# United States Patent [19]

**Krumrey**

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[45] **May 15, 1973**


## [54] PERFORATING DEVICE


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[51] **Int. Cl.**.....**G06k 21/06,** G06k 1/02, B26f 1/04, B44b 5/02

[58] **Field of Search**.....234/97, 98, 99, 100; 83/625, 633; 235/61.6 E, 61.7 B, 61.11 A, 61.11 B; 200/46; 101/19



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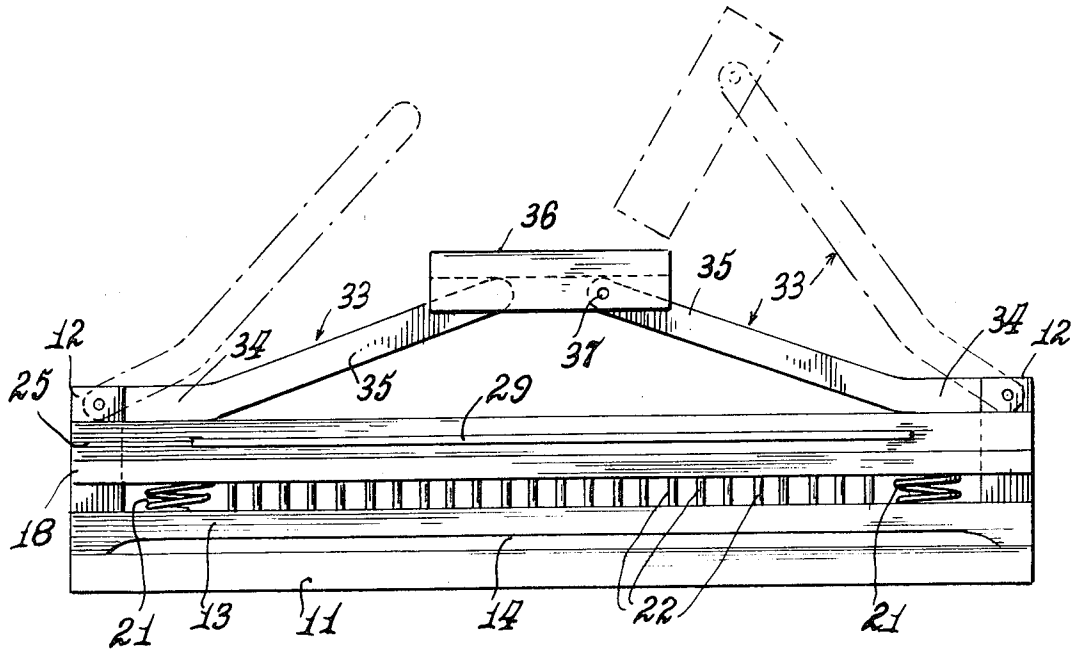
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[57] **ABSTRACT**

A multiple perforator for grading examination papers or score sheets of a type including a multitude of punches all or some of which are actuated upon manipulation of a hand actuated lever system to perforate such papers or sheets.


