No. 808,274. PATENTED DEC. 26, 1905.

G. H. DAVIS.

PERFORATING MACHINE.

APPLICATION FILED FEB. 27, 1903.

2 SHEETS—SHEET 1.

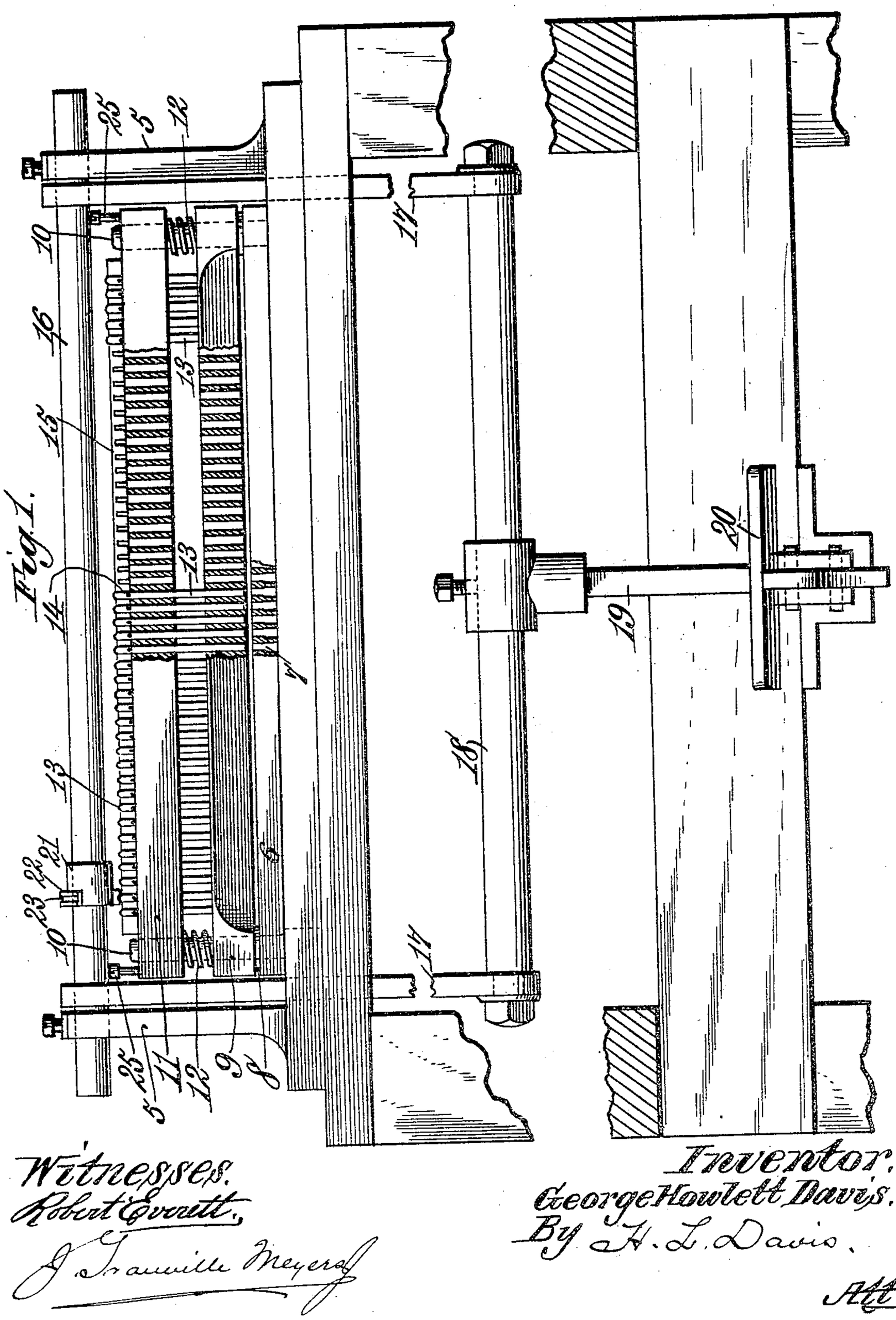


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

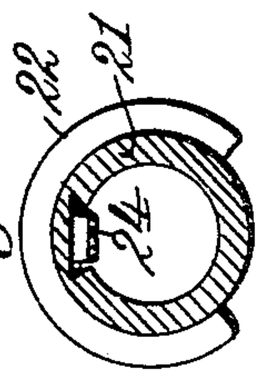


Fig. 4.

