

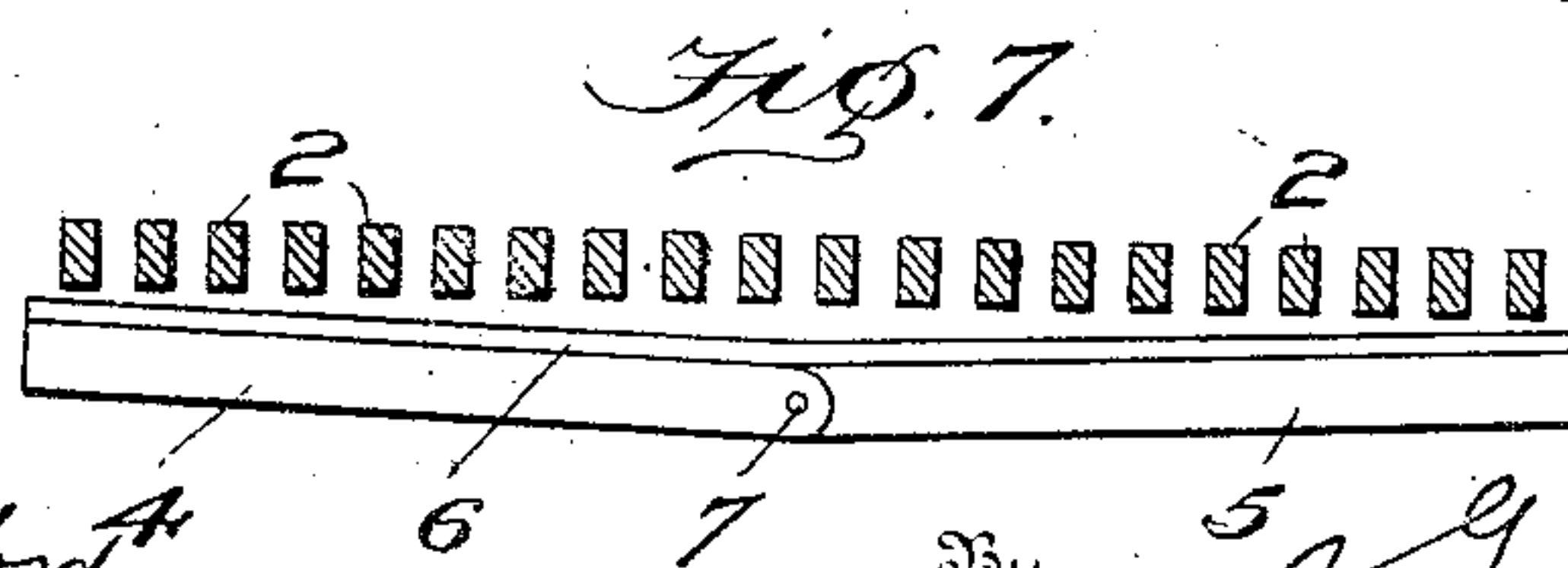
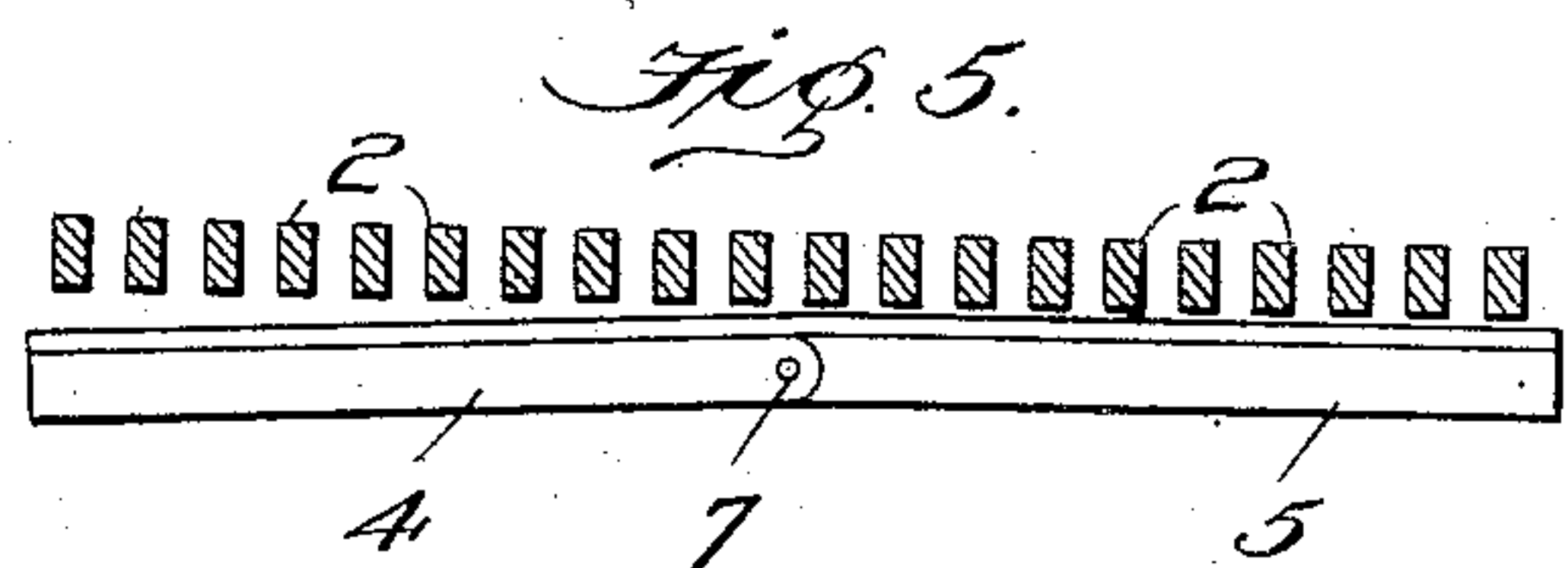