**7 Claims, 7 Drawing Figures**



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SHEET 1 OF 2

Fig. 1

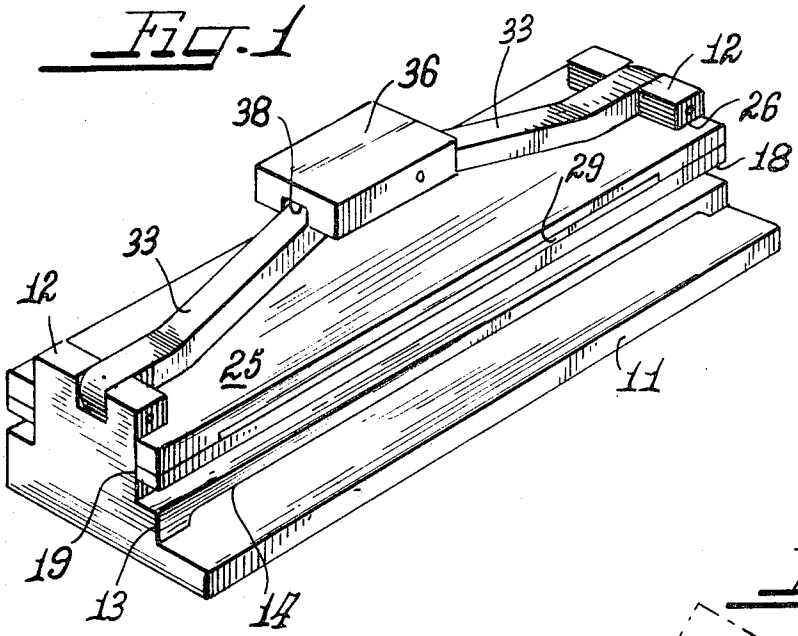
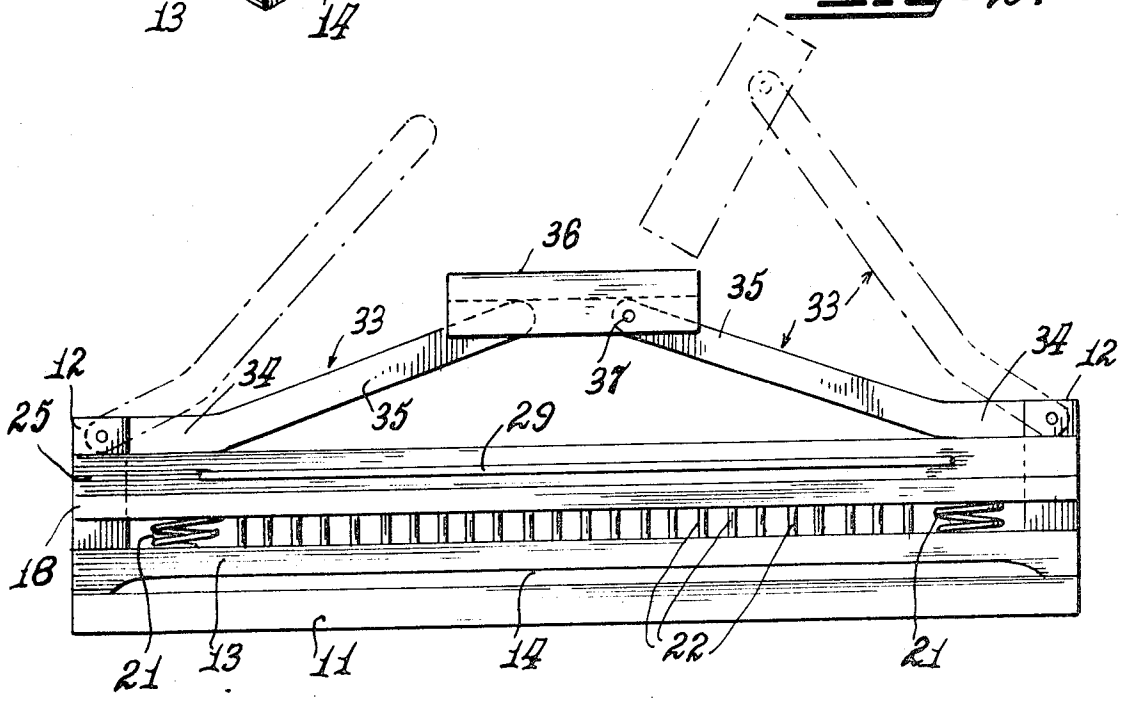



Fig. 2.




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Fig. 3.

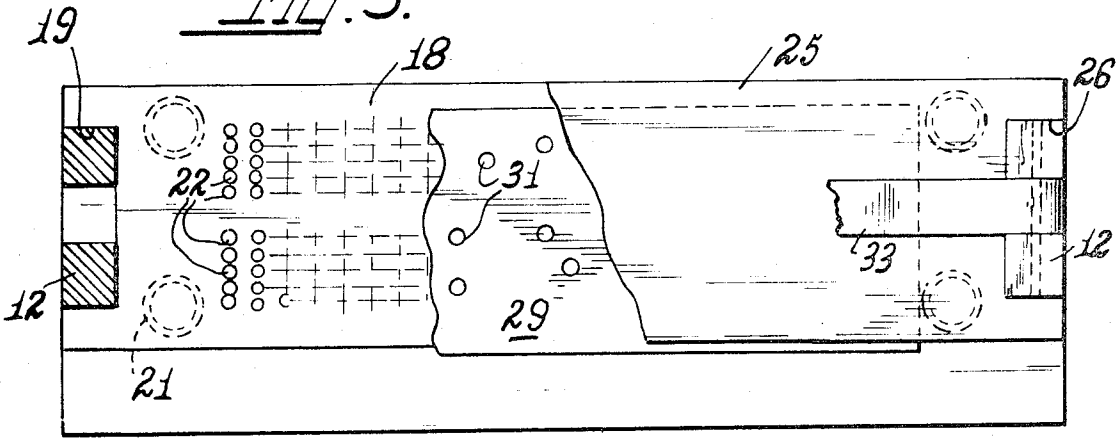



Fig. 4.

