A. KETTNICH.

PERFORATING DEVICE.

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1,083,541. Patented Jan. 6, 1914.

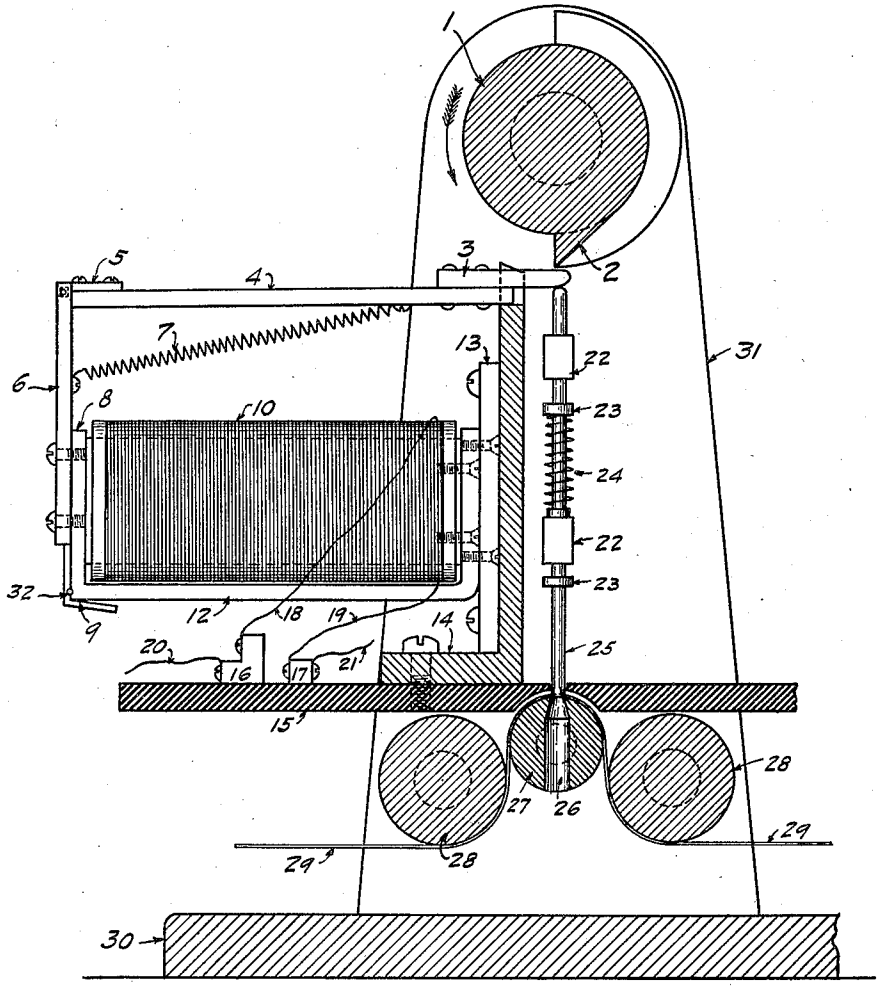


Fig. 1.

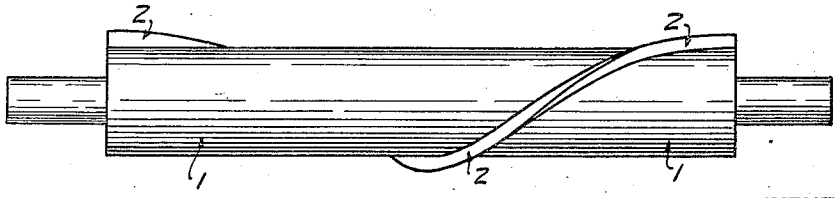


Fig. 2.

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PERFORATING DEVICE.

1,083,541. Specification of Letters Patent. Patented Jan. 6, 1914.

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To all whom it may concern:

Be it known that I, ALBERT KETTNICH, a subject of the Emperor of Germany, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Perforating Devices, of which the following is a specification.

The object of my invention is to facilitate the manufacture of perforated music rolls or sheets, such as are used for automatic player pianos and other automatic musical instruments.

In the drawing Figure 1 is a sectional side view of a perforating mechanism embodying my improvements; and Fig. 2 is a front view of the improved roller mounted at the top of such mechanism.

Referring to the drawings:—On a table or plate 30 are mounted standards 31 which constitute the supports for the whole structure hereafter described. A horizontal die rod 27, having a multiplicity of vertical holes 26, is mounted in, and extends between, standards 31. Above each of holes 26 a punch 25 is slidably mounted in two horizontal perforated rods 22 which extend between standards 31, above die rod 27, and are mounted in said standards.

With its axis directly above punches 25, there is rotatably mounted in standards 31 roller 1, provided on its surface with a spiral rib 2, preferably covering the entire length of roller 1 in one revolution, as shown in Fig. 2. By suitable mechanism, not shown in the drawing, roller 1 is revolved at a high rate of speed—about 1650 revolutions per minute—in the direction indicated by the arrow on the drawing.