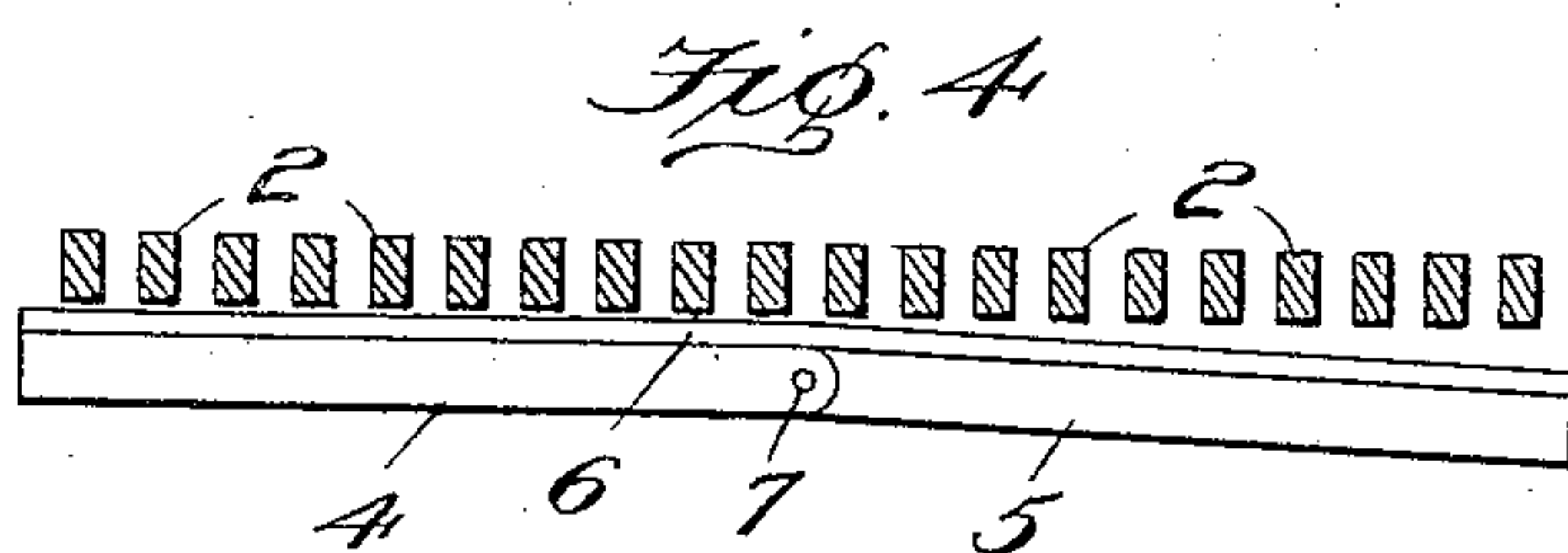
