

946,006.

*Fig. 1.*

*Fig. 2.*

*Fig. 5.*

*Fig. 4.*

*Fig. 3.*

Witnesses:

Robt. James

**Inventors:**

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# UNITED STATES PATENT OFFICE.

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PIANO HAMMER-RAIL AND MEANS FOR OPERATING THE SAME.

946,006.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that we, GEORGE P. BRAND and FREDERICK W. WINTER, citizens of the United States, residing in the city of New York, borough of Bronx, county and State of New York, have invented certain new and useful Improvements in Piano Hammer-Rails and Means for Operating the Same, of which the following is a specification.

Our improvements relate to pianos adapted to be played either by hand in the ordinary manner or automatically by pneumatic apparatus actuated and controlled by a perforated music sheet through the medium of a tracker bar, as is well known in the art.

The object is to afford means whereby a piano rail adapted to be operated by a pedal in the ordinary manner when the piano is played manually, may also be actuated pneumatically when the piano is used as an automatic player.

The invention consists essentially of a longitudinally split rail the main portion of which is operated by pedal rods connected with the usual pedal mechanism so that the rail as a whole may be used and operated in the manner usual in pianos played manually,—said main portion of the rail having pivotally attached to it one or more secondary sections adapted to be operated automatically independent of the main portion of the rail by pneumatic means,—said secondary pivotally supported section or sections constituting in either case the contact or contacts against which the hammer shanks rest, and by which the stroke of the hammers is prescribed and limited, substantially as hereinafter set forth.

By preference we provide the main portion of the rail with two such pivotally supported contact sections or rests for the hammer shanks, each operated by its own pneumatic and independently controlled, one section representing the treble and the other the bass, and we have herein shown and described this arrangement of parts, it being understood however that we do not necessarily limit ourselves thereto since a single pivoted contact section may be used in conjunction with the main portion of the rail if desired without departing from the spirit and intent of our invention in this respect.

In the accompanying drawings, Figure 1, is a sectional elevation of parts essential to

the practical application of our invention; Fig. 2, is a sectional view taken upon plane of line 2—2—Fig. 1; Fig. 3, is a top view of the rail the pneumatics being shown in horizontal section, portions of the rail being broken away; Fig. 4, is a detail view illustrating the deflation of a pneumatic and the consequent advance of the hammer rest with which it is connected; Fig. 5, is a view of one end of the rail and adjoining parts.

The rail R is connected in the usual manner by rods *r*, with pedal mechanism of well known construction which it is not necessary to show or describe,—the rail as a whole being adapted to be used as an ordinary hammer rail when the piano is played manually. The rail R constitutes the main pianissimo rail and has mounted thereon the two auxiliary rails *c c* which constitute the contacts or rests for the hammer shanks *h*, said auxiliary rails being pivotally mounted, as at *c' c'*, and normally resting against the rail R. These rests *c, c*, are faced with felt or other soft material for direct contact with the hammer shanks, each rest preferably extending approximately one half the length of the main portion of the rail, to afford a bass section independent of the treble section. The outer end of each section or rest *c*, is pivotally connected with the movable member *p* of a pneumatic P, as by a rod *c'*, inserted in the outer end of the section and projecting through a bearing *p'*, on said movable member *p*, as will be seen by reference to Fig. 3, of the drawings. The stationary member *p'* of the pneumatic P is rigidly secured as by a lug or block *p''*, to the piano frame or other stationary part of the piano, and has attached to it a valve chest *a*, with the valve chamber *a'*, of which it communicates through a port *p'*, shown in Fig. 2.

In the valve chamber *a'*, and attached to a common stem *b*, are two valve disks *b'*, and *b''*,—the first *b'*, resting normally upon a seat *a''*, in the partition *a''*, between the valve chamber *a'*, and the diaphragm chamber *a'*, in which latter is situated the button *b''*, attached to the lower end of the stem *b*,—said button resting upon the diaphragm *a'*. The stem *b* is centralized by a guide *a''*, and its valve disk *b''*, is opposed to a port *a''*, which when open connects the valve chamber *a'*, with the atmosphere. The upper portion of the diaphragm chamber *a'* com-

