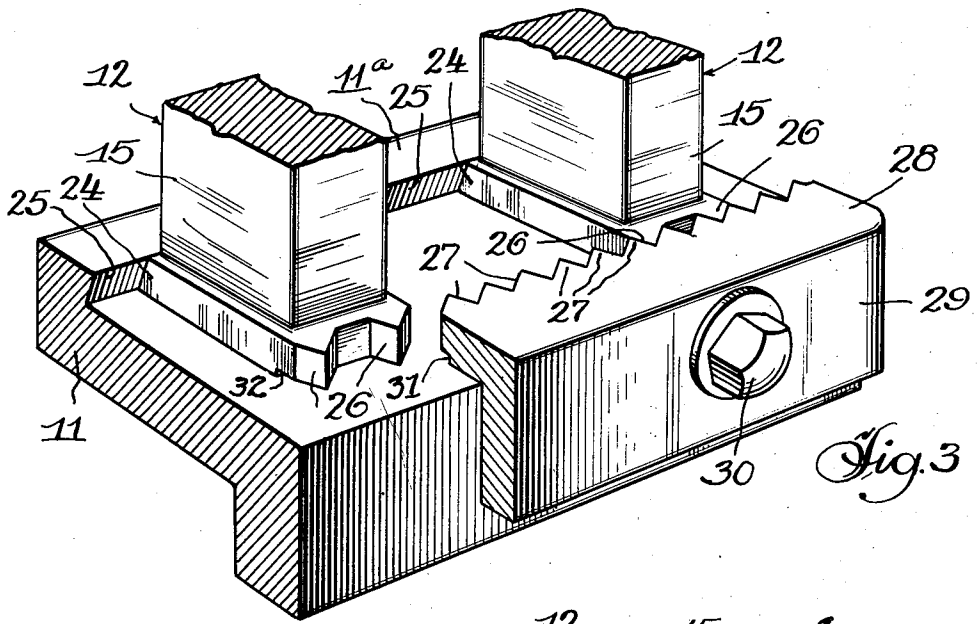


Fig. 3

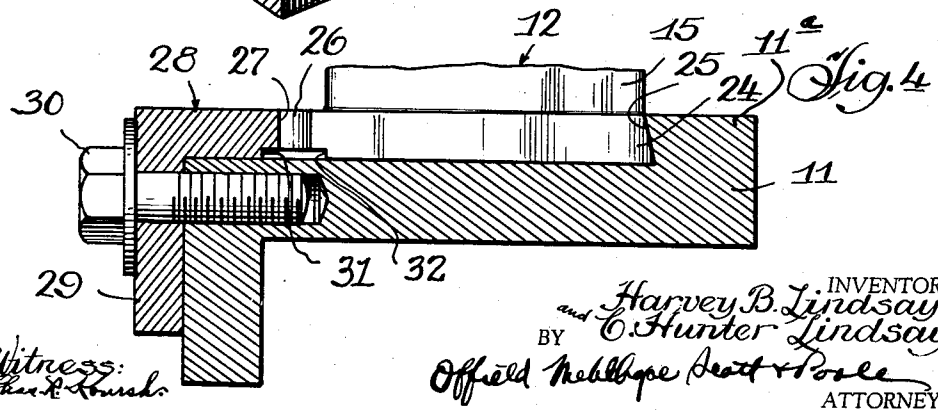


Fig. 4

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STRIP PUNCHING MACHINE

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5 Claims. (Cl. 164—118)

This invention relates to improvements in multiple punch presses and similar machines for forming holes, cuts, indentations or similar operations in metal strips, bars, plates or the like, in which machines a plurality of individual punch cages or like tool-supporting structures are mounted for adjustment along the frame of the machine so as to produce a plurality of such holes or effects simultaneously at predetermined, exactly spaced intervals.

The principal object of the invention is to provide an improved locking mechanism for the several cages which will permit quick readjustment thereof, and insure a precise positioning of such cages at the desired spaced intervals, without necessitating accurate measurment whenever the cages are reset at different intervals.

