No. 640,356. Patented Jan. 2, 1900.

L. H. BATTALIA.

PIANOFORTE ACTION.

(Application filed Mar. 29, 1899.)

(No Model.)

FIG: 1

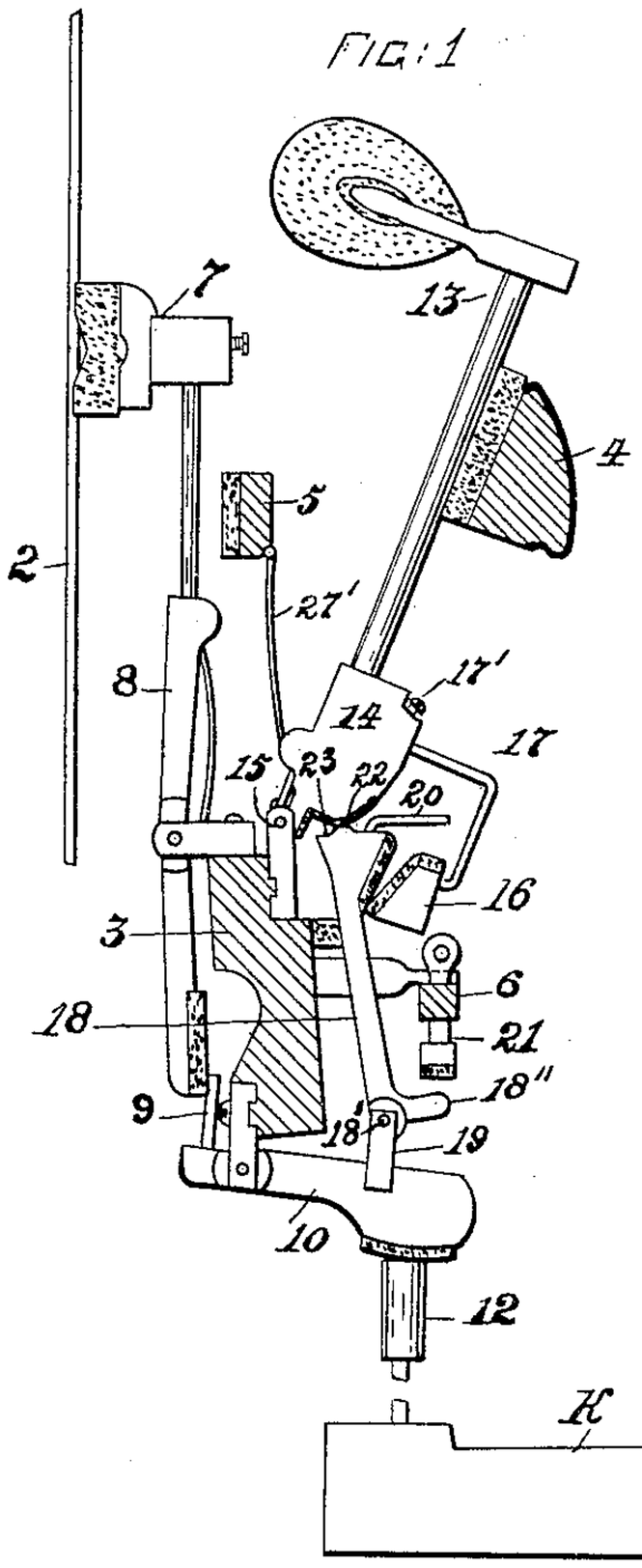


FIG: 2

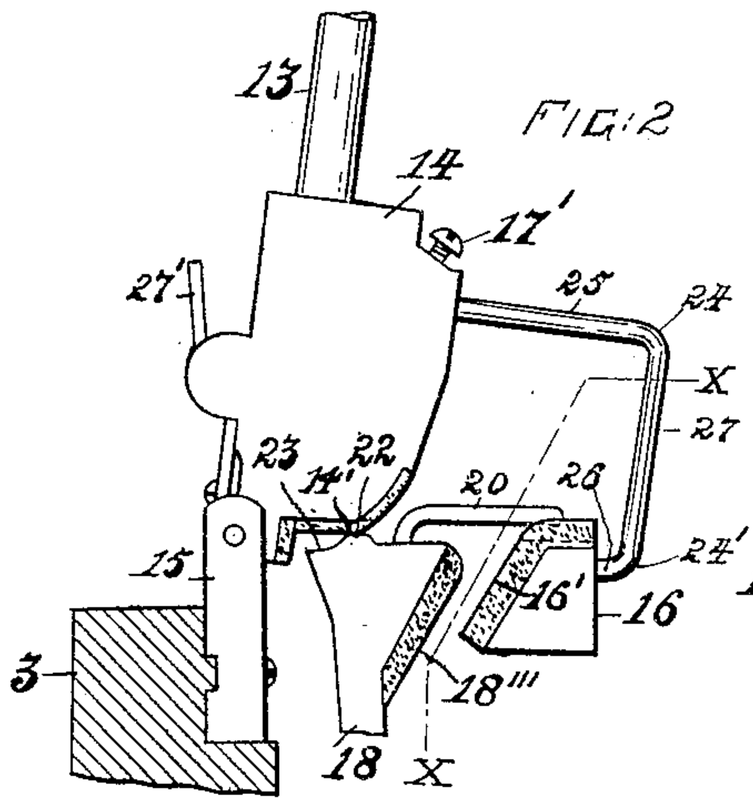


FIG: 4

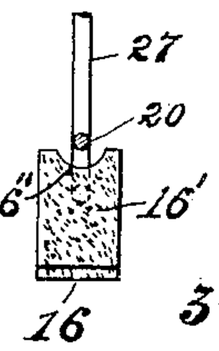
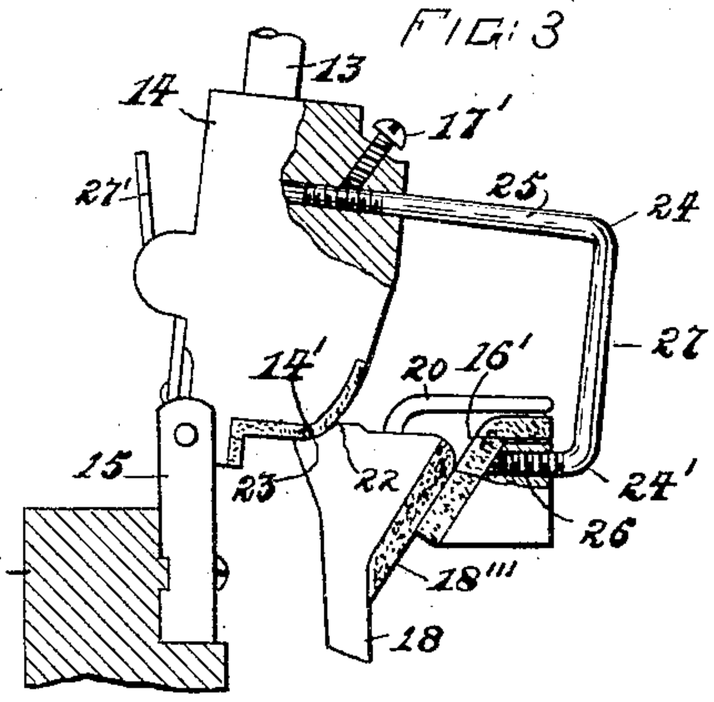


FIG: 3



WITNESSES:

L. H. Blood.

M. H. Flynn

INVENTOR.

Leo Herlino Battalia

by C. C. Whitney.

His Attorney.

UNITED STATES PATENT OFFICE.

LEO HERLINO BATTALIA, OF HARTFORD, CONNECTICUT, ASSIGNOR TO MARTHA A. BATTALIA, OF SAME PLACE.

PIANOFORTE-ACTION.

SPECIFICATION forming part of Letters Patent No. 640,356, dated January 2, 1900.

Application filed March 29, 1899. Serial No. 711,011. (No model.)

To all whom it may concern:

Be it known that I, LEO HERLINO BATTALIA, a citizen of the United States of America, and a resident of the city and county of Hartford, in the State of Connecticut, have invented certain new and useful Improvements in Upright-Pianoforte Actions, of which the following is a specification.

This invention relates to upright-pianoforte actions and is somewhat in the nature of an improvement upon the action shown, described, and claimed in an application filed by me March 3, 1899, Serial No. 707,637.

The object of the present invention is, primarily, to furnish an improved and simplified upright action of a construction and organization that will facilitate rapid repetitions of the stroke of the hammer on slight but rapid depressions of the key-lever when said lever is in an approximate full-stroke position and at the same time positively obviate the blocking of the hammer and jack frequently occurring in upright-pianoforte actions of ordinary construction and organization irrespective of the force applied to the key.

