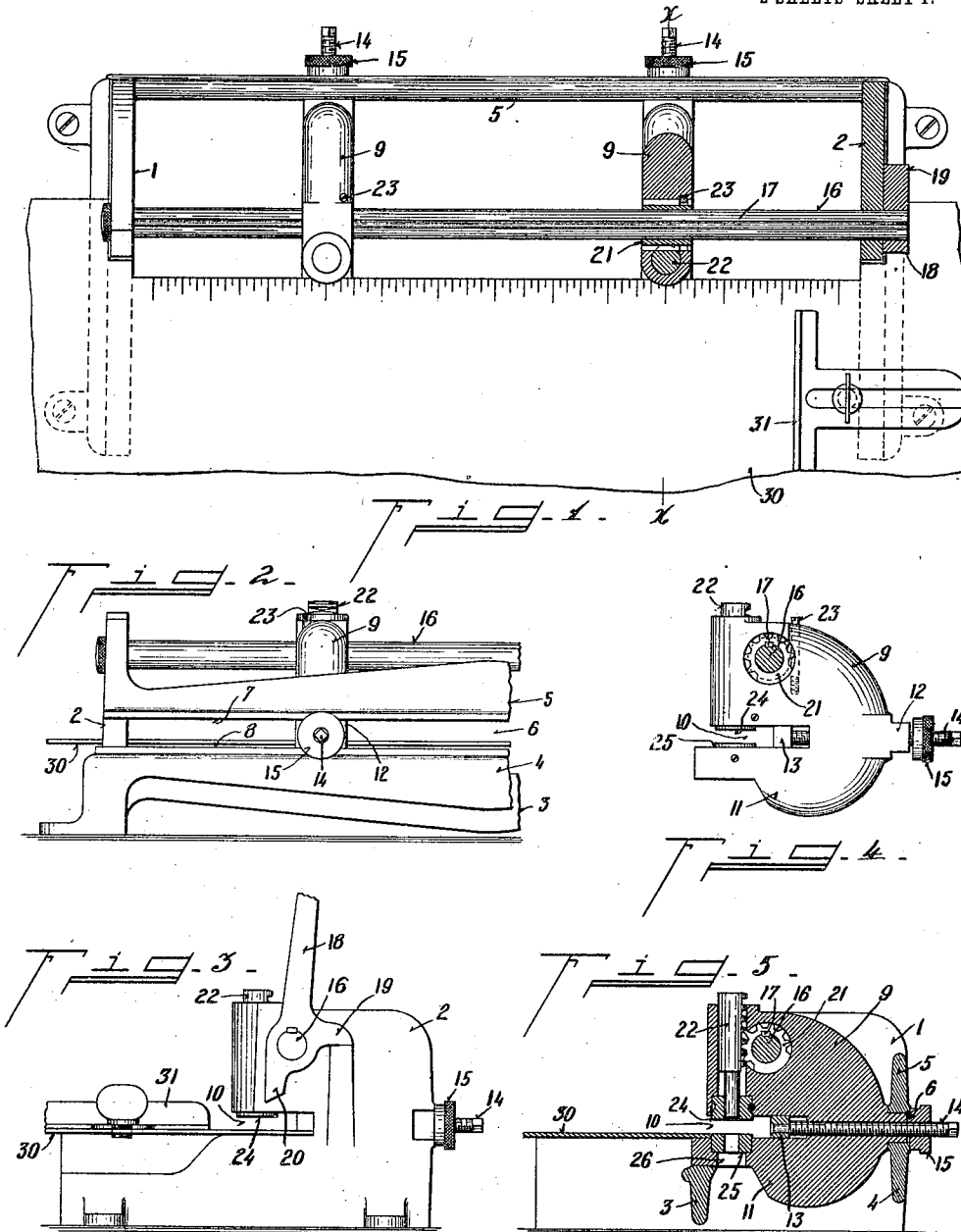


C. DOM.
PAPER PERFORATOR.
APPLICATION FILED OCT. 7, 1912.

1,129,652.

