

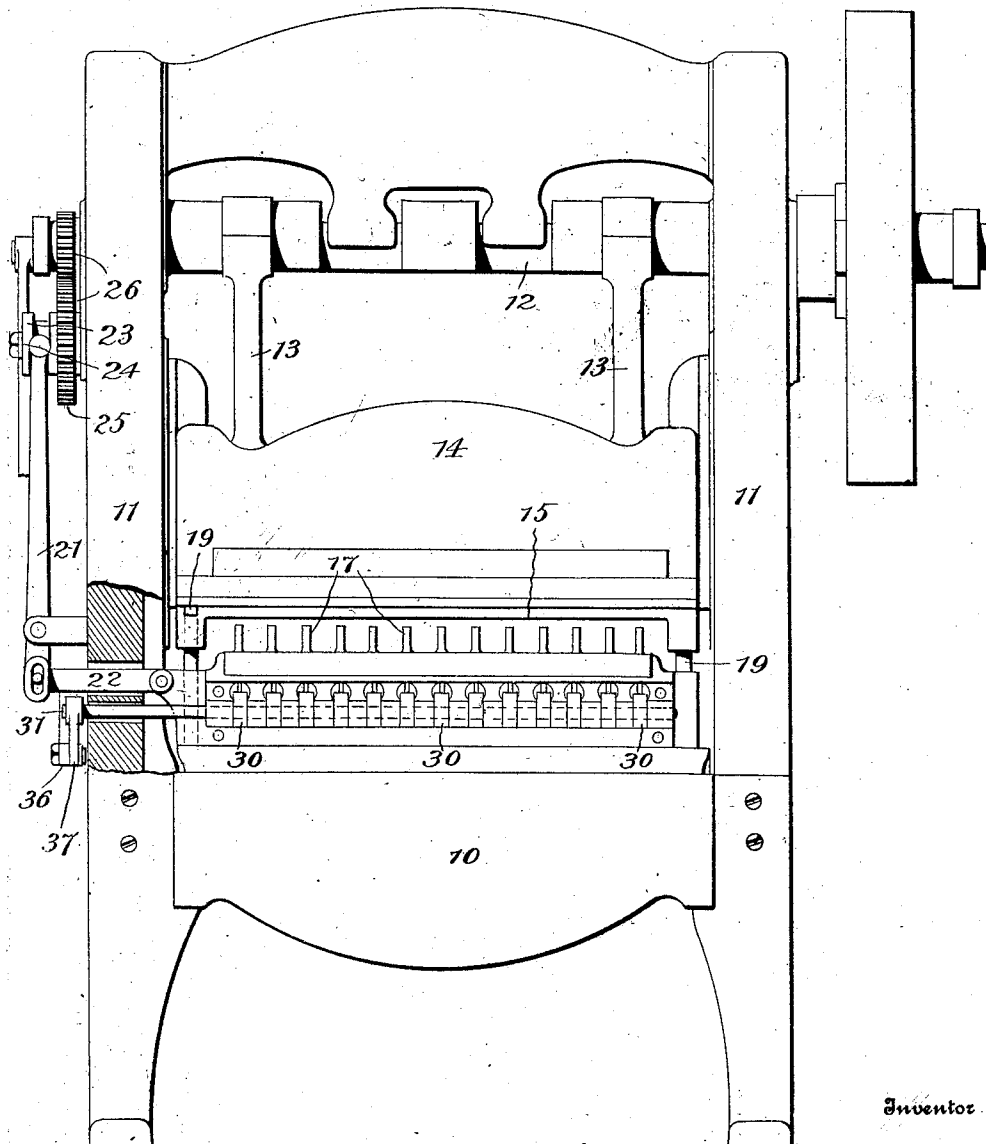
O. SMITH.
GANG PUNCHING PRESS.
APPLICATION FILED SEPT. 25, 1908.

1,062,995.