A further object of this invention is to provide, in connection with the hammer-butt and jack, an improved back-check, improved means for supporting said back-check and for adjusting the same with relation to the working end of the jack with which it is to coöperate, and means carried by said jack and coöperative with the back-check for positively insuring a quick return movement of the back-check and hammer to their initial positions concurrently with the descent of the jack on the release of the key.

With these objects in view my present invention consists in certain details of construction and in the combination and arrangement of these several parts of the action which directly control the movements of the hammer, as will be hereinafter fully described, and pointed out in the claims.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation, partly in section, of a portion of an upright-pianoforte action embodying my present invention and showing the parts thereof in their initial or normal positions. Fig. 2 is an enlarged view of a portion of the piano-forte-action, showing the hammer-butt, back-check, and a portion of the working end of the jack in the positions they occupy when the key-lever and hammer are substantially in mid-stroke positions or just before the repeating-face of the jack is brought into cooperative relation with the hammer-butt. Fig. 3 is a view similar to Fig. 2, showing the same parts in the positions they occupy when the jack is effective for imparting repetitions to the hammer; and Fig. 4 is a sectional view taken on dotted line, X X, Fig. 2, and showing the parts at the right of said line.

Similar characters designate like parts in all the figures of the drawings.

The pianoforte-action constituting the subject-matter of the present invention comprises, in addition to the string 2, balance or center rail 3, hammer-stem rail 4, upper or hammer-spring rail 5, regulating-rail 6, damper 7, damper-lever 8, damper-lever spoon 9, jack-rocker 10, jack-lifter 12, and key-lever K, all of which may be of any suitable construction and organization, the following instrumentalities, viz: a hammer 13, having its hammer-butt 14 pivoted at the lower rear end thereof to the upper end of the hammer-flange 15, secured to the center rail 3 near the front edge thereof; a back-check 16, which may be consistently termed a "counter-check;" a back-check carrier 17, adjustably secured to the hammer-butt; a fastening device 17′ for securing the back-check carrier in an adjusted position; a jack 18, pivotally supported at its lower end on the jack-flange 19, fixed to the jack-rocker 10 in the usual manner, and which jack has at the upper end thereof two independently-effective hammer-actuating faces 22 and 23, disposed at different distances, respectively, from the pivot-point of said jack, and one of which may be termed a "primary" actuating-face and the other a "secondary" or "repeating" face; a returning device 20, fixed to the upper end of the jack and coöperating with the back-check 16 for accelerating the return movement of the hammer, back-check, and jack, and a jack-regulator 21, adjustably mounted in the jack-regulating rail 6, and which may be of any suitable or well-known construction.

The jack 18, which is constructed to effect a "long" and "short" jack operation, and which on account of its functions will be herein referred to as a "duplex" repeating-jack, has at the working end thereof two successively-effective hammer-butt-actuating faces 22 and 23, respectively, disposed, preferably, in different horizontal planes, and, as before stated, at different distances from the pivot-point 18′ of said jack, the one 22, which may be of any desired construction other than concaved, and which is located at the greater distance from the pivot-point, being so constructed and so disposed with respect to the working face of the hammer-butt as to be in positive contact with the hammer-butt when the hammer is in its retracted position and also throughout the greater portion of the working stroke of the hammer and key-lever, and the secondary or repeating actuating-face of the jack being concaved and so disposed with respect to the working face of the hammer-butt as to be brought into effective engagement with said hammer-butt just preceding the striking of the hammer against the string 2 and facilitating a slight return movement of the hammer after it strikes the string or while the key is in an approximate full-stroke position. The hammer-butt 14 has a shoulder 14′ at the lower front end thereof which is convexed to coincide with and fit into the concavity of the secondary or repeating face 23 of the jack, the concaved face of the jack and the convexed shoulder of the hammer-butt being eccentric to the pivot-point of said hammer-butt, this shoulder being usually covered with felt in any suitable manner and being so disposed that when the jack, key, and hammer are in position for rapid repetition said shoulder 14′ will rest snugly against the repeating-face 23 of said jack. In operation the two hammer-actuating faces 22 and 23, one or the other of which is in working engagement with the hammer-butt according to the position of said hammer and key-lever, are brought by a depression of the key-lever K successively into contact with the shoulder or face 14′ of the hammer-butt, the primary actuating-face 22 first acting upon the hammer-butt to throw the hammer forcibly against the string 2 and the secondary hammer-actuating face 23 being brought into cooperative relation with said face 14′ just before the hammer strikes the string, permitting a slight return movement of the hammer while the key-lever is in a full-stroke position, and thus facilitating rapid repetitions of the stroke of the hammer on slight vibratory movements of the key-lever. In the present action the working end of the jack is at all times in position to effect an immediate response of the hammer on the slightest movement or action of the key, one or the other of the hammer-actuating faces 22 or 23 being in positive engagement with the hammer-butt, thus obviating lost motion, due to the throwing off of the working end of the jack from the hammer-butt on the full stroke of the key, as in upright actions of ordinary well-known constructions.