Patented Feb. 23, 1915.

2 SHEETS-SHEET 1.



Witnesses

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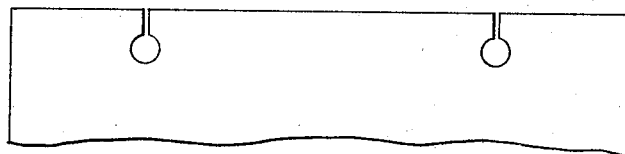
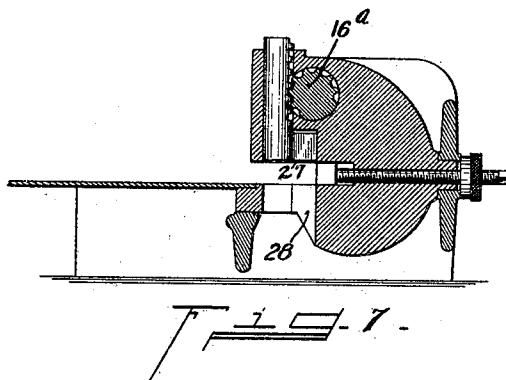
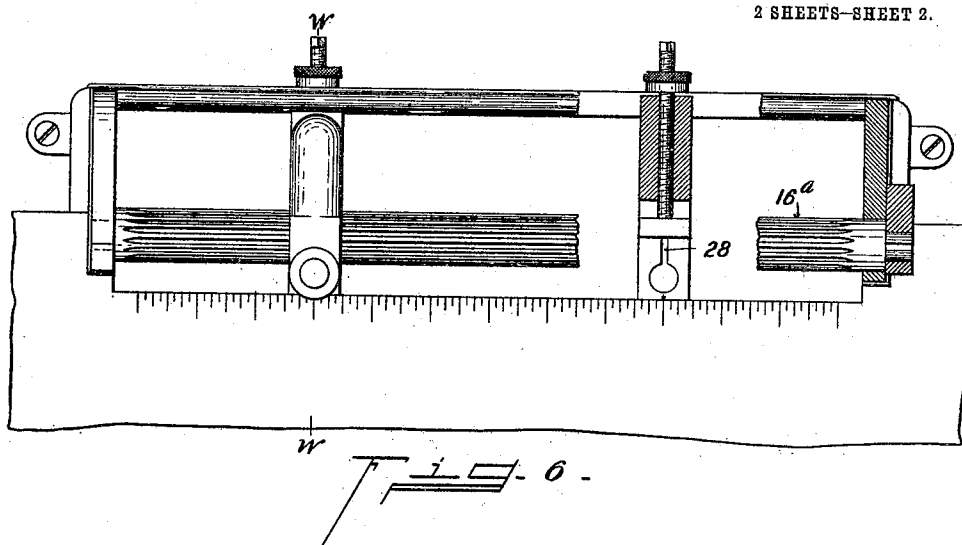
Attorneys

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2 SHEETS-SHEET 2.



Witnesses

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CHESLEY DOM, OF CINCINNATI, OHIO, ASSIGNOR TO THE SAMUEL C. TATUM COMPANY,
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PAPER-PERFORATOR.

1,129,652.

Specification of Letters Patent.

Patented Feb. 23, 1915.

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To all whom it may concern:

Be it known that I, CHESLEY DOM, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Paper-Perforators, of which the following is a specification.

My invention relates to a paper perforator or punch, and primarily to a type manually operated.

My invention comprises primarily a perforator unit of integral head and base, with an intermediate cut-away portion, providing a throat between the punch members, for the reception of the material to be perforated. The perforator units may be serially mounted upon a supporting frame or superstructure, and adjustable thereon, to provide various relative spacing, with the movable punch members of the series actuated by a single actuating rod, in the nature of a combined rack and shaft having a toothed intermesh with each movable punch member. Thus, each perforating unit has a unitary function in its adjustment, and its integral body formation provides rigidity and insures the maintenance of the alinement of its punch members.