Just above die rod 27 there extends between, and is mounted in, standards 31 horizontal plate 15, provided with suitable guideholes for punches 25 immediately above holes 26. Fastened to plate 15 is angle plate 14, extending, substantially, the whole distance between standards 31, and carrying non-magnetic armature support 13.

A sheet of suitable paper 29, extending, approximately, the whole width between standards 31, is pulled by a common feed device (not shown in the drawing) at a steady rapid pace over die 27; rollers 28, mounted in standards 31, serving to hold the paper firmly to die 27.

For each punch 25 operating means are provided as follows:—Each punch 25 carries two collars 23 and a coil-spring 24. This spring is mounted between the lower one of the rods 22 and the upper one of collars 23, and tends to push punch 25 upward. The lower one of collars 23 limits the upward movement of punch 25. In line with each punch 25, in a plane at right angles to die rod 27 and roller 1, there is attached to support 13 an armature 12 and magnetizing coil 10. To each armature 12 is hinged, by a pin 32, a hammer 8, the outward movement of which is limited by an angularly bent metal strip 9 which is attached to the lower end of such hammer 8. An extension rod 6, attached to the upper end of each hammer 8, is connected, by means of hinged strap 5, to horizontal rod 4, carrying, at its free end, steel nose 3, adapted to project over the upper end of the corresponding punch 25, into the path of spiral rib 2. Between rods 4 and 6 of each armature is extended a spiral spring 7, intended to serve the double purpose of removing hammer 8 from coil 10, and of keeping nose 3 in position to enter the path of rib 2 above punch 25. The ends 18 and 19, of the wire of each coil 10, through connection posts 16 and 17 and wires 20 and 21, are connected with an electric circuit provided with suitable means of closing and breaking (not shown in the drawing).

It is obvious that by closing the circuit for magnetizing coil 10, hammer 8 may be attracted for any desired length of time to coil 10. Whenever this happens nose 3 will be pushed into a position wherein at every revolution of roller 1 it will be the means of once forcing punch 25 down, through paper 29, into die 27,—through the contact of rib 2. The instant that rib 2 in the course of the revolution of roller 1, passes away from nose 3, spring 24 will elevate punch 25, lifting with it nose 3, and bringing it into position to be forced down again, together with punch 25, as soon as rib 2 strikes it again in the course of the revolution of roller 1. Thus, while the circuit for coil 10 remains closed, punch 25 will vibrate up and down at a rate corresponding to the speed of roller 1, perforating paper 29 at each vibration. The moment that the circuit in coil 10 is broken, hammer 8 will recede from coil 10, nose 3 will be withdrawn from the space on top of punch 25, and the

upward movement of punch 25 being limited by lower collar 23 so that the upper end of punch 25 cannot be directly struck by rib 2, punch 25 will not be affected by the revolution of roller 1, and will remain stationary in elevated position, without touching paper 29 until nose 3 is again shoved over its upper end into the path of rib 2, thus again causing punch 25 to vibrate up and down, and to perforate paper 29 for such length of time as the operator shall determine by keeping the circuit through coil 10 closed.

It is manifest that a sheet of metal or other substance may be perforated by my device as well as a sheet of paper; also that in lieu of rib 2 a series of suitably shaped and spirally arranged pegs might be used; also that for some purposes more than one rib 2 might be used, and that its disposition need not necessarily be a spiral one.

I claim:—

1. In perforating devices, the combination, with suitable means for supporting and driving, of a die; a row of punches registering with holes in the die and adapted to perforate the sheet; means for instantaneous retraction of each punch separately from the die; members, independent for each punch, projectable over the outer end of each punch; mechanism to project and retract such members at will; and a high speed revolving body located with its axis parallel to the die in the plane of the punches, and adjacent to the outer ends of the punches, clearing the punches, but adapted to strike, on each revolution, each of said projectable members when projected over the end of the corresponding punch members, preferably one at a time, when projected over the end of the corresponding punch, so as to cause rapid vibration of such punch.

2. In perforating devices, the combination, with suitable means for supporting and driving, of a die; a row of punches registering with holes in the die and adapted to perforate the sheet; means to retract each punch separately from the sheet; a high speed roller having a spiral projection along its surface, and located parallel to the die and directly above the punches, with said projection clearing the punches; independent means for each punch interposable between the punch and the spiral projection on the roller; and mechanism to interpose and withdraw such means at will; for the purpose set forth.

3. In perforating devices, the combination, with suitable means for supporting and driving, of a die; a row of punches registering with holes in the die and adapted to perforate the sheet; means for instantaneous retraction of each punch separately from the die; members, independent for each punch, projectable over the outer end of each punch; mechanism to project and retract such members at will; and a high speed revolving body located in axial alinement with the die in the same place as the punches, clearing said punches, but adapted to strike, on each revolution, each of said projectable members when projected over the end of the corresponding punch, so as to cause rapid vibration of such punch, substantially as and for the purpose described.

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