As heretofore constructed, multiple punch presses of the character above mentioned have usually included an elongated base frame on which is mounted a number of individual punch cages, commonly referred to as "strippits", eacl carrying both male and female parts of the punch and all arranged for simultaneous operation by a single elongated presser bar. The cages have been slidable along the base frame for adjustment as to lateral spacing and are held in position by clamping bars frictionally engaged therewith. In practice, the spacings usually vary by a certain standard unitary length, as for instance by ½ inch, or multiples thereof. In order to set the cages at the exact spacing desired, very careful measurement has to be made for each cage before clamping it in place. Moreover, when the clamping bar is removed for adjustment of one cage, adjacent cages are likely to become misplaced from their proper positions.

In carrying out our invention, we provide an improved construction and arrangement of locking mechanism including a channeled rail member provided with a continuous toothed surface adapted to intermesh with opposed toothed members carried by the cages, the distance between adjacent teeth having the same unitary and exact distance between centers. The arrangement is such that the cages can be given but a rough preliminary adjustment along the frame and finally brought automatically into exact spaced relationship by the locking movement of a clamping bar forming one side of the channeled rail.

The invention may best be understood by reference to the accompanying drawing, in which

Fig. 1 is a perspective view of a multiple press constructed in accordance with our invention.

Fig. 2 is a perspective view of a metal strip of the kind that may be operated upon by the machine shown in Fig. 1.

Fig. 3 is an enlarged fragmentary detail view, in perspective, of a cage base and clamping bar for locking it in place.

Fig. 4 is a detail transverse section of the base frame, showing a cage in locked position thereon.

Referring now to details of the embodiment of our invention illustrated in the drawing, 10 indicates generally the frame of a punch press having a channeled rail member 11 along which is mounted a plurality of individual cages or strippits 12, 12 all adapted to be operated simultaneously by a presser bar 13. As herein shown, each cage includes a base 15 and male and female punch members 16 and 17, respectively. Further details of construction of the cages need not be described herein, as they may take any form suitable for the general purpose of the machine, namely, that of producing a plurality of holes in a strip of steel or the like at predetermined spaced intervals. Such a strip of steel is indicated at 20 in Fig. 2, having holes 21, 21 formed therealong. Suitable drilling devices may also be used on the machine instead of the punch members, if desired.

Referring now more particularly to the means for locking the cages in place along the rail member 11, the base of each strippit is provided with a retaining flange 24 adapted to fit beneath an overhanging shoulder 25, herein formed along the rigid side member 11a of the channeled rail member 11. At the opposite side of each strippit base is provided one or more tapered, or V-shaped teeth 26, 26, herein shown as two in number, rigid with said base and projecting in position to have exact fitting engagement when intermeshed with correspondingly shaped teeth 27, 27 herein formed continuously along and rigid with a clamping bar 28 which forms a movable side member of the rail member 11. The latter bar extends along the front of the channeled portion of rail 11 and is detachably secured to said rail by suitable means arranged to force the cooperating teeth 26 and 27 toward each other, when the bar is secured in fully locked position shown in Fig. 4. In the form shown herein, the bar 28 has a depending flange 29 adapted to extend downwardly along the front of the rail 11, and is secured to the latter by a plurality of bolts 30, 30. The bar 28 may be of a single piece to extend the full length of the rail 11, or may be made up of several sections, as desired.

It will be understood that as an alternative structure the locking teeth in the channel rail

member 11 may be formed in the rigid side member 11a instead of on the movable clamping bar, or teeth may be formed on both the rigid and movable side members, in which latter case the cage base would have corresponding teeth both at front and rear. In any case, however, the movable clamping bar would serve to force the co-operating teeth into intermeshing engagement when the movable side member forming the clamping bar is secured in fully locked position.

