

No. 717,349.

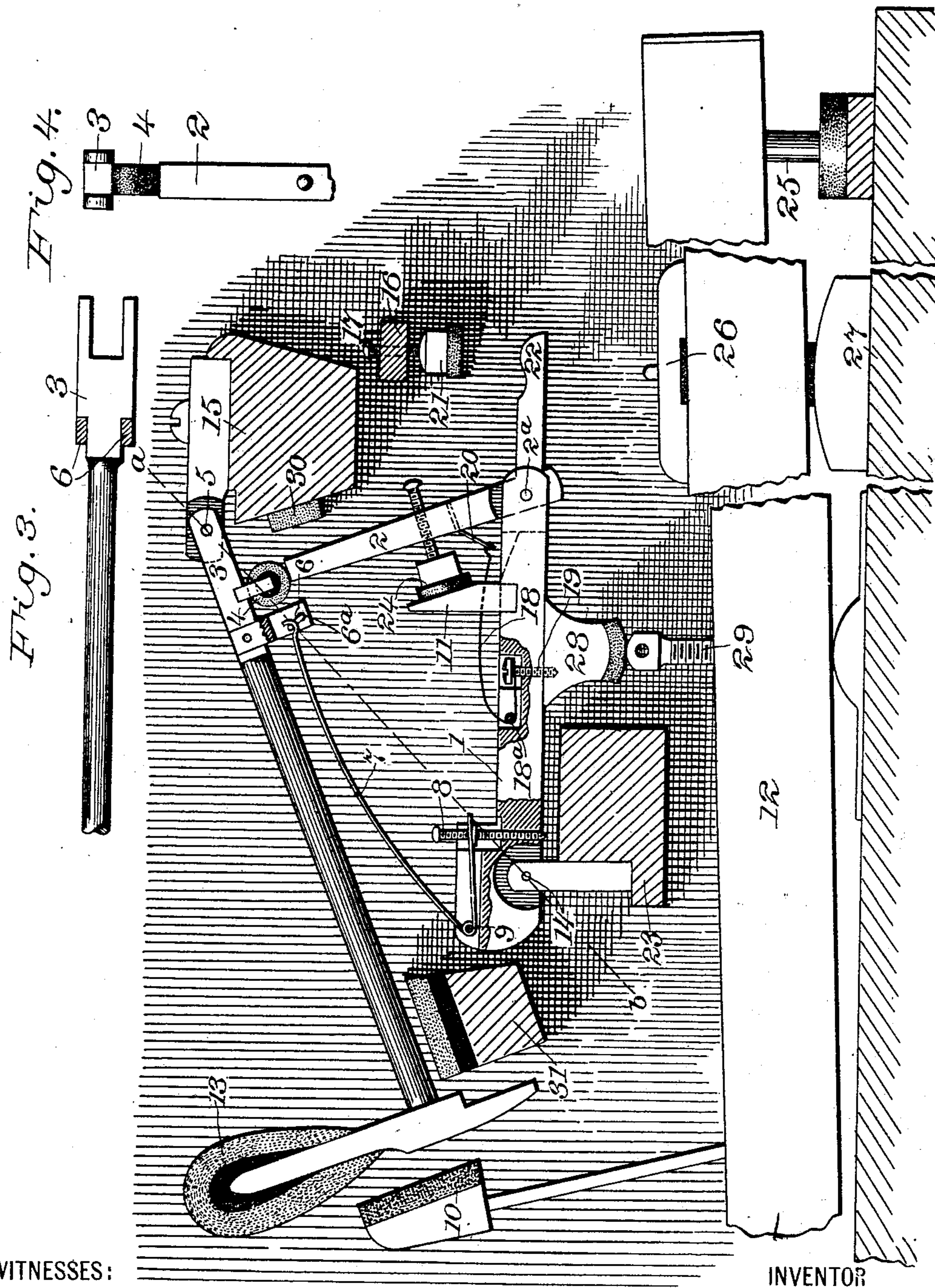
Patented Dec. 30, 1902.

L. CHARPIAT.
REPETITION ACTION FOR PIANOS.

(Application filed Feb. 15, 1902.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

R. Gerlach Jr.
W. H. Humphrey.

Fig. 1.

