P. J. MEAHL.

DEVICE FOR RECORDING THE TONE VOLUMES ON MUSICAL INSTRUMENTS.

APPLICATION FILED JUNE 13, 1912.

**1,074,556.** Patented Sept. 30, 1913.

3 SHEETS—SHEET 1.

*Fig. 1.*

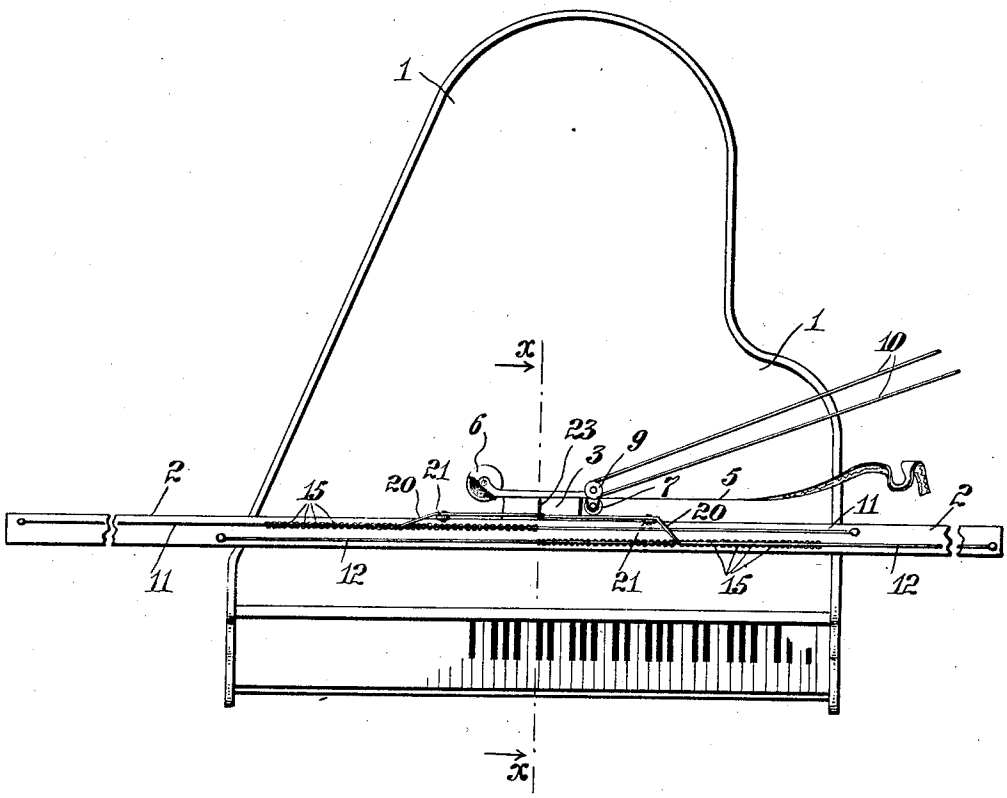
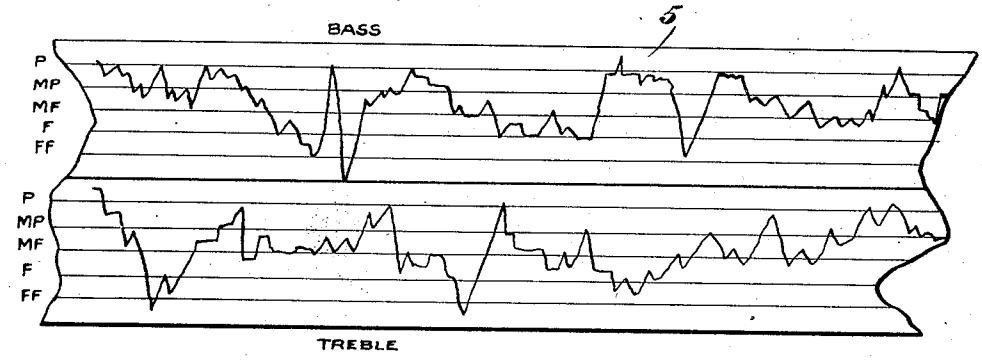



