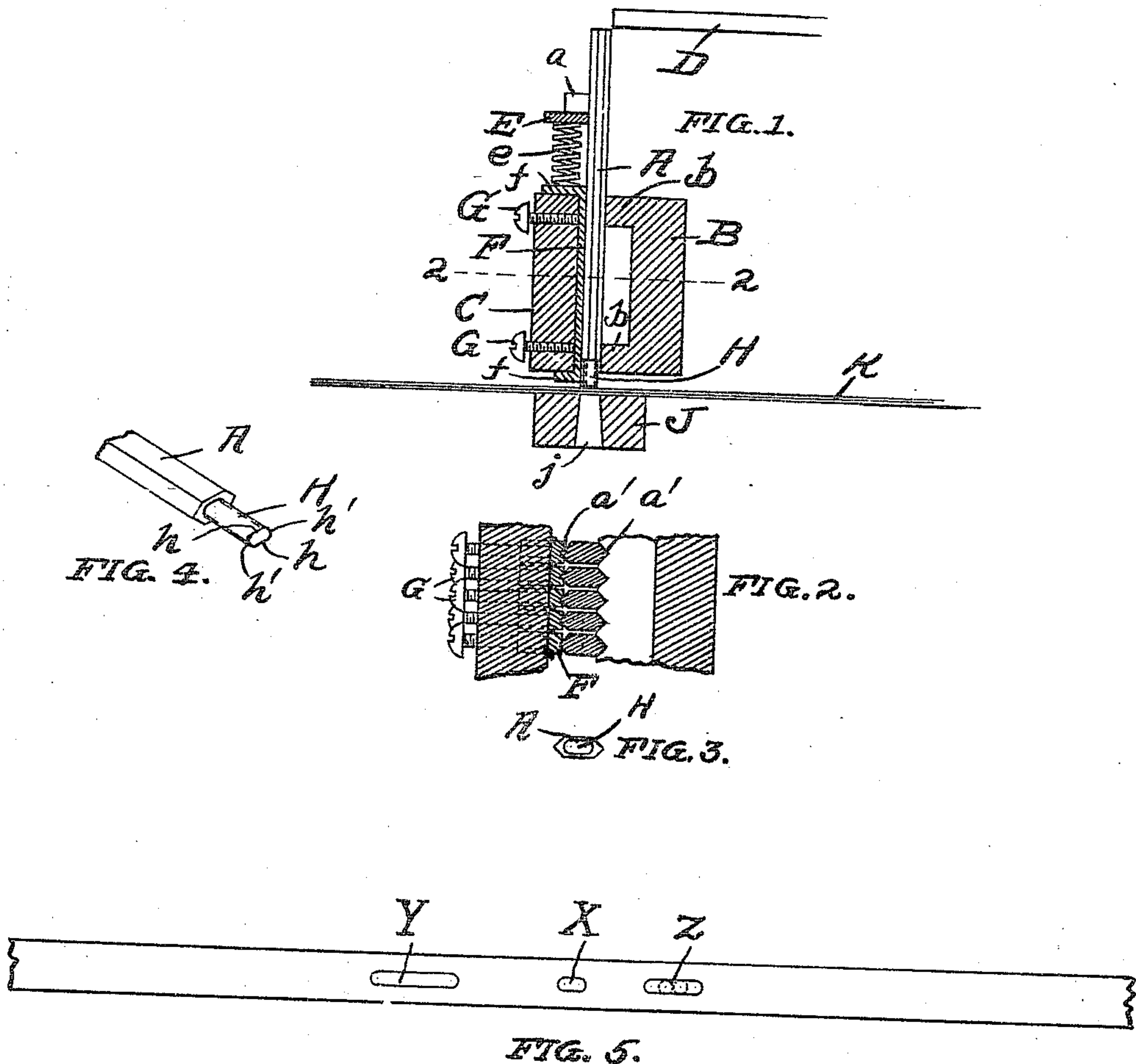


A. J. SWING.
 APPARATUS FOR CUTTING PERFORATED MUSIC SHEETS.
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Patented Jan. 31, 1911



Witnesses

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APPARATUS FOR CUTTING PERFORATED MUSIC-SHEETS.

983,094.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALFRED J. SWING, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Apparatus for Cutting Perforated Music-Sheets, of which the following is a specification.

My invention relates to the punch employed for cutting the perforations in the music sheets and the means for mounting and guiding the same.

My invention consists in the parts and combination and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a vertical section of a punch and its guide; Fig. 2, an enlarged section on line 2-2 of Fig. 1; Fig. 3, a bottom plan view of a punch; Fig. 4, a perspective view of the lower end of a punch and Fig. 5 a plan view of a strip of paper, showing the character of the perforations made by the punch.