INVENTOR

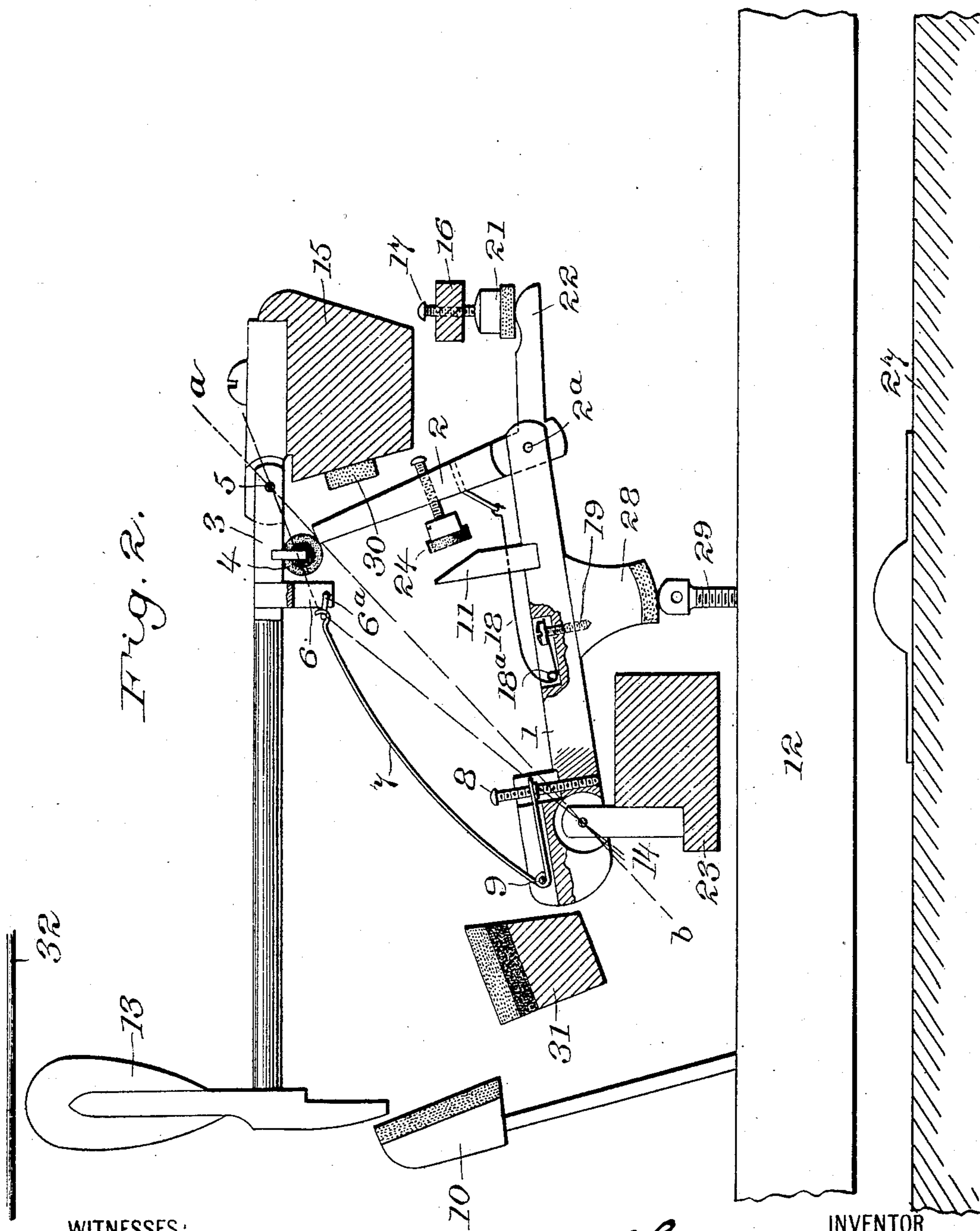
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WITNESSES:

E. Gerlach Jr.
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UNITED STATES PATENT OFFICE.

LOUIS CHARPIAT, OF NEW YORK, N. Y.

REPETITION-ACTION FOR PIANOS.