*Fig. 4.*




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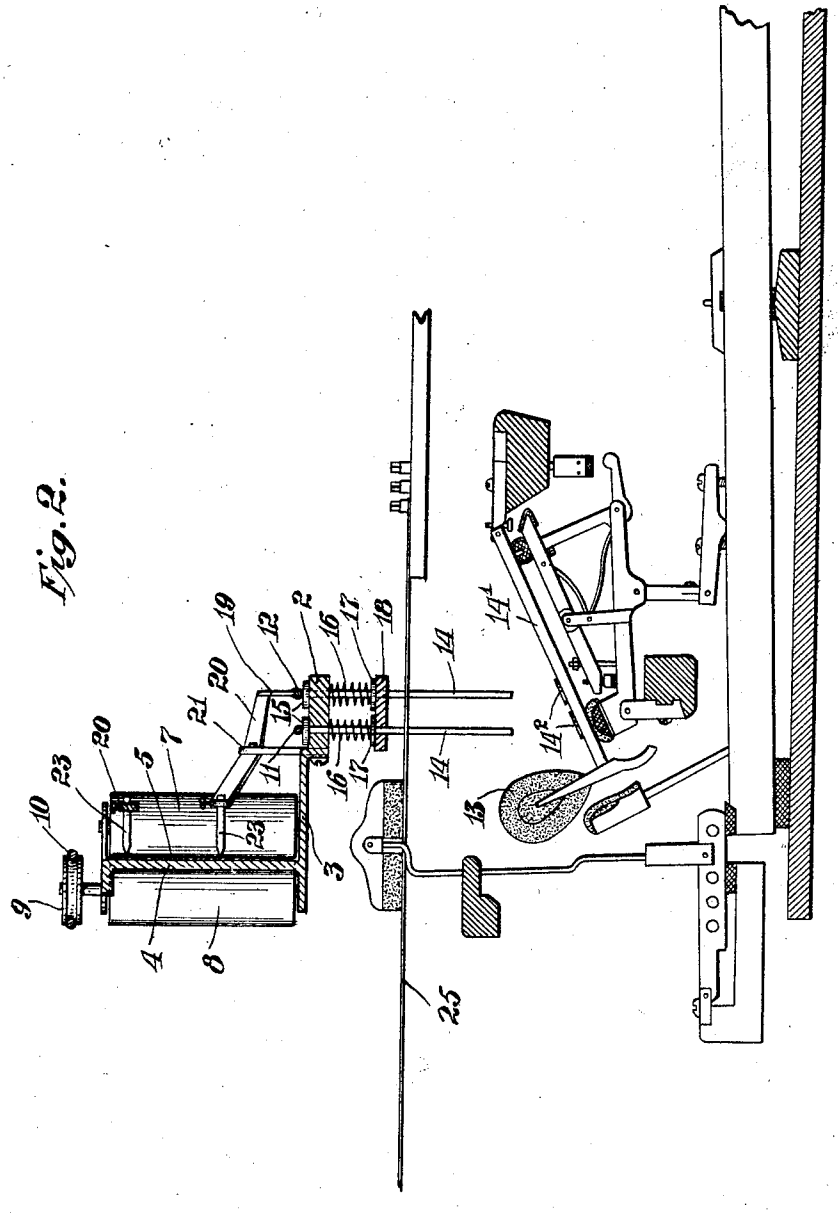
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3 SHEETS—SHEET 2.

Fig. 2.