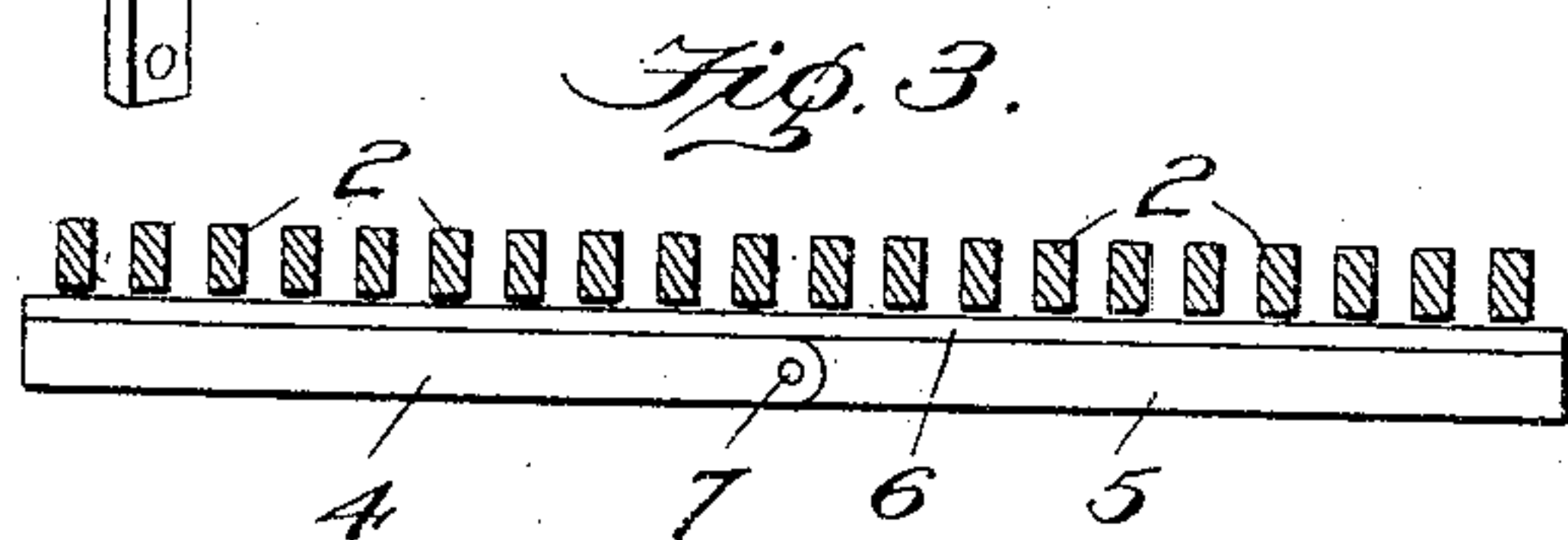
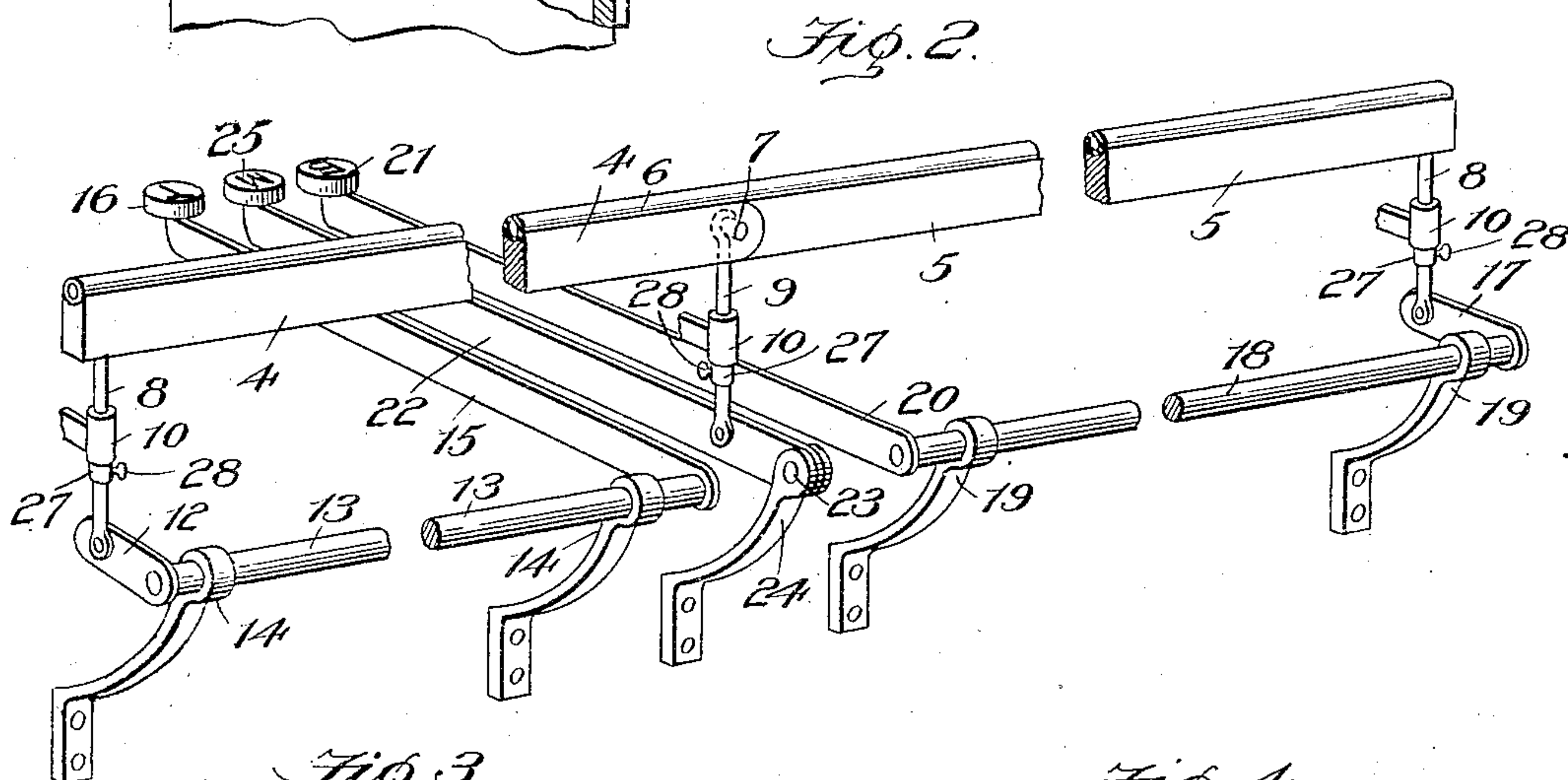