SPECIFICATION forming part of Letters Patent No. 717,349, dated December 30, 1902.

Application filed February 15, 1902. Serial No. 94,189. (No model.)

To all whom it may concern:

Be it known that I, LOUIS CHARPIAT, a citizen of the Republic of France, and a resident of the borough of the Bronx, city, county, and State of New York, have invented certain new and useful Improvements in Repetition-Actions for Pianos, of which the following is a specification.

My invention relates in general to piano-actions, and more specifically consists of an improved repetition-action for grand pianos. As heretofore constructed such repetition-actions have comprised a spring-controlled repetition-lever and a jack passing through an opening or mortise therein which act conjointly on the hammer-butt. This arrangement produces friction, noise, unequal wear of the parts, and absorbs power on account of the inertia and friction of the numerous heavy parts.

It is the object of my invention to avoid these difficulties and produce an action having certain advantages hereinafter set out, and I accomplish this mainly by dispensing entirely with the repetition-lever and substituting therefor a directly-acting spring with the connections hereinafter more specifically pointed out.

The preferred form of my invention is illustrated in the accompanying two sheets of drawings, in which—

Figure 1 is a side elevation of the action for one key with parts broken away, the supporting-rails and base being shown in cross-section and the hammer in its lowest position. Fig. 2 is a similar view with the parts shown in the position assumed during repetition just as the jack is either leaving or returning to its position below the roller-notch on the hammer-butt.

Throughout the drawings the same reference-figures indicate the same parts.

As shown in the drawings, the mechanism consists of the following parts: the jack-carrying arm 1, to which the jack 2 is pivoted at 2^a; the hammer-butt 3, upon which the jack operates through the medium of the roller-notch 4, which is usually formed of hard felt, said hammer-butt oscillating about the center 5; the bifurcated lug 6, extending downwardly from the under side of the hammer-butt, to which the repetition-spring 7 is connected by

the swinging link or loop 6^a, said repetition-spring being pivoted at 9 on the jack-carrying arm 1 and having its tension adjustable by means of the adjusting-screw 8; the usual hammer 13 and hammer-check 10, carried by the key 12, which is balanced at 26 on the key-bottom 27 and guided in the usual manner by the key-guide pin 25. The key operates upon the action by means of the adjustable capstan-screw 29, which engages with the heel 28 on the jack-carrying arm. The jack-carrying arm has the usual jack-stop 11, with which the jack-regulating button 24 co-operates, the jack being normally held with the button up against the stop by means of the jack-spring 18, which is pivoted to the jack-carrying arm at 18^a and controlled by the adjusting-screw 19, which engages the tail of the spring. The spring is connected to the jack by the swinging link 20. The jack-carrying arm 1 is pivoted at 14 to the rail 23. The hammer-butt pivot is carried by the hammer-butt-carrying rail 15. The set-off button 21 is carried by the set-off-button rail 16 by means of the adjustable screw-threaded set-off pin 17. This set-off button coöperates with the set-off arm 22 on the jack. The hammer-butt rail is provided with a second stop 30, limiting the motion of the jack in a right-hand direction. The hammer 13 is supported in its lowermost position by the hammer-rest rail 31.

The operation of my invention is as follows: When the outer end of the key 12 is depressed, the inner end of course rises, carrying with it the capstan-screw 29, which presses against the heel 28 on the jack-carrying arm and rotates said jack-carrying arm about its center 14. This causes the jack 2 to rise and by the pressure of the end of said jack upon the felt roller-notch 4 the hammer-butt 3 is thrown up, and with it the hammer 13, which strikes the piano-string 32. After the key and action have moved in the above-described manner through nearly the whole distance rendered possible by the permissible movement of the key the set-off arm 22 comes in contact with the set-off button 21, and further motion of the action forces the jack 2 out from under the roller-notch 4, and the momentum of the hammer, assisted by the resiliency of the repetition-spring 7, carries the hammer through the remaining distance to strike the