Patented May 27, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor

Witnesses

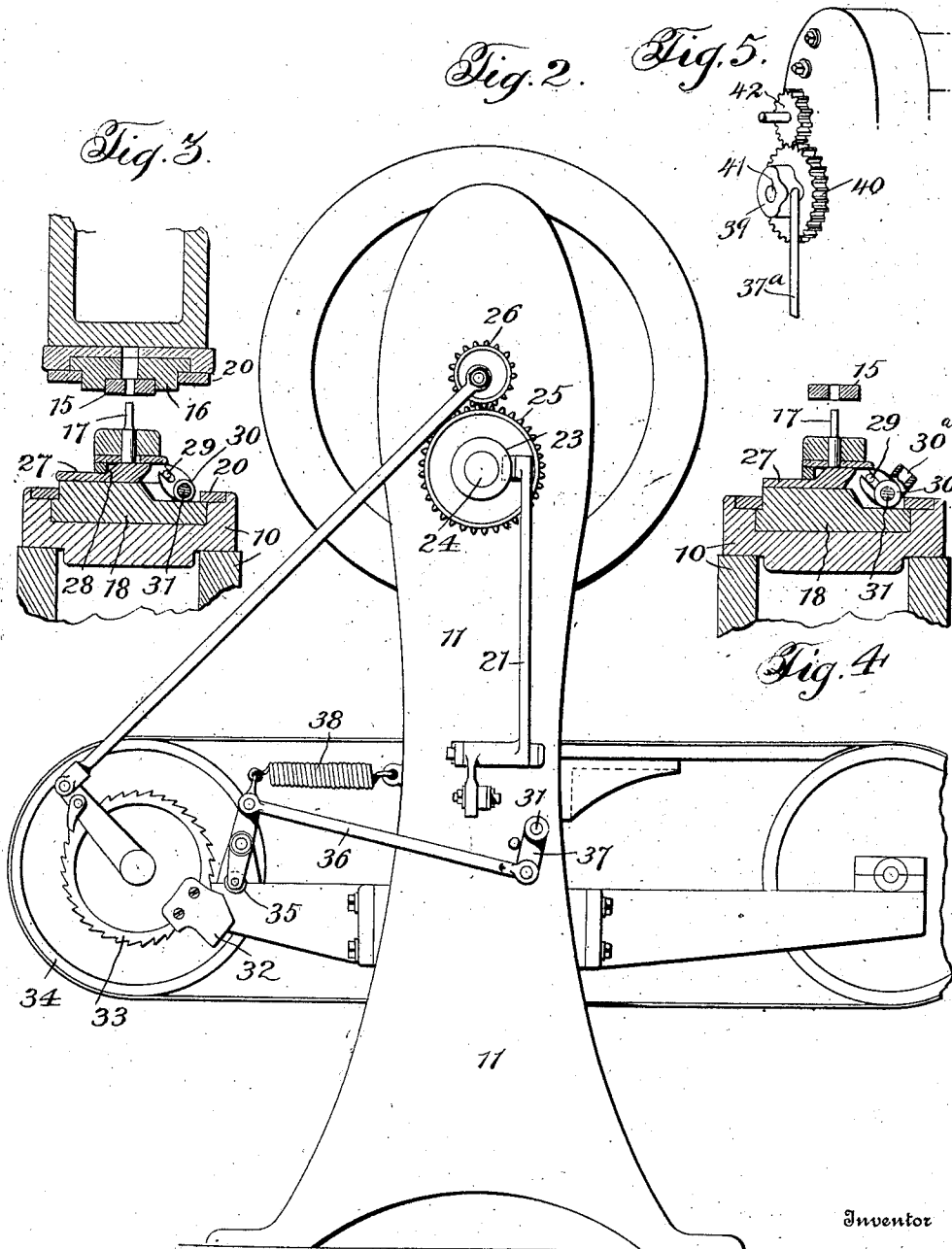
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2 SHEETS-SHEET 2.



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OBERLIN SMITH, OF BRIDGETON, NEW JERSEY.

GANG PUNCHING-PRESS.

1,062,995.

Specification of Letters Patent.

Patented May 27, 1913.