municates through a port  $a^9$ , with a conduit  
 $a^{10}$ , leading to a tension chest, while the  
 lower portion of said diaphragm chamber  
 below the diaphragm  $a^5$ , communicates  
 5 through a duct  $a^{11}$ , and tube  $a^{12}$ , with a push  
 button valve  $v$ , or equivalent, conveniently  
 situated upon or with relation to the front  
 of the piano. It is obvious that if desired  
 air may be admitted to the duct  $a^{12}$ , through  
 10 a duct provided for the purpose in a tracker  
 bar over which a suitably prepared perfor-  
 ated music sheet is passed, in lieu of the  
 finger button valve  $v$ , with like result in so  
 far as the operation of the parts is concerned.  
 15 The piano actions are of the usual con-  
 struction and arrangement, H representing  
 a hammer,  $h$  the shank, and  $h'$ , the butt  
 thereof, and D a damper resting against the  
 string S.  
 20 As before intimated when the piano is  
 played manually the rail R as a whole may  
 be operated by a pedal in the usual manner,  
 since the pneumatics being normally in com-  
 munication with the atmosphere through the  
 25 ports  $p^4$ , and  $a^8$ , will readily allow their  
 movable members  $p$ , to adapt themselves to  
 the movements of the rail R. When how-  
 ever the piano is to be played automatically,  
 the main portion of the rail is stationary  
 30 and each rest  $c$ , is advanced as required  
 through the medium of the valve chest  $a$ ,  
 and connections. Thus air being admitted  
 to the air duct  $a^{12}$ , either through the valve  $v$   
 or through a duct in a tracker bar controlled  
 35 by a perforated music sheet as before stated,  
 raises the diaphragm  $a^5$ , causing the stem  $b$ ,  
 to lift the disk  $b'$ , from its seat  $a^2$ , at the  
 same time closing the port  $a^8$  by means of  
 the valve disk  $b^2$ . As a result the valve  
 40 chamber is closed to the atmosphere and  
 opened to the tension through the port  $a^2$   
 diaphragm chamber  $a^4$ , and conduit  $a^{10}$ ,  
 thereby deflating the pneumatic P. The de-  
 flation of the pneumatic P causes its movable  
 45 member  $p$ , to swing the rest  $c$ , on its pivot  
 so as to advance the upper edge of the rest  
 toward the piano strings and thereby restrict  
 the thrust of the hammers, as will be readily  
 understood.  
 50 When the air is cut off from the underside  
 of the diaphragm  $a^5$  (which is formed with  
 the usual bleed hole) the latter allows the  
 stem  $b$  and valve disks  $b'$  and  $b^2$ , to descend  
 to their normal positions, above described,  
 55 thereby cutting off the tension from the  
 pneumatic and admitting air to it by which  
 it is again inflated, so that its movable mem-

ber swings the rest  $c$ , back to its normal position against the main portion  $r'$ .

It will thus be seen that the hammer rail 60 is equally and independently adapted to be operated mechanically by pedal, or by pneumatic means, which is the whole object of my invention.

What we claim as our invention and desire 65 to secure by Letters Patent is,

1. In combination with a piano action, a hammer rail and a rest for the hammer shanks, said rail and rest comprising two longitudinally separated pivotally mounted 70 sections, one of which is movable with or independent of the other, a pneumatic disposed at the end of and in the horizontal plane with the end of one of said sections, and means connected with the end of one of said 75 sections and extending in the direction of the length thereof and having its outer end mounted in a bearing on the movable member of the pneumatic.

2. In combination with a piano action, a 80 pneumatic, a hammer rail adapted to be moved by pedal mechanism, supplemental sectional rails pivotally mounted for movement with or independent of the hammer rail proper, and a rod inserted at one end in 85 one of said sectional rails and projecting beyond the same in the direction of the length thereof and directly connected with the movable member of the pneumatic.

3. In combination with a piano action, and 90 a pneumatic, a hammer rail having a portion adapted to be moved by pedal mechanism, two longitudinally separated sections, one of said sections being movable independ- 95 ently of the other, and a direct removable connection between one of said sections and the pneumatic and extending in the longitudinal direction of and beyond the end of the section to which it is connected.

4. The combination with a piano action, of 100 a hammer rail, a rest for the hammer shanks, movable with or independently of said rail, a rod inserted at one end in said rest and projecting in the direction of the length thereof, and a pneumatic at the end of said 105 rest and having a bearing on its movable member in which the other end of said rod is received.

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Witnesses:

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