One of the objects of my invention is to provide a perforator with one or more punch or perforator units adjustable upon a base, with an operating rod or shaft engaging all the movable punch members of the series by a toothed intermesh.

Another object of my invention is to provide a perforator, with a punch member supporting unit of integral head and base, and intermediate cut-away throat portion dividing the same. A movable punch member mounted in the head portion, and a stationary punch member mounted in the base portion, and an actuating rod or shaft projected through the head portion at right angles to the punch members.

Another object of my invention is to provide a perforator of an integral head and base units, each having an intermediate paper-receiving throat, with the punch members oppositely disposed relative thereto, and with the movable punch member guided within the head its entire range of movement and its cutting end guided through the throat opening, whereby delicate radiating ribs may be provided and operated

through heavy thicknesses of material, without disturbing its alinement.

Another object of my invention is to provide a perforator, with one or more unitary perforating units adjustable upon a superstructure, the units resting upon rails extended longitudinally with the adjustment of the units. The rails providing multiple points of bearing contact. A throat depth gage and a two-fold functioning lock for setting the depth gage and the perforator units in their respective adjustments.

The features of my invention will be more fully set forth in the description of the accompanying drawings, forming a part of this specification in which:—

Figure 1 is a top plan view of my punch or perforator with one of the perforator units shown in section, and a portion of the supporting table cut away. Fig. 2 is a rear end elevation of a portion of the machine shown in Fig. 1. Fig. 3 is a side elevation of the same. Fig. 4 is a detailed side elevation of a perforator unit. Fig. 5 is a section on line *x, x*, Fig. 1. Fig. 6 is a view similar to Fig. 1, but illustrating a modified form of perforator unit and punch actuating rod. Fig. 7 is a section on line *w, w*, Fig. 6. Fig. 8 is a top plan view of a sheet of paper perforated by punch members such as shown in Figs. 6 and 7.

The perforator herein shown and described is primarily adapted for perforating paper, and of a hand-operated type, to perforate sheets intended for temporary binding, and to prepare the same for the loose sheet holders known to the trade as temporary binders. The perforator units are adjustable to increase their range of use.

With my improvement the perforator units are self-contained unitary structures conveniently adjusted without disturbing the operative mechanism. It is obvious, however, that the general features of my invention can be embodied in a perforator in which the perforator units are formed integrally with a common base and the parts permanently located, for a standard spacing of perforations, and such permanently spaced type of perforator is herein included, except where otherwise specifically distinguished in the claims herein. The base, or super-structure upon which the perforator units are adjustably supported, is prefer-

ably of skeleton form, with the perforator units resting upon rails, rendering it possible to manufacture a very strong and rigid structure, and very light in weight. This super-structure comprises the side or end plates 1, 2 connected by the rails 3, 4, and 5, with rails 4 and 5 relatively superposed and parallel providing an intermediate way 6 and opposing bearing surfaces 7 and 8. The rail 3 supports the forward portion of the perforator units, while the rails 4, 5 support the rear portion thereof. Thus a clearance is produced between the forward and rearward rails, into which the perforator units depend or project, enabling the production of a circular form of perforator unit body to materially increase its strength at such portions receiving the greatest strain.

9 represents the body of the perforator unit, provided with an intermediate cut-away throat portion 10 separating the upper and lower die or punch members. The body is formed substantially circular in outline, with the base portion 11, in which the stationary die member is mounted, depending or projecting into the clearance between the rails, enabling the production of a narrow perforator unit, increased in cross sectional area at the points receiving the punching strains direct and torsionally radiating from the throat as a center. Thus, the head and base portions or elements are capable of withstanding the opposing perforating strains without fracture to the punch body as an integral element and the substantial elimination of such strains upon the rails of the super-structure. The rear portion of the body 9 is provided with a lug or anchor projection 12, having the right angled top and bottom bearing surfaces, the vertical surfaces forming shoulders, engaging respectively with the rails 4 and 5 to prevent displacement of the body upon the rails, and relatively insure and maintain the alinement of the punch units of a series. This lug 12 projects preferably in a radial line with the throat 10. The throat is provided with a depth gage in the nature of a slide block 13 adjustable within the throat by means of the adjusting screw 14 projecting through the rear portion of the body, and lug projection, and medially between the rails 4, 5.