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To all whom it may concern:

Be it known that I, OBERLIN SMITH, of Bridgeton, in the county of Cumberland and in the State of New Jersey, have invented a certain new and useful Improvement in Gang Punching-Presses, and do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to gang presses for operating upon sheet metal, either for cutting out at each stroke numbers of small objects from sheet metal, such as bottle caps, blanks for cartridges, etc., or for the formation of holes or perforations in sheet metal to produce ornamental work, such as the tops of registers, etc., and generally stated, the object of my invention is to throw out or discontinue at predetermined times the action of all or any number of the punching or hole-forming devices, and to provide very simple means for effecting the cutting out of the objects or blanks, or the production of the holes in a staggered relation. The discontinuing or suspension of the action of the punching or hole-forming devices is desirable for several reasons.

First, in punching from a sheet when the end of the sheet is reached, so that only a portion of the face of the punches has contact with the sheet metal, there results an unbalanced pressure on the punches that injures them. This injury to the punches may be avoided by discontinuing or preventing their operation when the end of the sheet is reached.

Second, where the punching operation is performed for the manufacture of small objects from sheet metal, half or fragmentary pieces are formed when the end of the sheet is reached, which are mixed with the whole pieces, and this requires sorting. The necessity for sorting is saved by preventing the action of the punches on that portion of the sheet where half or fragmentary pieces would be formed.

Third, the half or fragmentary pieces that are cut out are waste so that by preventing the cutting of the sheet at the end thereof a strip is left intact that may be utilized.

Fourth, where the object is to provide holes or perforations in a sheet, a design may be produced by preventing or discontinuing the operation of the punches at predetermined times, or according to a predetermined plan.

Referring to the accompanying drawings, Figure 1 shows a front elevation of a press embodying my invention, portions being shown in section; Fig. 2 a side elevation thereof; Fig. 3 a vertical detail section; Fig. 4 a similar section showing an embodiment of my invention in which the means for discontinuing or preventing operation of the punches is hand-operated; and Fig. 5 a fragmentary view showing a different arrangement for automatically discontinuing or preventing the operation of the punches, from that shown in Figs. 1 and 2.

In general construction, the press illustrated in the drawings as an embodiment of my invention is of ordinary construction, it comprising a bed, a bolster 10, vertical side frames or columns 11, and a power-driven main shaft 12 having cranks or eccentrics that are connected by pitmen 13 to a vertically reciprocating ram 14 that moves in guides on the side frames. Mounted upon the ram and bolster, respectively are the cooperating members of a gang punching mechanism, composed of a series or row of punches and a series or row of dies, and as illustrated in the drawing, the dies 15 which are attached to a supporting plate 16, are secured to the bottom of the ram, while the punches 17, which are mounted in a supporting plate 18, are supported by the bolster. The connection between the dies and punch-supporting plates 16 and 18 is one that permits them to be reciprocated laterally or sidewise of the press, and in order to maintain the gang of punches and dies in proper relation at all times, notwithstanding this lateral or sidewise movement of them, they are tied or connected together by means of posts or studs 19, which are secured to the opposite ends of the punch-carrying plate 18 and slidably engage openings in the ends of the die-carrying plate 16, this slidable connection between the plates being necessary in order to allow the vertical movement of the die-carrying plate with the ram. The sliding connection between the plates 16 and 18 and the ram and bolster may be formed by gibs that overlap flanges on the plates. The lateral or sidewise movement of the punches and dies is for the purpose of causing the punching to be done in a staggered relation, the sheet being operated on being maintained in a fixed position as far as lateral or sidewise movement is concerned.

It will be obvious that it is a much simpler matter to shift the punches and dies than to shift the sheet, which, by reason of its length, is of considerable weight, and which also involves shifting the usual sheet-feeding mechanism, that, as ordinarily made, consists of double feed rollers at the front and back of the press, together with the sheet gages, guides and supporting tables. The mechanism I employ for automatically shifting the punches and dies laterally, is a very simple and light one, and consists, as illustrated, of a lever 21 that is pivoted to an arm on the outside of one of the side frames of the press and is connected at its lower end by means of a link or pitman 22 with the vertically stationary punch-carrying plate 18, and at its upper end has a roller that engages a grooved cam 23 on a stud shaft 24 on said side frame, which stud shaft has keyed to it a gear wheel 25 meshing with a gear wheel 26 on the main driving shaft of the press. The gears, of course, are timed so as to produce the desired shifting of the dies and punches with reference to the stroke of the ram and according to the order in which the holes or articles are to be punched.