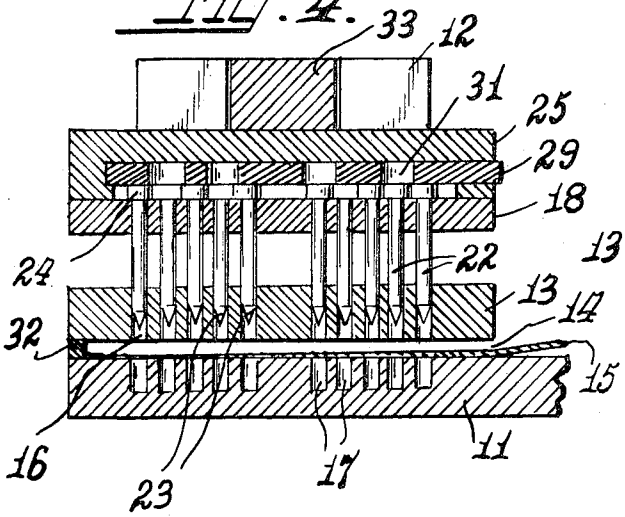



Fig. 5.

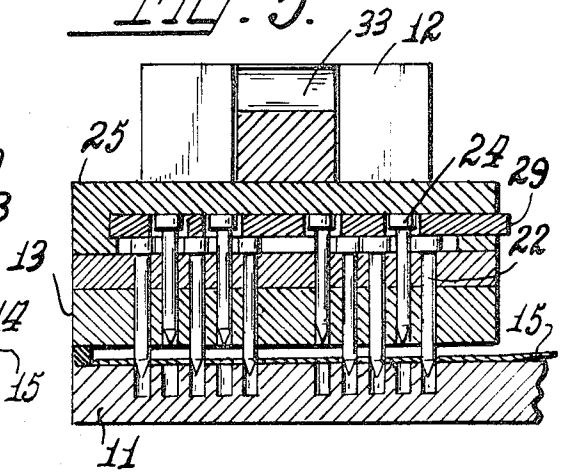



Fig. 7

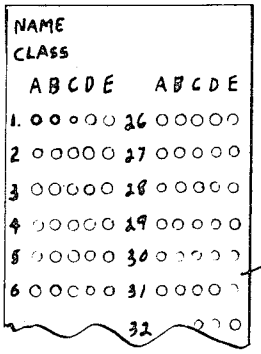
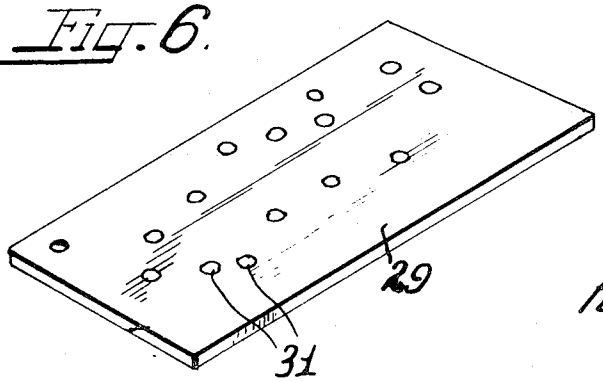



Fig. 6.




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# PERFORATING DEVICE

This invention relates to improvements in perforating devices and is particularly concerned with a multiple grading perforator useful to selectively punch holes in one or more score sheets of multiple choice examination papers to determine the correctness of the answers. Many devices and mechanisms have been devised for correction determination but many are complicated and expensive to construct while others are less efficient than the one herein disclosed.

The grading perforator of the present invention is characterized by the provision of a multitude of selectively placeable and/or selectively actuable punches all or some of which are actuated to perforate an inserted score sheet upon manipulation of novel single handle actuated means. Specifically, the operating means comprises a pair of levers one pivotally mounted at each end of the perforator and which are actuated in unison to urge a pressure place downwardly to depress the punches. The pressure place includes a replaceable selector or indexing plate suitably conditioned to cause actuation of but selected ones of the punches. The punches selected correspond to "correct" markings on multiple choice examination score sheets which are perforated by the selected punches.

It is therefore an object of the invention to provide a novel grading perforator of the character referred to.

Another object is to provide a grading perforator with novel means to selectively elect which of a plurality of punches are to be actuated upon manipulation of single hand actuating means.

Another object is to provide novel means for actuating the grading perforator.

Another object is to provide a perforator structure of the character referred to which is inexpensive and simple to construct, simple in its operation, and very efficient in its use.

Other objects and advantages of the invention will become apparent with reference to the following description and accompanying drawing.

IN THE DRAWINGS:

FIG. 1 is a perspective view of the grading perforator.

FIG. 2 is a front elevational view thereof, showing the operating levers raised into an inoperative position, in dotted lines.

FIG. 3 is a top plan view of the perforator showing successive plates broken away.

FIG. 4 is a transverse sectional view of the perforator showing the punches elevated.