The primary hammer-actuating face 22 is so disposed with respect to the pivotal point 18′ of the jack that when the key and hammer are in their normal or initial position said face 22 will act through the first portion of the stroke of the key to throw the hammer forcibly against the string, said face remaining in contact with the hammer-butt until the hammer is in close proximity to the string and until the angularly-disposed arm 18″ at the lower end of the jack is brought into contact with the jack-regulator 21, at which time the primary actuating-face 22 is carried forward out of effective engagement with the shoulder 14′ of the hammer-butt and the secondary actuating-face 23 is immediately brought into coöperative relation and into effective engagement with said shoulder 14′ and in position where slight rapid depressions of the key will effect rapid repetitions of the stroke of the hammer. In the present instance the jack 18 has its upper working end flared or of greater width than the main body portion or stem of said jack and the primary actuating-face 22 is shown as a teat or projection located at the extreme upper end of the jack substantially in alinement with the longitudinal axis and approximately midway between the front and rear faces of said jack, and the front face 18‴ of the working end of said jack is disposed oblique to the longitudinal axis of said jack for a purpose hereinafter more fully described.

The oblique face 18‴ of the jack, which may be consistently termed the "back-check-engaging" face, and the upper working end of the jack are in practice covered with some flexible material, such as felt, and as indicated in the accompanying drawings.

As a means for limiting the forward movement of the jack and for preventing the disengagement of said jack from the hammer-butt and also for blocking the return movement of the hammer from its repeating position (shown in Fig. 3) until the key is fully released, I have provided a back-check 16, having a felt-covered inclined inner or working face 16′, which coöperates with the inclined or oblique face 18‴ of the jack when the jack and hammer are in the position shown in Fig. 3, and as a simple and convenient means for supporting said back-check and for facilitating an adjustment thereof with relation to the jack and hammer-butt I have provided a back-check carrier 17 and a carrier-fastening device 17′, which latter cooperates with said carrier for locking the same, together with the back-check, in any desired position with respect to the jack. The back-check carrier 17, in the preferred form thereof shown most clearly in Fig. 3, consists of a single piece of wire bent at 24 and 24′ at different points in its length and substantially at right angles to form two parallel arms 25

and 26, respectively, disposed in the same plane and connected together by a rectangularly-disposed bar 27, the arm 25 being of considerably-greater length than the arm 26, and both arms 25 and 26 being preferably screw-threaded at their extreme ends, the latter, 26, being screwed into a horizontal opening in the front face of the back-check 16, and the former, 25, being adjustably seated in a smooth transverse opening in the front face of the upper end of the hammer-butt. The fastening device 17′ for the back-check carrier is shown as a screw, adjustably seated in a screw-threaded opening intersecting the opening in which the arm 25 of the carrier is seated, the inner end of the shank of said screw engaging the threaded end of the arm 25 of said carrier and locking said carrier against movement.

As a convenient means for accelerating a return movement of the hammer and jack on the release of the key I have provided, in connection with said jack, a returning device 20, which in the present instance is shown as a piece of wire bent at right angles intermediate its ends in the form of an L and one arm of which is screwed into the upper end of the jack somewhat in advance of the hammer-actuating face 22 and the other arm of which extends forward over the upper face of the back-check and in position for coöperating with said upper face on the release of the jack, whereby to effect a return movement of the back-check and jack, the upper face of the back-check being for convenience indented or concaved, as shown at 16″, to form a seat for the returning device and also for preventing accidental disarrangement of the back-check.