In the apparatus, a series of punch bars A are slidably mounted between the guide pieces B and C and are adapted to be thrown in and out of operation by means of selector bars D which may be operated by any of the usual or desired means for this purpose as will be readily understood by those skilled in the art. Each of the punch bars carries a stop *a* resting upon a bar E which is supported by springs *e* and serves to elevate the punches after each operative stroke. The body portion of each of the punch bars is made in the form shown in Fig. 2, with V-shaped edges *a'* and the limbs *b* of guide B are provided with corresponding V-shaped notches to receive the rear edges of the punch bars. The guide C is milled on its inner face to form channels adapted to receive bearing strips F which loosely rest therein, being held from vertical displacement by means of flanges *f* extending over the top and bottom guide C. The inner faces of strips F are provided with V-shaped grooves adapted to receive the forward edges of punch bars A. Set screws G are threaded in guide C to bear against the top and bottom of each of the strips F so that the strips F may be nicely adjusted to the punch bars A. By this arrangement it will be seen that the strips F may be nicely adjusted to take up lost motion or wear on the punch bars or the

guides and prevent turning of the punch bars.

The lower ends of punch bars A are formed into oblong shaped punches H which have flat sides *h* and rounded ends *h'*. A die J having oblong shaped openings *j*, is placed under punches H and is adapted to cooperate therewith to perforate the music sheets K as they are intermittently fed over die J. The cross section of each of the punches H is preferably approximately twice as long in the direction of the feed of the sheets K as it is wide and its length is made equal to the length of the smallest hole or unit desired in sheets K. Suitable mechanism is provided for intermittently feeding the sheets K, a distance equal to the length of the flat sides *h* of the punches during the period of elevation of the punches. By this construction it will be seen that a single operation of a punch will cut a perforation in sheets K, having flat or straight edges and rounded ends as shown at X in Fig. 5, and that a series of consecutive operations of a punch will cut a perforation having continuous flat or straight edges and rounded ends as shown at Y in Fig. 5.

At Z in Fig. 5, I have illustrated another perforation in which the positions of the punch in cutting are indicated in dotted lines.

The intermittent feed of the paper to an extent less than the length of the cut made by the punch at each corresponding reciprocation, results in an overlapping of the successive perforations and the production of a straight sided slot of greater length than that of the punch member. In Fig. 5 such perforations are illustrated, and they are formed with sharp parallel edges free from any raggedness, and the absence of such raggedness or irregularity provides a full area of perforation essential when the sheet is used as a record for a musical instrument.

The rounded ends of the perforations obviate sharp corners which are easily engaged and torn, and the rounded ends of the punches are not readily chipped. The elongated shape of the punches also permits of a comparatively rapid feed of the sheets to be perforated, thus increasing the output and the perforations may be made very narrow thus increasing the number of lines of perforations per inch of width of sheet.

I claim as my invention:

1. As a means for guiding punches, the combination of punch bars A having V-shaped edges; guide B having V-shaped notches adapted to receive an edge of punch bars A; guide C carrying strips F having V-shaped grooves adapted to engage the other edge of bars A; and set screws G for adjusting strips F, substantially as specified.
2. In apparatus of the class described, the combination of punch bars A provided with V-shaped edges and carrying punches H having straight sides h and rounded ends h^1 ; guide B having V-shaped notches adapted to receive an edge of bars A; guide C carrying strips F having V-shaped grooves adapted to engage the other edges of bars A; and set screws G for adjusting strips F, substantially as specified.
3. In an apparatus of the class described, a series of punch members, a guide therefor, within which said punch members reciprocate respectively and separate the same from each other, and a second guide member registering respectively with each punch member and adjustable relative thereto.
4. In an apparatus of the class described, a reciprocating punch member, a guide

therefor, said punch member provided with oppositely disposed V-shaped edges registering with coincidently formed grooves in said guide, means for adjusting said punch member within its guide, means for controlling the reciprocation of said punch member, and relatively with the feed of the paper to be perforated, whereby a series of punch reciprocations are had to a given length of paper feed to make a perforation with straight, parallel edges of greater area than the cross-section of the punch.

5. In an apparatus of the class described, a reciprocating punch member, a guide therefor, means for controlling the reciprocation of said punch member, said punch member being of greater area in cross-section than the relative area of an intermittent feed of the paper thereto, whereby a series of punch reciprocations are had to a given length of paper feed to make a perforation with straight, parallel edges of greater length than the punch member.

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Witnesses:

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