FIG. 5 is a sectional view similar to FIG. 4, showing the punches depressed

FIG. 6 is a perspective view of the selector plate.

FIG. 7 is a fragmentary view of a score sheet.

Referring to the exemplary disclosure of the perforator shown in the accompanying drawings, the perforator is generally rectangular in shape and it includes a base plate 11 having at each end an upstanding post 12 which is substantially narrower than the width of the base. The base plate also includes a raised portion 13, co-extensive with its length but of lesser width, having its underside recessed, as at 14, which recess terminates short of the ends of portion 13 and opens on the front side thereof as best shown in FIGS. 1 and 4. The recess defines a horizontal slot to receive an examination paper score sheet or sheets 15 of a type such as is shown in FIG. 7. The raised portion 13 has a plurality of holes 16 therein and the base plate 11 has a series



of recesses 17 one aligned axially with each hole 16. This structure just described constitutes the rigid or immovable portion of the perforator.

Arranged above the raised portion 13 and held normally spaced therefrom is a punch supporting plate 18. This plate has its ends notched, as at 19, to slidingly embrace the posts 12 which serve to guide vertical reciprocation of said plate. Normally, the plate 18 is held elevated from the raised portion 13 by four (more or less) springs 21 that are arranged between said plate 18 and the raised portion 13.

A multitude of punches 22 having pointed ends 23 and heads 24 are supported on the plate 18 and depend therethrough and into the aligned holes 16. When the plate 18 is in the elevated position shown in FIG. 4, the pointed ends 23 of the punches terminate above the paper receiving recess or slot 14.

A pressure plate 25 lies over the punch support plate 18. As shown, this plate 25 is also notched at its ends, as at 26, to embrace the posts 12 and it is undercut, as at 27, and formed with end guides 28 to receive and support a template 29, therein. This template, shown in FIG. 6, is slidably removable through the front of the pressure plate and it is keyed to a particular answer sheet by having therein selectively placed apertures 31 overlying selected punches 22.

In operation, insofar as described, a score sheet 15 is inserted into the slot 14 a distance to carry its lead edge into abutment with a stop wall 32. The pressure plate 25 is then urged downwardly, carrying with it the punch support plate 18 and punches therein. However, those punches that align with the template apertures 31 will cease to move downwardly upon contact with the sheet, whereas the remaining punches will continue on downwardly to pierce the sheet and enter into holes 17.

As an alternative to use of the perforated template 29, a non-perforated plate may be inserted in the pressure plate 25 and, with the pressure plate temporarily removed, all punches 22 not to be activated are removed from the punch support plate 18 while those remaining are positioned to respond to and punch answers on the score sheet.

Downward movement of the pressure plate 25 and punch support plate 18 is accomplished by means of a pair of levers 33, one each pivoted to a post 12. Each lever includes a horizontal portion 34 that lies against the pressure plate and an upwardly inclined free end portion 35. One of these levers mounts a handle 36, pivoted to it at 37, while the other lever is engaged loosely in a groove 38 on the underside of the handle 36. It should be evident that upon applying downward pressure on the handle 36, both levers function simultaneously to urge the pressure plate down uniformily.

Although I have described a preferred embodiment of the invention, in considerable detail, it will be understood that the description thereof is intended to be illustrative, rather than restrictive, as details of the structure may be modified or changed without departing from the spirit or scope of the invention. Accordingly, I do not desire to be restricted to the exact construction described.

I claim:

1. Perforating apparatus for grading examination papers comprising a base plate, a punch guide plate integral with said base plate and spaced thereabove to provide a slot to receive a sheet to be graded, a vertically reciprocal punch support plate yieldably spaced above

said punch guide plate, a plurality of punches carried by the punch support plate and depending into holes in the punch guide plate, a vertically reciprocal pressure plate overlying the punch support plate, upstanding posts on said base plate on which the punch support plate and pressure plate are guided, a removable template carried by the pressure plate, and manual means operable to depress the pressure plate uniformly to urge the punches through the sheet, the manual means comprising a pair of levers, which are hingedly connected to the posts.

**2.** The apparatus recited in claim **1,** in which means detachably connects the levers for movement in unison.

**3.** The apparatus recited in claim **1,** in which the levers each comprise an arm having a generally horizontal portion and an upwardly inclined portion.



**4.** The apparatus recited in claim **1,** in which the template includes means to engage and depress but some of the punches.

**5.** The apparatus recited in claim **1,** in which the pressure plate is removable

**6.** The apparatus recited in claim **1,** in which the punch support plate is removable.

**7.** The apparatus recited in claim **1,** in which the yieldable means comprises a plurality of springs arranged between the punch guide plate and the punch support plate.

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