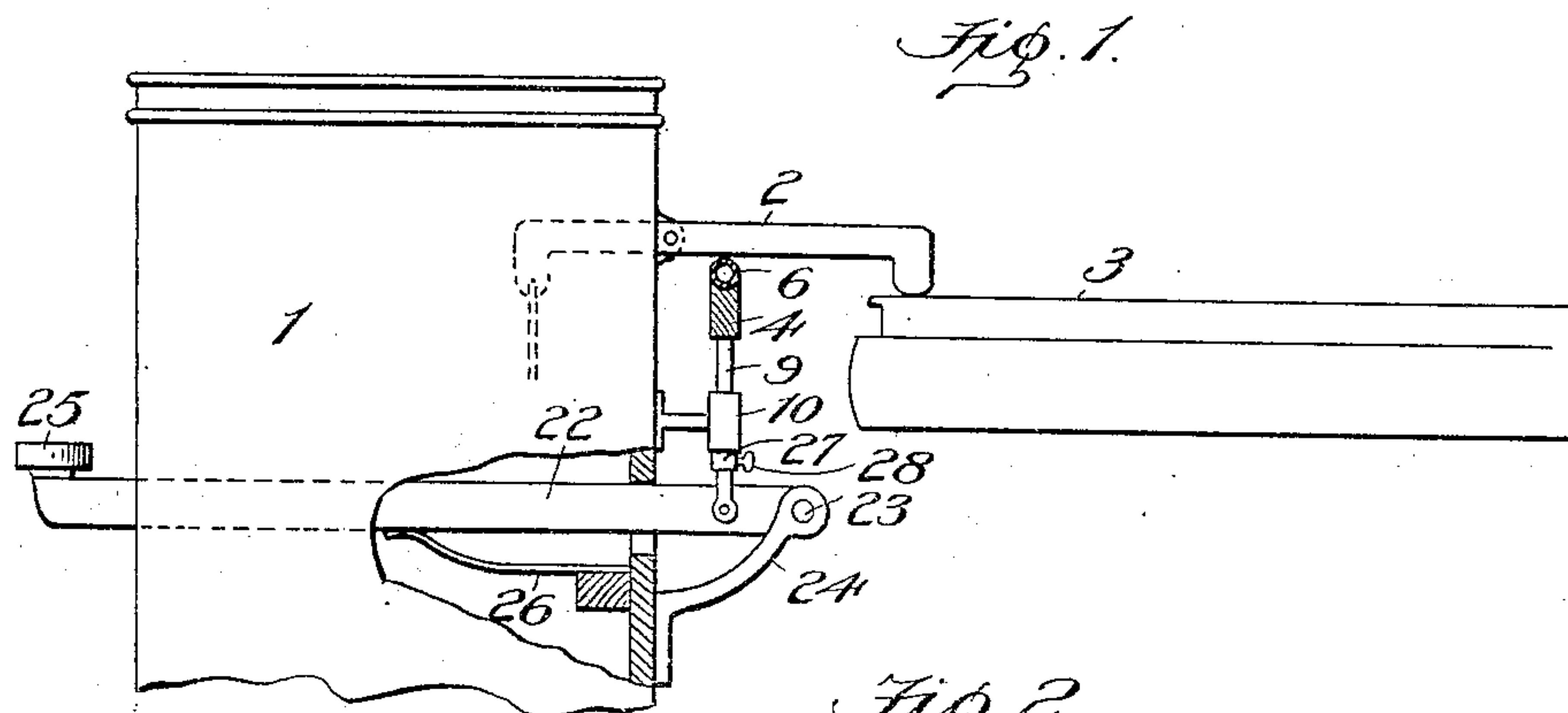
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PATENTED JULY 10, 1906.