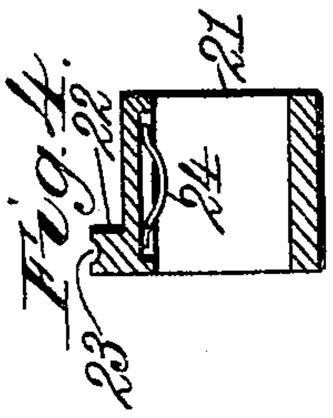


Fig. 5.




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# UNITED STATES PATENT OFFICE.

GEORGE HOWLETT DAVIS, OF WEST ORANGE, NEW JERSEY.

## PERFORATING-MACHINE.

No. 808,274. Specification of Letters Patent. Patented Dec. 26, 1905.

Application filed February 27, 1903. Serial No. 145,351.

*To all whom it may concern:*

Be it known that I, GEORGE HOWLETT DAVIS, a citizen of the United States, residing at Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Perforating-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to perforating-machines of the type in which is employed a punch-carrier having a plurality of punches freely supported therein, with means for locking or setting any given punch of the normally idle gang, whereby to cause the same to be carried through the material being operated upon, while the other punches of the gang will remain inactive.

The machine is especially adapted for making additional or correcting perforations in perforated music-sheets such as are employed to control self-playing musical instruments and for this reason is technically known as a "correcting-machine."

It is well known in the art to which this invention relates that the machines employed to perforate music-paper sometimes miss or skip a perforation, or, in other words, a particular punch fails to perform its required work when called upon, thus leaving an imperforate place in the paper where a perforation should appear or an incomplete perforation, and if the music-sheet were allowed to remain in this shape an inaccurate rendition of the musical composition would naturally result.

It is the object, therefore, of the present invention to provide a simple and easily controlled and operated machine by means of which corrections in perforated music-sheets may be quickly and accurately made and whereby a number of sheets may be operated upon at the same time.

Briefly and generally stated, the machine comprises a punch-carrier carrying a plurality of independently-operable and freely-movable punches, a bar or rod disposed above and in line with the gang of punches, a locking or setting device for the punches movable longitudinally on the said bar or rod and adapted to be brought into coöperative engagement with any single punch of the gang, so as to connect said punch with the punch-carrier and cause it alone to act, and means for reciprocating said bar or rod with its locking device to cause the punch-carrier and the locked or set punch to be forced or driven through the work and make the correcting perforation.

The invention comprises, further, the various features of construction and combination and arrangement of parts hereinafter described and then more definitely pointed out in the claims following the accompanying description.

In order to enable others to understand, make, and use my invention, I will now proceed to describe the same in detail, reference being made for the sake of clearness to the accompanying drawings, in which—

Figure 1 is a front elevation of the machine, parts being shown in section. Fig. 2 is a longitudinal sectional view of the same. Figs. 3 and 4 are detail sectional views of the punch-setting device, and Fig. 5 is a side elevation of the complete machine.

Referring to the drawings by numerals, like numerals indicating like parts in the several views, 1 denotes the machine-table supported on suitable legs, said table having at one end a box or receptacle 2, (partially shown in Fig. 5,) which receives the pack or roll of perforated sheets to be corrected as they come from the perforating-machine proper. The sheets 3 are led from said receptacle 2 over the surface of the table 1 and are fed into a box 4, mounted on suitable supports beneath the table, so that a considerable length of the perforated sheets lie extended along the surface of the table and in plain view of the operator. Mounted upon the said table, near one end thereof, as shown in Fig. 5, is a supporting-frame having slotted brackets 5 at each end thereof. Resting upon said frame is a die-block 6, having suitable openings 7 (see Figs. 1 and 2) to receive the ends of the punches. Above said die-block and separated therefrom by suitable washers 8 is a guide-bar 9 for the punches, said guide-bar being supported and alined relative to the die-block by means of vertical pins or studs 10, mounted in said die-block at either end, the pile of sheets 3 being led between the said die-block 6 and guide-bar 9. The face of the said guide-bar 9 is preferably inclined rearwardly and downwardly to the line of punch-openings (see Fig. 2) in order to expose the music-sheets 3 to the view of the operator and permit the accurate adjustment of the same beneath the punches, and,

if desired, the said bar 9 may be made V-shaped in cross-section, as shown. Above said guide-bar is the punch-carrier 11, which slides freely on the studs 10 and is held in normal elevated position by means of springs 12, interposed between the said die-block 9 and the punch-carrier 11. The gang of perforating-punches 13 are mounted in said punch-carrier 11 so as to slide freely therein, said punches being provided with supporting-pins 14, (see Figs. 1 and 2,) which prevent the punches from dropping through the guide-bar and die-block, but leave them free to move upwardly. In order to limit the upward movement of the punches 13, the said punch-carrier 11 is provided with a slotted rib 15, (see Figs. 1 and 2,) in the slots of which the said punch-supporting pins 14 can move freely in a vertical direction to a limited extent.