blow on the piano-wire. Upon the rebounding of the hammer its backward motion beyond a certain point is checked by the resiliency of the repetition-spring 7, whose resistance has been greatly increased by the toggle-joint-like action of the link 6^a in combination with said spring. The hammer is therefore held in the position shown in Fig. 2 at a point where the jack 2 can return beneath the roller-notch 4 the instant the coöperating set-off arm 22 and set-off button 21 will permit the same. The quick return of the jack is assured by the toggle-joint action of the link 20 and wire spring 18, which has its greatest power but slowest action on the jack at the beginning of the return motion of the jack, when the inertia of the parts has to be overcome, and a rapidly-accelerating action with diminishing power as the jack gets under way on its return movement. The same toggle-joint action of the link 6^a and repetition-spring 7 creates an increased distortion of the repetition-spring 7 at the uppermost position of the hammer at the time when the greatest power of said spring is required. This last results from the fact that the parts are so proportioned and arranged that when the hammer is in the lowermost position, as shown in Fig. 1, the point of connection between the link and the spring lies approximately on the line *a b*, connecting the centers 5 and 14, when the link 6^a is approximately at right angles to said line, while in the uppermost position (shown in Fig. 2) this point of connection is thrown to one side of the line *a b*, and consequently the swinging motion of the repetition-spring 7 to the left about the center 14 of the jack-carrying arm pulls the upper end of the link 6^a to the left and downward relatively to the hammer-butt. This compels a backward and downward bending of the repetition-spring 7 relatively to said hammer-butt, and so increases its distortion and consequent tension. By turning the screw 8 the initial tension of the repetition-spring 7 may be varied. By turning the screw 19 the initial tension of the jack-spring 18 may be similarly varied. By turning the set-off pin 17 the position of the set-off button may be adjusted so as to produce the tripping of the jack at just the right time. The adjustment of the button 24, which coöperates with the jack-stop 11, insures the traveling of the jack just the right distance beneath the roller-notch 4 to insure its obtaining a firm grip thereon.

The advantages of my invention comprise simplicity and the reduction of the number of parts resulting from doing away with the usual repetition-lever and its numerous attachments, stops, and adjustments, the consequent elimination of friction between the repetition-lever and the hammer-butt, the shortening up of the distance from the hammer-butt center to the roller-notch and consequent possibility of either shortening the hammer-butt or reducing the amplitude of motion of the jack and connected parts, ease of adjust-

ment of both the repetition-spring and the jack-spring, the even wearing of the face of the set-off button resulting from its face being at right angles to the line of travel of the set-off arm and its adjustment in a line parallel thereto, the possibility of making the face of the jack of a width equal to or greater than the width of the roller-notch, whereby the cutting of a groove in said notch is prevented, and the automatically-accelerating action of the repetition-spring and of the jack-spring, all as above described.

It is evident, of course, that various changes could be made in the details of construction above described without departing from the spirit and scope of my invention so long as the principles of the various novel features of improvement, or some of them, be preserved. Modifications in the forms of the parts might be rendered necessary in applying the invention to different kinds of piano-actions, and some of the features of novelty herein claimed might be used and others omitted; but such modifications, being mere mechanical equivalents, I should still consider within the boundaries of my invention.

Having, therefore, described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. The combination with the hammer-butt and jack therefor, of the pivoted jack-supporting arm, the repetition-spring carried by the arm and the swinging link connecting the hammer-butt and the free end of the spring.

2. The combination with the hammer-butt and jack therefor, of the pivoted jack-supporting arm, the repetition-spring carried by the arm and the swinging link connecting the hammer-butt and the free end of the spring, the link extending substantially at right angles to a line connecting the hammer-butt center and jack-supporting-arm pivot and the point of connection of the link and spring lying approximately on said line when the hammer-butt is in its lowest position.

3. The combination with the hammer-butt and jack therefor, of the pivoted jack-supporting arm, the repetition-spring carried by the arm and the swinging link connecting the hammer-butt and the free end of the spring, together with means for adjusting the tension of said spring.

4. The combination with the hammer-butt and jack therefor, of the pivoted jack-supporting arm, the repetition-spring carried by the arm and the swinging link connecting the hammer-butt and the free end of the spring, said swinging link being mounted in a bifurcated lug which projects from the under side of the hammer-butt.

Signed at New York, N. Y., this 10th day of February, 1902.

LOUIS CHARPIAT.

Witnesses:

W. H. PUMPHREY,
R. GERBRACHT, Jr.