I. B. SMITH.

EXPRESSION MECHANISM FOR MECHANICAL PIANO PLAYERS.

APPLICATION FILED NOV. 12, 1904.



Witnesses

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EXPRESSION MECHANISM FOR MECHANICAL PIANO-PLAYERS.

No. 825,618.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed November 12, 1904. Serial No. 232,444.

To all whom it may concern:

Be it known that I, IRVING B. SMITH, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Expression Mechanism for Mechanical Piano-Players, of which the following is a specification.

My present invention relates to certain new and useful improvements in expression mechanism for mechanical piano-players, and has for its object to provide simple and readily-operable means under the control of the performer for obtaining varied musical tone effects at any point of the keyboard of the piano.

I am aware that devices have been heretofore proposed seeking to accomplish the end in view, but these devices are not altogether satisfactory, for the reason that the possible range of tone variation is not wide and varied enough and, furthermore, in many of the prior devices the change in the tone variation from one note to another or from one group of notes to another group is so marked or severe as to destroy the effectiveness of the whole scheme.

The purpose of the present invention is to provide simple and readily-operable means under the control of the performer for variably and progressively changing the tone volume of the piano at different points of the keyboard either in the bass, middle, or treble in such manner that there will be no appreciable break at the point of change, but a perfect blending of the musical tones will be had.

My improvement is designed to be applied to the type of automatic players that are pushed up in front of the piano and which have striking fingers or levers that overhang and are adapted to actuate the piano-keys, and the specific means for effecting the tone variations comprises a plurality of connected bar-sections, each having a resilient face arranged end to end and in the same plane, said bar-sections normally lying beneath and parallel with the line of striking-levers, with means under the control of the performer for moving either one of the bar-sections or the two connected ends of adjacent sections toward or away from the line of striking-levers on oblique or inclined lines to offer a

gradually increasing or decreasing resistance to the action of said levers, whereby to cause the bass, middle, or treble keys of the piano to be struck with gradually-varying force.

In order to enable others to fully understand, make, and use my said invention, I will now proceed to describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of a piano-player in position for use, said player having my improvement applied thereto. Fig. 2 is a perspective view of the improvement and one form of operating means therefor. Fig. 3 is a view, partly in section, showing the normal position of the resistance means relative to the striking fingers or levers, in which positions said fingers or levers will strike the piano-keys softly, giving pianissimo effects throughout the length of the keyboard. Fig. 4 is a similar view showing the position of the resistance means when the treble notes are to be accented and the bass notes subdued. Fig. 5 is a like view showing the position of the resistance means when the bass notes are to be accented and the treble notes subdued. Fig. 6 is a similar view showing the position of the two sections of the resistance means when both the bass and treble notes are to be accented and the middle notes subdued, and Fig. 7 is a like view showing the position of the resistance means when the middle notes are to be accented and the bass and treble subdued.

Referring to the drawings, the reference-numeral 1 designates the case of an ordinary well-known type of piano-player, having the striking levers or fingers 2, which overhang and are adapted to actuate the keys 3 of a piano. These striking-levers are actuated by any suitable means controlled by a perforated music-sheet, (not shown,) all as well understood in the art.

My improved resistance device consists of a plurality of bar-sections, in the present instance two sections 4 and 5 being shown, having on the upper edge thereof a resilient resistance or cushioning strip or tube 6, which may be of rubber, felt, or the like. These bar-sections are arranged end to end and situated below and parallel with and transversely of the line of striking-levers, the section 4 be-

ing pivotally connected at one end, as at 7, to the section 5, the said pivoted point when only two sections are employed being located about centrally of the range of striking-levers or centrally of the keyboard of the piano when the player is in position for use. When in normal position, the resilient resistance means 6 lies closely adjacent to and parallel with the under side of all the striking-levers 2 and is held in this position by means presently to be described, so that when said levers are actuated to strike the piano-keys the resistance means will absorb a part of the blow imparted to said levers or offer a partial resistance to the otherwise free movement thereof and cause the levers to strike the keys softly, so as to produce pianissimo effects.

It will of course be understood that a movement of the resistance means toward or away from the striking-levers will permit said levers to strike the keys a blow the force of which will depend entirely upon the amount of resistance offered and that if said resistance means is moved in parallel lines toward and from the striking-levers the force of the blow imparted to the piano-keys throughout the range thereof will be uniform, whereas if the resistance means be moved in oblique lines relatively to the line of striking-levers then the successive keys will be struck with a progressively increasing or decreasing blow, either in the bass, the treble, or the middle part of the keyboard, so that varied and pleasing musical expressions may be had.