The use and operation of our improved form of locking mechanism will now be understood. The valleys of the teeth 27, 27 on the clamping bar are identical in shape and are spaced apart exactly the minimum unitary distance desired, as for instance, on ½ inch centers. Similarly, the apexes of the co-operating teeth 26 on cage bases 15 are spaced the same centers, or multiples thereof, herein one inch apart, since an intermediate tooth has been omitted to allow for excessive accumulations of dirt, filings, etc., on the rail seat. The arrangement is such that when the clamping bar 28 is loosened, one or more cages can be slid along the rail 11 to any new station desired, and given but a rough setting in its new position, that is to say, within ¼ of an inch in either direction from the exact setting desired. Thereafter, the clamping bar is drawn into locking position by the bolts 30, and the intermeshed wedge-shaped teeth 26 and 27 will automatically cause the cage to be brought into the exact spaced setting required. In this manner, any visual need of accurate measurement and placement is entirely eliminated, and the strippits can be locked in positions of extreme accuracy, easily and speedily. As a result, we find it possible to reduce the time of readjusting the strippits to a mere fraction of that required with previous methods, and with far greater accuracy than has heretofore been considered attainable.

In order to afford further means for clearance of dirt, filings and similar particles from between the co-operating teeth, it will be noted that the rail 29 is undercut by a groove 31 formed along the bottom of the teeth 27, and a similar groove 32 is cut along the bottom of the cage base 15 beneath the teeth 26.

Although we have shown and described one particular embodiment of our invention, it will be understood that we do not wish to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of our invention as defined in the appended claims.

We claim as our invention:

1. In a multiple tool machine, a base rail, a plurality of tool cages adjustable therealong in independently selective spaced relation to each other, said cages having tapered teeth carried rigidly thereon, a clamping bar having opposed co-operating tapered teeth formed continuously therealong on centers of predetermined equal intervals, and means for applying said clamping bar to said base rail in a direction to intermesh said opposed teeth and cause each of said cages to be accurately positioned at one of said predetermined intervals along said rail by the wedging action of said teeth when said clamping bar is moved into locking position.

2. In combination with a multiple punch press, having a base rail, a plurality of punch cages slidably adjustable in independently selective spaced relation therealong, and a presser bar for operating said punch cages simultaneously, locking means for said cages comprising a clamping bar having a plurality of rigidly mounted V-shaped teeth spaced continuously therealong on centers of predetermined equal intervals, opposed co-operating V-shaped teeth rigidly mounted on said cages, and means for detachably securing said clamping bar to said rail with said opposed teeth in intermeshing engagement, and arranged to cause each of said cages to be accurately positioned at one of said predetermined intervals by the wedging action of said teeth.

3. In a multiple tool machine, a base rail having opposed side members forming a channel, one of which side members is movable toward and away from the other, a plurality of tool cages adjustable in spaced relation along said channel, said cages having tapered teeth carried thereon, and one of said side members having opposed co-operating teeth formed continuously therealong on centers of predetermined equal intervals, and means for applying said movable side member to said base rail in a direction to intermesh said opposed teeth and cause each of said cages to be accurately positioned at one of said predetermined intervals along said rail by the wedging action of said teeth.

4. In combination with a multiple punch press, having a base rail, a plurality of punch cages slidably adjustable in independently selective spaced relation therealong, and a presser bar for operating said punch cages simultaneously, said base rail having opposed side members forming a channel, one of which side members forms a locking means for a plurality of said cages movable toward and away from the other side member, said cages having tapered teeth carried rigidly thereon, and one of said side members having co-operating tapered teeth formed continuously therealong on centers of predetermined equal intervals whereby the locking movement of said movable side member will cause each of said cages to be accurately positioned at one of said equally spaced intervals by the wedging action of the opposed co-operating teeth on the cages and side member.

5. In a multiple tool machine, a base rail having opposed side members forming a channel, one of which members is movable toward and away from the other, a plurality of tool holders optionally slidable independently of each other along said channel and having tapered teeth extending toward one of said side members, such side member having opposed, co-operating teeth continuously therealong at predetermined spaced intervals, and means for drawing said side members toward each other with clamping action, causing said tool holders, when optionally placed in approximately desired position, to be automatically positioned in accurately spaced relationship with each other at one of said predetermined spaced intervals.

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