Supported in the slotted brackets 5 and in vertical alinement with the punch-carrier 11 is a reciprocating punch-actuating rod or bar 16, said bar 16 being connected with the arms 17 of a yoke 18, which is connected by a suitable connection 19 with a suitable operating device, such as a treadle 20. (See Figs. 1, 2, and 5.) Mounted upon said punch-actuating bar, so as to slide freely thereon over the gang of punches, is a shiftable locking device comprising a sleeve 21, said sleeve being provided with a circumferential rib 22, (see Figs. 1, 2, and 3,) which is broken away throughout a portion of its circumference, so that if the broken-out portion be over any particular punch actuation of the punch-actuating bar will not depress the punch, but the bar and the punch-actuating sleeve will move idly, said cut-away portion permitting also the ready shifting of the sleeve 21 along the bar 16 over the punches. The said punch-actuating rib 22 is preferably provided with a groove 23, so that it will engage the rounded end of the punch with certainty when the sleeve 21 is thrown into locking position, and all danger of inaccurate engagement of the rib and punch is obviated. The said sleeve 21 is preferably provided with a frictional engaging device, as a spring 24, (see Figs. 3 and 4,) so as to hold the said sleeve in any of its adjusted positions and prevent its accidental displacement, although leaving it free to move readily in the hand of the operator.

In order to limit the upward movement of the punch-carrying bar 11 under the influence of the springs 12 relative to the reciprocating punch-actuating bar 16, said bar 11 is provided with adjustable screws 25 at each end, by adjusting which the said bar 11 may be kept at the proper position relative to the bar 16, so as to prevent the gang of punches being elevated by the spring-lifted bar 11 so high as to interfere with the shifting of the punch-locking sleeve 21 over the gang of punches.

I preferably provide the said table 1 with suitable guides 26 on either side, said guides 26 being adjustable, so as to adapt the machine to different widths of paper, and by means of these adjustable guides the paper to be corrected may be adjusted transversely of the table and brought to proper alinement beneath the punches.

Mounted upon the table 1, preferably in the rear of the punching mechanism above described, is an inclined supporting-frame 27, which carries a sheet-holder comprising two supporting-rolls 28 29, upon which rolls the pattern stencil-sheet is mounted, the lower of said rolls 28 being provided with a crank, so that it may be slowly rotated by the operator, and the stencil-sheet may be run from the upper roll to the lower roll and comparison between the said pattern-sheet and the sheets under correction be readily made, the upper roll 29 being connected with a multiplying-gear provided with a crank, so that the pattern-sheet may be quickly run back upon the roll 29 when the correction of one set of perforated sheets has been completed and a new batch of sheets is placed in the machine for correction.

The operation of the machine above described is briefly as follows: The sheets 3, which are to be corrected, having been placed in the position shown in Fig. 5, the operator will draw the sheets from the box 2 along the table and pass them into the box 4, at the same time rotating the roll 28 slowly to bring the pattern-sheet before him, and he will then scan said pattern-sheet and the sheets to be corrected to determine whether or not the sheets which are undergoing correction contain all of the perforations shown in the pattern-sheet or whether some of the punches in the regular perforating-machine have failed to act. If a blank thus having imperforate places or incomplete perforations or an incomplete note is detected, the operator will then center the unperforated note or blank beneath the particular punch in the gang of punches which should be operated to make the correction. The ribbed locking-sleeve 21 will then be slipped into position over the particular punch which it is desired to depress, and the grooved rib 22 will be brought into engagement with the head of that particular punch by rotating the sleeve 21. When in this position, depression of the treadle 20 will through the yoke 18 give a downward reciprocation to the punch-actuating bar 16, forcing the particular punch with which the ribbed sleeve is in engagement downwardly, together with the punch-carrier 11, and make the desired correcting-punch. The other punches, since they rest upon the surface of the note-sheet, will not

be moved, but will slide freely in their seats and remain inactive.

Having described my invention, what I claim is—

1. In a perforating-machine; the combination with a plurality of normally idle yieldably-supported punches; of punch-actuating mechanism; and a manually shiftable and rotatable locking device common to all of said punches to operatively connect any one of said normally idle punches with said punch-actuating mechanism and render it active.

2. In a perforating-machine, the combination with a plurality of normally idle punches; of punch-actuating mechanism; and a shiftable and rotatable locking device, common to all of said punches, to operatively connect any one of said normally idle punches with said punch-actuating mechanism and render it active.