It is the peculiar construction and arrangement of the resilient resistance means and the manner of operating the same whereby to secure the aforesaid tone variations in the piano that constitutes the salient feature of the present invention, and I will now describe one construction of mechanism for actuating said means, it being understood that the showing here made is only by way of example and that other mechanism might be equally well employed without departing from the spirit of the invention as defined in the appended claims.

Secured to and depending from the outer end of each bar-section 4 and 5 is a rod 8, and a similar rod 9 depends from the pivoted pin 7, that connects the adjacent ends of said bar-sections, and each of said depending rods is guided in its vertical movements through an apertured bracket 10, secured to the case 1 of the player. One of the depending rods 8 is pivoted at its lower end to an arm 12, fixed to a horizontal rock-shaft 13, said shaft having its bearing in two brackets 14, projecting toward and from the case 1. The opposite end of the shaft 13, which, it will be seen, terminates at a point about centrally, or nearly so, of the pivoted point 7 of the bar-sections, has secured thereto a forwardly-extending lever 15, that projects through the case 1 of the player and has on its outer end a

key or button 16, bearing the letter "T," which indicates that this lever controls the treble keys of the piano. The other depending rod 8 is pivoted at its lower end to a similar arm 17 and rock-shaft 18, journaled in the brackets 19, and has a forwardly-extending lever 20, carrying a button 21, bearing the letter "B," indicating the bass keys of the piano. The depending rod 9 is pivoted at its lower end directly to a lever 22, which lever is pivoted at 23 to a bracket 24. This lever 24 is located between the two other similar levers 15 and 20 and has on its outer end a button 25, bearing the letter "M," indicating the middle keys of the piano. The three levers, it will be seen, are arranged close together and at the front of the player, so that they may be readily operated by the fingers of the performer. Springs 26 normally tend to force the levers upward, and with them the bar-sections 4 and 5, and this upward movement is limited by means of stop-collars 27, adjustably mounted by thumb-screws 28 on the depending rods 8 and 9, said collar being adapted to make contact with the brackets 10. It will be apparent that the position of the resilient tube or strip 6 relatively to the striking-levers 2 may be adjusted at will by simply setting the collars 27 to proper position on the rods, and, if desired, the said tube or strip may be set and held entirely away from the levers and out of operative position by properly setting the collars, in which case the levers would strike the piano-keys with a full blow.

The manner of operating the three levers to secure the various musical-tone variations may be briefly stated as follows, it being understood that the resilient strip or tube when in normal position lies parallel with and close to the striking-levers, so that ordinarily the blow of the levers will be cushioned and the notes sounded pianissimo. If now the lever having the character "B" is depressed, the bar-section 5 will be moved on an oblique line relatively to the line of striking-levers, as shown in Fig. 4, and the successive bass keys will be struck with gradually-varying force from the lowest bass key to the highest, while the treble keys will be unaffected. Thus the bass notes will be accented, running regularly and gradually down to pianissimo. If now the lever having the character "T" is depressed, then in like manner will the treble keys of the piano be accented. If both levers having the characters "B" and "T" be simultaneously depressed, then the bar-sections with the resistance strip or tube will be moved on oppositely-inclined or oblique lines relatively to the line of striking-levers, as shown in Fig. 6, and in this case both the bass and treble keys will be accented and gradually subdued toward the middle keys. If the lever having the character "M" should be depressed, then the adjacent pivoted ends of

the bar-sections would be moved in the position shown in Fig. 7, in which case the middle range of notes would be accented, while the base and treble would be gradually subdued.