15 represents a nut screw-threaded upon the screw 14 adapted to engage bearing surfaces formed upon the rails 4, 5, for locking the body or perforating unit in any adjusted position, at the same time serving as a set-nut, for locking the depth gage screw in its adjusted position. Thus, the nut and screw perform a twofold function, and cheapen the cost of manufacture, by a reduction in the number of parts.

16 represents a rock shaft (see Fig. 1)

having a longitudinal spline 17. This shaft is supported in the end plates 1, 2, with one end of the shaft provided with a hand lever 18, (see Fig. 3) for rocking said shaft. The lever 18 is provided with stop lugs 19, 20, radiating therefrom adapted to engage abutments formed on the end plate 2, to limit the motion of the rock shaft in either direction, the function of which will be described hereafter.

In the form of perforator shown in Figs. 1 and 5 each head of the perforator units is provided with a bore concentric with the shaft 16, and into which a pinion 21 is mounted, and splined to the shaft 16, the teeth of the pinion engaging the circumference of the bore, which thereby serves as a bearing for the shaft and pinion, preventing flexing thereof. The teeth of the pinion engage with teeth formed on the stem of the movable punch member 22, to reciprocate the same vertically within the head of the perforator unit upon rotation of the shaft and pinion. The pinion is provided with an annular groove, into which a pin 23 projects for retaining the gear or pinion within the bore of the head to prevent its displacement in a lateral adjustment of the perforator unit upon its base or super-structure. 24 represents a guide block mounted within the head at the upper portion of the throat through which the punch end of the movable punch member projects and travels. Such guide block can, however, be dispensed with when the punch end is of the same diameter as its stem, but is advantageous when the punch end is of smaller cross-sectional area than its stem, as it prevents displacement of alinement with the stationary punch member. 25 represents a stationary punch member comprising a removable plate seated and secured within the base of the perforated unit. This construction of movable and stationary punch members enables the same to be readily removed for substitution, to change the die elements. The base of the perforator unit beneath the stationary punch member is provided with an orifice 26 to receive the cuttings and discharge the same into a receptacle, which may be mounted at the base of the rails.

In the form illustrated in Figs. 6 and 7 the rock shaft 16^a comprises a combined shaft and elongated pinion with the teeth thereof extended substantially the entire length of the shaft, between the end plates 1, 2. This form eliminates the independent pinion in each head as shown in Figs. 1 to 5. The teeth of the shaft 16^a engaging and journaling directly against the surface of the bore through which it projects, and may be regarded as the preferable form of rock shaft, although such shaft must be made in special sizes commensu-

rate with each size of super-structure, to accommodate for a complete range of adjustment. The toothed formation on the rock shaft 16^a or pinion 21, is of a number sufficient to compensate for the maximum movement of the movable punch member with the untoothed peripheral portion of each increasing the bearing surface. Therefore, to prevent undue strains from being brought upon the teeth of the stem of the movable punch member, at the limits of punch movement, the operating lever is provided with the stops heretofore described, relieving such strains from being imparted to the teeth, which might have a tendency to rupture or break the same.

To provide open perforations, as illustrated in Fig. 8, in the ends of a sheet of paper, the movable punch member is provided with a radiating rib 27, which type permits the insertion or removal of a sheet at random within the holder, without disturbing the other sheets contained in the holder, or without removing the binder elements, upon which the sheets are mounted. The free end of said rib is guided in its entire range of movement in the guide way 28 formed in the perforator unit, thereby insuring the intermesh or registration of the punch members, and also enables the rib to be of a small area in cross section to merely provide a cut for accessibility to the perforations, so as not to materially disturb the texture of the paper along its marginal perforated edge. 30 represents a table plate secured to the side frames 1 and 2, extending in a horizontal plane from the plane of the lower surface of the throat, upon which the material to be perforated is supported. 31 represents a gage adjustably secured upon the table plate 30.