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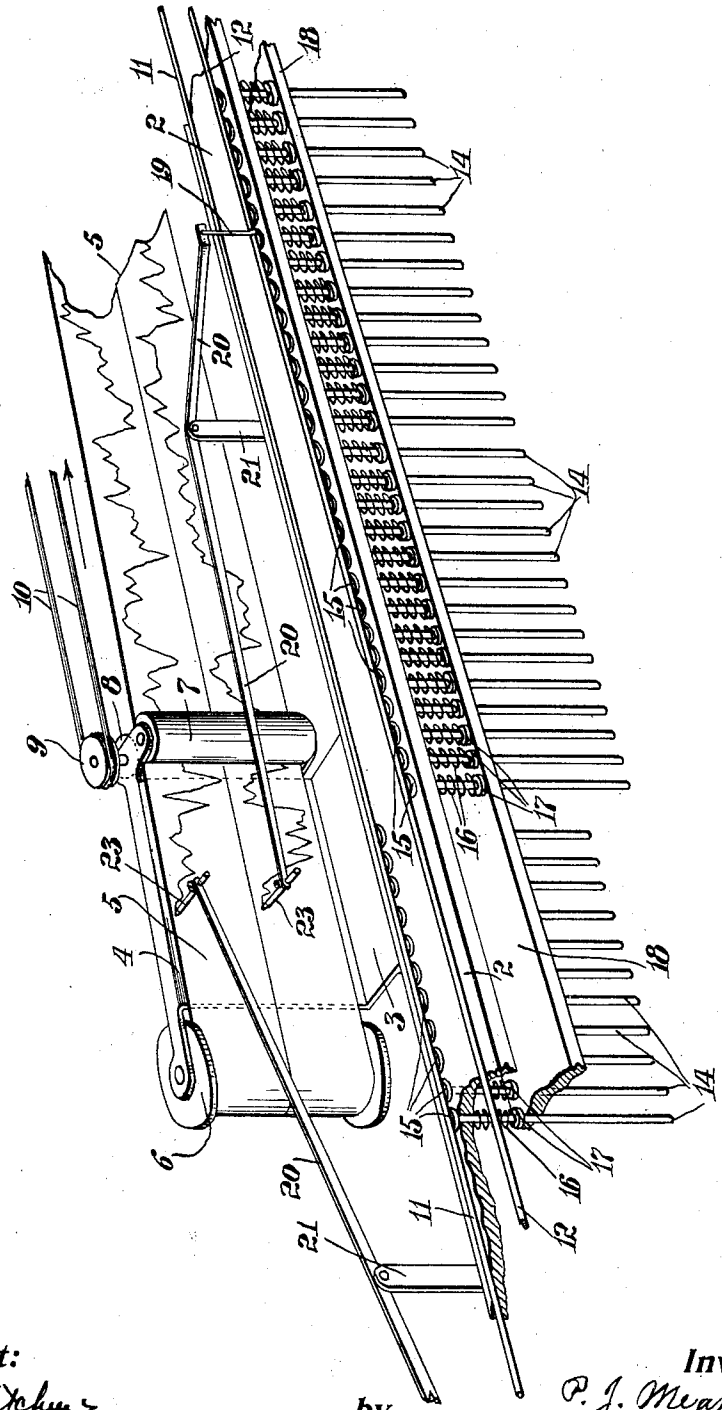
DEVICE FOR RECORDING THE TONE VOLUMES ON MUSICAL INSTRUMENTS.

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3 SHEETS—SHEET 3.

Fig. 3.




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# UNITED STATES PATENT OFFICE.

PHILIP J. MEAHL, OF SUMMIT, NEW JERSEY.

## DEVICE FOR RECORDING THE TONE VOLUMES ON MUSICAL INSTRUMENTS.

1,074,556. Specification of Letters Patent. Patented Sept. 30, 1913.

Application filed June 13, 1912. Serial No. 703,382.

*To all whom it may concern:*

Be it known that I, PHILIP J. MEAHL, a citizen of the United States, and a resident of Summit, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Devices for Recording the Tone Volumes on Musical Instruments, of which the following is a specification.

The object of my invention is to provide a new and improved dynamic recorder for pianos and similar musical instruments, by means of which a visible record of the dynamics, or power of the stroke on each key manipulated during the playing of the piano is recorded on a traveling sheet of paper both for the treble and bass, so that by means of said record the force of each blow delivered can be easily read, which device is simple in construction, reliable and effective in operation and easily applied.

In the accompanying drawings in which like letters of reference indicate like parts in all the drawings; Figure 1 is a plan view of the conventional grand piano provided with my improved dynamic recording device, parts being broken away and others shown in section. Fig. 2 is an enlarged transverse sectional view taken on the line $x$—$x$ of Fig. 1. Fig. 3 is a perspective view of my improved dynamic recording device. Fig. 4 is a face view of the recording tape or band upon which the record is produced.

The piano 1, illustrated in the drawings, is a grand piano of conventional type. Upon the case of this piano and above the several points at which the hammers strike the strings, a flat rail 2 is placed horizontally. From the rear edge of this rail a bracket 3 projects and this bracket carries a vertical plate 4 over which a record tape or band 5 is drawn from a spool 6. This spool is supported on said plate and the record band or tape is drawn between two rollers 7 and 8 of which the latter carries a grooved pulley 9. A belt 10 passed around this pulley 9 is driven from some suitable source of power so that as the roller 8 is rotated the band or tape is drawn in the direction of the arrow shown in Fig. 3. This band or tape 5 is divided into an upper section adapted for the production upon it, of a record of the bass notes and a lower section, for receiving the record of the treble notes. This band or tape is also provided with a series of horizontal longitudinal lines, marked in each longitudinal section as follows—P—MP—MF—F—FF— or with other suitable marks indicating dynamics, that is loudness or softness of playing. Two wires 11 and 12 are secured at their ends to the rail 2 in such a manner that they rest upon the upper surface of the rail 2, the wire 11 pertaining to the bass notes, and the wire 12 to the treble notes.