The provision of means whereby the back-check may be adjusted in its position with respect to the jack and hammer-butt is a matter of desideratum, as it facilitates such changes in position as are rendered necessary by shrinkage and expansion of material or by the compacting of coöperating felt faces; furthermore, by providing means whereby the back-check may be adjusted to insure positive contact with the working end of the jack on the full stroke of the key and between said working end and the hammer-butt, the usual back-catch and back-catch-supporting wire may be wholly dispensed with. In my prior application noted in the preamble of this specification I employed a pivotally-supported back-check and means in connection therewith for adjusting the working end of said back-check in the arc of a circle. This necessitates the employment of a pivot in connection with the back-check and back-check carrier and also an adjusting device in connection with the upper end of said jack and hammer-butt, and it is the intent and purpose of the present invention to provide a more simplified construction of back-check and back-check carrier and at the same time secure the advantages of adjustability.

By providing a returning device, such as hereinbefore described, I am enabled to dispense with springs commonly employed for returning the jack to its normal position. For convenience I have shown in connection with the hammer the usual hammer-spring 27′, fixed at its upper end to the hammer-spring rail 5 in the usual manner and bearing at its lower free end against the hammer-butt, whereby to exert a hammer-returning stress upon said hammer. The employment of a hammer-spring in the action constituting the subject-matter of this application is not necessary for the reason that on a return movement of the key-lever the hammer will be positively returned to its normal position through gravity due to the hammer-returning stress exerted by the weight of the jack, jack-rocker, jack-lifter, and the rear end of the key-lever upon the inner end of the jack-returning device 20, which tends to depress said hammer, together with the back-check, thus naturally causing the return movement of the hammer to its normal position.

The operation of the action, which will be readily understood by any one skilled in the art on reference to the accompanying drawings, is as follows: Assuming the action to be at rest or in its initial position, I have shown at Fig. 1, wherein the primary actuating-face 22 of the jack is in engagement with the shoulder 14′ of the hammer-butt, the jack being at its extreme rearward position, a full-stroke depression of the key (not shown) will forcibly throw the hammer, through the medium of the jack, jack-rocker, and jack-lifter, against the string, the secondary hammer-actuating face of said jack coming, through the last portion of this movement of the hammer, into a hammer-actuating position, allowing a slight return movement of said hammer, which brings the shoulder 14′ of the hammer-butt against the secondary actuating-face 23 of the jack, thus leaving the parts which control the action of the hammer in position to secure rapid repetition in the stroke of the hammer on slight release and depressions of the key, the working faces of the jack, as before stated, being at all times—that is, one or the other of them—in actuating contact with the hammer-butt for the reason that there can be no lost motion of the jack, as on the full stroke of the jack and hammer the jack is thrown tightly against the rear face of the back-check and positively prevents any disengagement between the working end of the jack and hammer-butt. On a full release of the key the parts return to their normal positions, the jack being assisted in its return movement by the jack-returning device, secured to the lower end of the back-check, the button or abutment of said returning device striking the front face of the jack on a return movement of the hammer, forcing said jack to its normal position, at the same time the weight of the jack, jack-rocker, and jack-lifter during

their descending movement being exerted upon the inner end of the jack-returning device and accelerating the return movement of the hammer and connected back-check.

From the foregoing it would be obvious that springs and other devices heretofore employed for effecting return movements of the different parts of the action may be wholly dispensed with, which in this art is a matter of extreme importance, as it not only lessens the cost of manufacturing and setting up the action, but also obviates the annoyances inherent to actions of ordinary construction, due to the breaking of springs and resilient or reactionary part-returning devices.

By providing the hammer-butt and jack with convexed and concaved faces 14′ and 23, respectively, which are eccentric to the pivot-point of said hammer, the hammer will, when the parts are in the position shown in Fig. 3, or immediately upon the engagement of the repeating-face 23 with the hammer-butt, be positively held against movement in either direction until movement is imparted to the jack, thus effectually obviating accidental repetitions of the hammer-stroke, which are due in pianoforte-actions of ordinary construction to the non-provision of means for blocking the movement of the hammer while the key is in a substantially full-stroke position and immediately after the hammer has struck a string or the non-provision of means for preventing movement of the hammer independent of the movement of the jack.

It will be readily seen that by providing a concaved seat in the upper end of the jack and forming the working end of the hammer-butt to coincide with and fit this seat when this working face of the hammer-butt is seated in the concaved portion of the said jack and the back-check is in engagement with the hammer-butt the hammer cannot have any effective vibration, but on the contrary will be held substantially stationary until movement is imparted thereto through the medium of the jack.