The punches are slidable vertically or lengthwise in their chucks so that they may occupy a projected position for punching or a retracted position in which they cannot enter the dies, and in the case of my invention illustrated in the drawings they are positively moved to and held in their projected position by a bar 27 for each punch, that is slidably mounted in a guideway in the punch-carrying plate 18 which extends crosswise of the punch at the bottom or lower end thereof, said bar having an inclined or cam surface 28 to act upon the lower end of the punch, when the bar is moved in one direction to positively raise the punch, and having a surface in the plane of the highest part of the incline which engages the punch and holds it in its raised position. When the sliding rod is moved in the opposite direction, it may be moved to a point where it will no longer support the punch, so that when the ram descends with the sliding rods not in position to support the punches, the punches encountering the sheet metal will be forced downward and not perform a punching operation on the sheet metal. For reciprocating the punch-engaging rods, each rod is slotted at its end, and in the slot is a cross pin 29 that is engaged by the slotted end of a lever 30 pivoted to the punch-supporting plate 18. Said lever may be operated by hand, in which case it may be provided, as illustrated in Fig. 4, with a socket 30^a to receive a removable operating handle or rod, each punch-engaging rod being operable independently of the others; or, as illustrated in Figs. 1, 2

and 3, the levers may be rocked automatically, which may be accomplished by mounting all the levers on a rock shaft 31, if it be desired to simultaneously control the operation of the whole gang of punches. As illustration of a means for automatically rocking the levers 30, a cam 32 may be attached to the ratchet wheel 33 on the shaft of the rear sheet-feeding roller 34, which cam by acting on the end of a lever 35 rocks the latter in one direction so that through a link or rod 36 which connects said lever with a crank arm 37 on the rock shaft 31, the latter will be rocked in a direction to release the punches. A spring 38 produces the reverse movement of the parts. Of course there is a sufficiently loose connection between the crank arm 37 and the link 36, or at some other point in the connections between the rock shaft 31 and the lever 35, as to permit the lateral or sidewise shifting of the punching mechanism.

In Fig. 5 I illustrate another means for automatically rocking the levers 30, which comprise a cam 39 which acts on a lever 37^a corresponding to the lever 37, which cam is connected with a spur gear 40 mounted on a stud 41 on one of the columns of the press, which gear meshes with a pinion 42 on the main driving shaft of the press. Of course, still other means for automatically throwing the punches into and out of position for operation may be employed, as for example, worm gearing or a train of spur gears, and I therefore do not limit myself to any particular means for automatically throwing the punches into and out of position for operation.

Of course, instead of the punches being mounted upon the bolster and the dies on the ram, a reverse arrangement may be employed.

It is to be understood that with reference to such matters as mounting the punches and dies on the ram and bolster, the number and manner of throwing the punches into and out of operation, and the time of shifting the punches and dies laterally, the machine may be varied without departure from the scope of my invention, so that presses differing in this and other respects may be built which will nevertheless be an appropriation or embodiment of my invention.

Having thus described my invention, what I claim is—

1. In a press the combination of a ram, means for reciprocating the ram, a gang of independent punches, a rock shaft, supporting devices for the punches connected with said rock shaft, and means to move said rock shaft to simultaneously move said supporting devices into and out of operative relation to the punches.

2. In a press, the combination of a punching means and means to shift the latter with

reference to the work in a direction crosswise of the line of movement of the punching means.

3. In a press, the combination of cooperating punches and dies, a reciprocating ram for operating the same, and means to shift the punches and dies crosswise of the direction of travel of the ram.

4. In a press, the combination of a ram and bolster, punches and dies, plates carry-

ing the punches and dies slidably connected to the ram and bolster, and means to reciprocate said plates.

In testimony that I claim the foregoing I have hereunto set my hand.

OBERLIN SMITH.

Witnesses:

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