The wires are fastened on the rail in such manner that the hammers corresponding to the bass notes are about midway between the ends of the wire 11 which ends are secured to the rail 2, and the hammers corresponding to the treble notes are about midway between the secured ends of the wire 12. For each hammer 13 a rod 14 extends through the rail 2 and is provided at its upper end with a head 15, which is directly beneath the wire 11 or wire 12. These rods 14 are pressed downward, each by a spring 16 surrounding the rod 14, and bearing upon plates 17 secured on the rods 14 and these plates 17 normally rest on a rail 18 beneath the rail 2 and provided with apertures through which the rods 14 pass. The rods 14 extend downward toward each hammer shank 14′, just behind the hammer 13, to such an extent that the rods 14 are just touched when the hammer head touches the corresponding piano string 25, under the impact of the minimum key-stroke.

Each hammer shank 14′ is provided with a suitable felt striking pad $14^2$ for the corresponding rod 14. Each wire 11 and 12 is connected about midway of its length, by a link 19, with one end of a lever 20 pivoted on a standard 21 extending upward from the rail 2. Each lever 20 carries at its free end a pencil 23 or other suitable marking device which rests against the face of the tape 5. The pencil 23 for the bass rests on the upper longitudinal half or part of the tape and the pencil 23 for the treble on the lower longitudinal half or part of the tape. Whenever a key is struck and the corresponding hammer 13 thrown upward, the hammer is thrown with more or less force according to the force exerted in striking the key. As a hammer is thus thrown upward its shank strikes the corresponding rod 14 and thereby the corresponding wire 11 or 12, accordingly as to whether the key struck is in the bass or in the treble, is bent upward, more or less, according to the force of the blow on the key. As the wire 11 or

12 is forced upward the corresponding link 19 throws up the corresponding lever 20 whereby the pencil 23 is moved downward accordingly. The normal position of the pencil is at the top of the corresponding longitudinal sub-division of the tape. Even the slightest pianissimo playing causes a slight downward movement of the pencil, which downward movement increases with the force of the blow, so that the record thus produced, while the record tape is being moved lengthwise, gives an exact, reliable and automatic diagrammatic record of the blows upon the keys while playing the instrument.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. The combination with a pianoforte, of a flexible member having its ends secured to suitable supports, a record-producing mechanism operatively connected with said member and means for moving said member between its secured ends by the actuation of piano hammers, substantially as set forth.

2. The combination with a pianoforte, of a member secured at its ends to suitable supports and thereby normally held in a predetermined position, a record producing mechanism operatively connected with said member, means for moving a record receiving element, and means for moving said member out of the predetermined position, between its secured ends by the actuation of the piano hammers, substantially as set forth.

3. The combination with a pianoforte, of a flexible member secured at its ends to suitable supports and held normally in a predetermined position, a recording device operatively connected with said flexible member, means for moving a record tape lengthwise, a series of instrumentalities coöperating with movable parts of the pianoforte for bringing the said flexible member out of its normal position, substantially at right angles to a line connecting the secured ends of said flexible member, substantially as set forth.

4. The combination with a pianoforte, of a flexible member secured at its ends to suitable supports and held in a predetermined normal position, a series of movable instrumentalities below the flexible member and adapted to move said flexible member between its secured ends substantially at right angles to the length of said member, a recording device operatively connected with said member and means for moving a record strip upon which the recording device can produce a record, substantially as set forth.

5. The combination with a pianoforte, of a flexible member having its ends secured to suitable supports, a record producing mechanism operatively connected with said member and means for moving said member between its secured ends, substantially at right angles to the length of said member by the actuation of any one of a number of pianoforte hammers, substantially as set forth.

Signed at New York city, in the county of New York and State of New York, this 12th day of June, A. D. 1912.

PHILIP J. MEAHL.

Witnesses:
M. E. McNINCH,
R. G. BREEN.

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