I claim—

1. An upright-pianoforte action embodying a hammer having a hammer-butt furnished with a shoulder at the lower end thereof; a pivotally-supported jack, having at the upper end thereof two hammer-actuating faces disposed at different distances, respectively, from the pivotal point of said jack, and having the one which is located at the greatest distance from said point substantially in alinement with the longitudinal axis of said jack; a back-check connected with the hammer-butt for movement therewith, and having an inclined rear face coöperative with a correspondingly-inclined front face of the jack; a back-check carrier having two parallel arms one of which is seated for longitudinal adjustment in an opening in the hammer-butt, and the other of which is fixed to the back-check; a fastening device carried by the hammer-butt in position to engage the arm of the back-check carrier, for holding the same in adjusted position; and a returning device fixed to the upper end of the jack, and coöperating with the back-check for returning the parts to their normal positions.

2. In an upright-pianoforte action, the combination with the hammer-butt of a pivotally-supported jack having an inclined front face; a back-check carrier adjustably secured to the hammer-butt; a back-check mounted on said carrier and having an inclined rear face in coöperative relation with, and corresponding to, the inclined face of the jack; and a returning device fixed to the upper end of the jack and extending over and in coöperative relation with the upper face of the back-check.

3. In an upright-pianoforte action, the combination with the hammer-butt, and with the pivotally-supported jack, of a back-check carrier consisting of a single piece of wire bent to form two parallel horizontally-disposed arms, connected together at their ends by a vertically-disposed bar, and the upper arm of which is of greater length than the lower arm and has its outer end movably seated in an opening in the hammer-butt; a back-check adjustably secured to the lower short arm of said carrier; a fastening device coöperating with the longer arm of said carrier for holding the same in an adjusted position; and a returning device fixed to the upper end of the jack and having an arm extending over the upper face of the back-check and operative for accelerating the return movements of the parts to their initial positions.

4. In an upright-pianoforte action, the combination with a pivotally-supported hammer-butt, of a pivotally-supported jack having two successively-effective hammer-actuating faces disposed at different distances, respectively, from the pivotal point of said jack and also having an inclined front face near the working end thereof; a back-check carrier composed of a single piece of wire bent to form two parallel arms of different lengths, the longer of which is adjustably mounted in the hammer-butt; a back-check mounted on the shorter arm of the carrier and having an inclined face in coöperative relation with the inclined face of the jack, and also having its upper face recessed to form a seat for a returning device; a returning device carried at the upper end of the jack and having an arm adapted to enter the seat in the back-check; and a fastening device carried by the hammer-butt and in position and adapted to engage the longer arm of the back-check carrier for locking the same in an adjusted position.

5. An upright-pianoforte action including a pivotally-supported hammer-butt having an outwardly-curved shoulder disposed in an arc eccentric to the pivot-point of said butt; a pivotally-supported hammer-actuating jack having a plane transverse primary actuating-face disposed at the extreme upper end of said jack in position to coöperate with the

hammer-butt, and also having a concaved secondary actuating-face located in the rear of, and at a lesser distance from the pivot-point of the jack than, the primary actuating-face, and disposed in an arc of a circle eccentric to the pivot-point of the hammer-butt and in position to engage the shoulder of said hammer-butt; means for actuating said jack to bring the two actuating-faces successively into operative engagement with the hammer-butt; and a back-check carried by the hammer-butt and constructed and disposed to engage the front face of the jack concurrently with the engagement of the hammer-butt shoulder and secondary actuating-face of the jack, whereby to coöperate with said jack for blocking the movement of the hammer.

6. In an upright-pianoforte action, the combination of a pivoted hammer-butt having an outwardly-curved shoulder at the lower front end thereof disposed in an arc eccentric to the pivot-point; a pivoted hammer-actuating jack having a primary and a secondary actuating face, the former of which is located at the extreme upper end of said jack and disposed in a plane substantially at right angles to the longitudinal axis of said jack; and the latter of which is inwardly curved to coincide with the curvature of the hammer-shoulder and is located below the former and in position to engage the hammer-butt shoulder upon the full depression of a key; key-operated mechanism for actuating said jack to bring the primary and secondary actuating-faces successively into engagement with the hammer-butt; and a back-check carried by the hammer-butt and constructed and organized to engage the front face of the jack concurrently with the engagement of the secondary actuating-face with the hammer-butt, whereby to coöperate with said secondary face in blocking the movement of the hammer.

Signed by me at Hartford, Connecticut, this 27th day of March, A. D. 1899.

LEO HERLINO BATTALIA.

Witnesses:

E. C. WHITNEY,

BENTON N. PARKER.