3. In a perforating-machine, the combination with a spring-supported punch-carrier, of a plurality of freely-movable punches mounted therein; means for depressing said spring-supported punch-carrier and a shiftable locking device common to all of said punches, to lock any one of said movable punches to said carrier to reciprocate therewith.

4. In a perforating-machine, the combination with a slidably-mounted reciprocating punch-carrier, of a plurality of freely-movable punches mounted therein; springs normally acting to hold said carrier and the punches elevated, a reciprocating bar to actuate said punch-carrier; and a locking device shiftable longitudinally of said bar to lock any one of said movable punches to said punch-carrier to reciprocate therewith.

5. In a perforating-machine, the combination with a punch-carrier, of a plurality of freely-movable punches mounted therein; a reciprocating bar to actuate said punch-carrier; and a rotatable and longitudinally-shiftable locking device on said bar to lock any one of said movable punches to said punch-carrier to reciprocate therewith.

6. In a perforating-machine the combination with a punch-carrier, of a plurality of freely-movable punches mounted therein; a reciprocating bar to actuate said punch-carrier; and a longitudinally shiftable and rotatable sleeve mounted on said bar and provided with a circumferential rib to engage and lock any one of said movable punches to said punch-carrier to reciprocate therewith.

7. In a perforating-machine, the combination with a punch-carrier, of a plurality of freely-movable punches mounted therein; a reciprocating bar to actuate said punch-carrier; a rotatable frictionally-held sleeve mounted on said bar and shiftable longitudinally thereof; and a circumferential rib on said sleeve to engage any one of said punches and lock it to said carrier to reciprocate therewith, said rib being partially cut away to permit shifting of the said sleeve longitudinally.

8. In a perforating-machine, the combination with a punch-carrier, of a plurality of freely-movable punches mounted therein; a reciprocating bar to actuate said punch-carrier; a rotatable frictionally-held sleeve mounted on said bar and shiftable longitudinally thereof; and a circumferential grooved rib on said sleeve to engage any one of said punches and lock it to said carrier to reciprocate therewith, said rib being partially cut away to permit shifting of the said sleeve longitudinally.

9. In a perforating-machine; the combination with a die-block; of a punch-carrier; a plurality of freely-movable punches mounted therein; a guide-bar beneath which the paper passes having its face rearwardly and downwardly inclined to the line of the punch-openings, a reciprocating bar to actuate said punch-carrier; and means, common to all of said punches, to lock any one of said movable punches to said punch-carrier to reciprocate therewith.

10. In a perforating-machine, the combination with a die-block, of a perforated guide-bar arranged adjacent to said die-block but separated therefrom sufficiently to permit the feeding of stock between these two elements, a plurality of punches passing freely through the perforations in the guide-bar, said guide-bar having its front face inclined rearwardly and downwardly to the line of perforations therethrough to expose the stock being operated upon at a point directly beneath the punches whereby to permit an accurate adjustment of the latter relative to said stock, and means for actuating the punches.

11. In a perforating-machine, the combination with a spring-supported punch-carrier; of a plurality of freely-movable punches mounted therein; a reciprocating bar to actuate said punch-carrier; means for adjusting said carrier relative to said bar; and a shiftable locking device, common to all of the punches, mounted on said bar to lock any one of said punches to said punch-carrier to reciprocate therewith.

12. In a punching-machine, the combination with a plurality of independently-operable punches, of a locking device for said punches, comprising a sleeve having a circumferential rib extending partially around the same, and a support upon which said sleeve is rotatably and longitudinally movable.

13. In a punching-machine, the combination with a gang of independently-operable punches, of a locking device for said punches, comprising a sleeve having a circumferential rib extending partially around the same, said rib having a groove in its periphery arranged

to receive the end of any punch of the gang, and a support upon which said sleeve is movably mounted.

14. In a perforating-machine, the combination with a yieldably-supported punch-carrier, of a plurality of freely-movable punches mounted therein, a reciprocatory bar means connecting the opposite ends of said bar for moving the latter toward and from said punches, and locking means for the punches carried by said reciprocatory bar.

15. In a perforating-machine, the combination with a yieldably-supported punch-carrier, of a plurality of punches freely movable in said carrier, a reciprocatory bar movable to and from said punches, locking means for the punches mounted on said bar, and means for reciprocating the bar.

In testimony whereof I affix my signature in presence of two witnesses.

G. HOWLETT DAVIS.

Witnesses:
ESTELLE JORALEMON,
J. FRED BERSTEELEER.