Having described my invention, I claim:—

1. A perforating machine, comprising a super-structure composed of a series of cross rails, two thereof relatively superposed and parallel providing opposing bearing surfaces and an intermediate way, a perforator unit engaging all of said rails of the series and projecting into said way, and engaging said bearing surfaces to prevent displacement of the unit.

2. A perforating machine, comprising a super-structure composed of a series of cross rails, two thereof relatively superposed and parallel providing opposing bearing surfaces and an intermediate way, a perforator unit engaging all of said rails of the series and projecting into said way, and engaging said bearing surfaces to prevent displacement of the unit, and means for locking said perforator unit to said superposed rails.

3. In a perforating machine combining a frame of skeleton form, comprising a series of three parallel cross rails, a forward and

two superposed rear rails, with a perforator unit of circumferential outline supported upon said rails, with a portion thereof depending between the forward and rear pair of rails, said superposed rails having opposing longitudinal and vertical bearing surfaces against which said perforator unit engages to prevent displacement, and means for clamping the same to said rails.

4. In a perforating machine, a super-structure thereof, comprising a series of longitudinal rails upon and between which one or more perforator units are adjustably mounted and secured, a pair of said rails relatively superposed and parallel, providing an intermediate way for the reception of a portion of the perforator unit, or units, and to which they are clamped in any adjusted position.

5. In a perforating machine, a super-structure thereof, comprising a series of longitudinal rails relatively spaced, a perforator unit of substantially circular outline having a cut-away throat portion along a horizontal radius line thereof defining the head and base portions thereof, with the base portion supported on said rails and depending between same and adjustable thereon, means for clamping the perforator unit in any adjusted position, punch members above and below said throat, the upper comprising a movable member having a toothed formation longitudinal thereof, a toothed actuating rod supported within said head at right angles to the movable punch member with its teeth intermeshed with the teeth of the movable punch member.

6. A perforating machine comprising a super-structure having a series of longitudinal rails relatively spaced, two thereof relatively superposed and parallel, providing opposing bearing surfaces and an intermediate way, one or more perforator units, each of circular outline having a cut-away throat portion extended along a horizontal radius line thereof defining the head and base portions of the unit, a plane surface formed upon the base of said unit adapted to engage one of the rails of the series, a projection extending from the rear portion of said unit adapted to project into said way formed by the superposed rails, and engage against the bearing surface, and means for locking the units thereto.

7. A perforator machine comprising a super-structure having a pair of longitudinally superposed relatively parallel rails, a perforator unit projecting between said rails and engaging therewith, having a throat formed therein in a horizontal plane, a depth gage block slidably mounted within said throat having an adjusting screw projected through said perforator unit, and between said superposed rails, a nut threaded upon said screw for locking the same and

the perforator unit to the rails in any adjusted position.

8. A perforating machine having a base, a pair of parallel superposed rails providing
5 opposing bearing surfaces, and an intermediate way longitudinally above the base, a perforator unit integrally combining a head element and a base element divided at the forward portion by a slot, the base element
10 having a plane surface at its lower forward portion to provide a foot for the unit resting upon the base, and an element projecting rearwardly from the unit having opposing plane surfaces to provide
15 a rear support for the unit and projected between and engaging with said rail bearing surfaces.

9. A perforating machine having a base, a pair of parallel superposed rails providing

opposing bearing surfaces, and an intermediate way longitudinally above the base, a
20 perforator unit integrally combining a head element and a base element divided at the forward portion by a slot, the base element
25 having a plane surface at its lower forward portion to provide a foot for the unit resting upon the base, and an element projecting rearwardly from the unit having opposing
30 plane surfaces to provide a rear support for the unit and projected between and engaging with said rail bearing surfaces, and means for binding said unit to said rails.

In testimony whereof, I have hereunto set my hand.

CHESLEY DOM.

Witnesses:

OLIVER B. KAISER,
CLARENCE B. FOSTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."