5 It will be quite apparent that different combinations of the three levers will effect different changes in tone volume and that a wide range of musical effects may thus be secured with a minimum number of levers, and in each and every change made a perfect 10 blending of the tones will result. It is possible to so manipulate the levers as to accent a single note or group of notes, to give a "crescendo" or "diminuendo" effect, to 15 wave a trill, to bring out the air or melody and subdue the accompanying parts, and, in fact, to secure substantially all the pleasing effects now obtained by the performer in manual playing.

20 I do not wish to be understood as limiting myself to the precise construction of yielding resisting means herein shown, as it will be obvious that other forms or constructions might be employed without departing from the spirit of the invention. For instance, 25 I might employ instead of the tube or strip of felt 6 a separate spring-blade for each striker-lever, each of said spring-blades being secured at one end to the bar-sections 4 30 and 5 and each having its free end bearing under one of the levers in substantially the same position occupied by the tube or strip 6.

What I claim, and desire to secure by Letters Patent, is—

35 1. In a piano-player, the combination with the striking-levers, of a plurality of independently-movable bar-sections arranged end to end and situated transversely with respect to said striking-levers and having a 40 resilient surface adjacent the latter, and means whereby one bar-section independent of another can, at the will of the performer, be caused to assume an oblique position relatively to the plane of the striking-levers 45 either toward the bass or the treble of the keyboard for the purpose specified.

2. In a piano-player, the combination with the striking-levers, of a movable resilient resistance device made in sections arranged end 50 to end and situated transversely with respect to said striking-levers, and means whereby a section of the resistance device can at the will of the performer be caused to assume an oblique position relatively to the plane of the 55 striking-levers either toward the bass or treble of the keyboard for the purpose specified.

3. In a piano-player, the combination with the striking-levers, of a movably-mounted resilient resistance device made in pivotally- 60 connected sections arranged end to end and situated transversely with respect to said striking-levers, and means whereby the said sections can, at the will of the performer, be caused to assume oppositely-oblique posi- 65 tions relatively to the plane of the striking-

levers either toward the base or treble or the middle of the keyboard for the purpose specified.

4. In a piano-player, the combination with the striking-levers, of movably-mounted bar- 70 sections having a yielding face arranged end to end and pivoted together, said bar-sections being situated transversely with respect to said striking-levers, and means whereby the said sections can, at the will of 75 the performer, be caused to assume opposite oblique positions relatively to the plane of the striking-levers either toward the bass or treble or toward the middle of the keyboard for the purpose specified. 80

5. In a piano-player, the combination with the striking-levers, of movably-mounted bar- sections having a yielding face arranged end 85 to end and pivoted together, said bar-sections being situated transversely with respect to the striking-levers and the said yielding face normally lying parallel therewith, and means whereby the said sections can, at the will of the performer, be moved in paral- 90 lel or oblique lines toward and from and relatively to the striking-levers, for the purpose specified.

6. In a piano-player, the combination with the striking-levers, of a movably-mounted re- 95 silient resistance device situated transversely with respect to said striking-levers and normally lying parallel therewith throughout the line of levers, and means whereby the said device can, at the will of the performer, be moved in parallel or oblique lines toward and 100 from and relatively to the striking-levers for the purpose specified.

7. In a piano-player, the combination with the striking-levers, of a plurality of movably- 105 mounted and pivotally-connected bar-sections arranged end to end and having a resilient surface situated transversely with respect to the striking-levers, and lever mechanism under the control of the performer for 110 operating the said bar-sections either independently or simultaneously for the purpose specified.

8. In a piano-player, the combination with the striking-levers, of a resistance device com- 115 prising a plurality of movable bar-sections arranged end to end and situated transversely with respect to the said levers, means under the control of the performer for moving either or all of the bar-sections in parallel or 120 oblique lines relatively to the plane of the striking-levers, for the purpose specified, and means for locking the said bar-sections out of operative position.

In testimony whereof I have hereunto set my hand in presence of two subscribing wit- 125 nesses.

IRVING B. SMITH.

Witnesses:

CHARLES BOWMAN,
GEO. Z. SUTTON