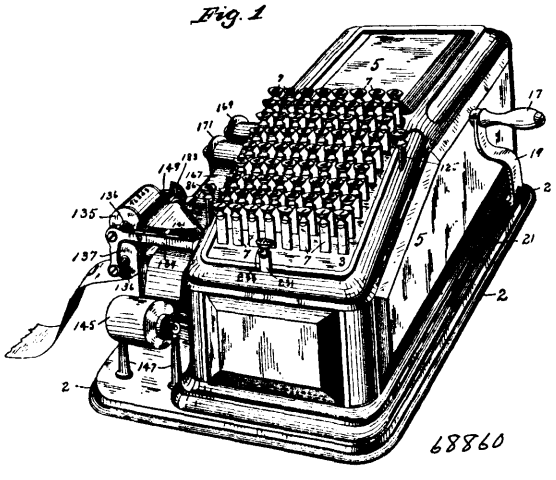
lifter connected therewith by a joint permitting movement of the jack in one direction only, a spring for stiffening the joint and keeping the jack in line with its extension during the greater part of its upward movement, a radial connecting arm pivoted at one end to a stationary support and extending rearwardly therefrom and connected at its opposite end to the jack extension, said arm as it moves upward from a horizontal toward a vertical position, in describing the arc of a circle, serving to draw forward the jack extension and the jack with accelerating forward movement as they are raised to opeate the hammer, a throw-off device for producing a sudden withdrawal of the jack from the shoulder of the jack butt when the hammer has nearly reached the string, a back catch, consisting of an arm extending upwardly from the jack, and an arm projecting from the hammer butt and provided with an adjustable button, and a lever pivoted to the lower end of the jack extension and actuated by the key, substantially as described. 9th. In a piano action, the combination with the hammer butt provided with an oblong recess having a longitudinal groove in its front wall, of a hammer retracting spring connected at its lower end to the jack and having at its upper end an off-set, whereby it is adapted to enter said recess and engage the said longitudinal groove, substantially as described. 10th. In a piano action, the combination with the jack butt, of the jack jointed to a downwardly extending lifter rod and provided on its rear side with a tongue abutting against the said lifter rod, and a spring secured at its lower end to the lifter rod and bearing at its upper end against the tongue of the jack, whereby the jack and lifter rod are kept in line with each other as the are raised to operate the hammer, substantially as described. 11th. In a piano action, the combination with the jack and the lifter rod or extension jointed thereto, of a rail or support made adjustable both vertically and horizontally, and a connecting arm pivoted at end to said lifter rod and at its opposite end to said adjustable rail or support, substantially as described. 12th. In a piano action, the combination with the damper and damper lever, the latter pivoted to the flange 2 of the centre rail, of the downwardly extending spring 44 secured to the outer side of the damper lever, the rail 45 connected with and supported by the centre rail and having a recess forming a bearing for the lower end of the spring 44, the lever 14 operated by the key, and the arm 43 projecting upward from the rear end of the lever 14 and acting directly on the damper lever to actuate the same on the depression of the key, substantially as described. 13th. A piano action, substantially as described, the same consisting of the rail 1, flange 2, hammer 8, hammer butt 6 having the jack butt 7 formed thereon, the jack 22 with its projection 30, and back catch arm 35, the back stop 36 projecting from the hammer butt, the hammer spring 11 having one end connected with the hammer butt and the other end with the jack, the throw-off button 32, the lifter rod 20 jointed to the jack, the spring 24 secured to the lifter rod and bearing upon the lower end of the jack, the radial connecting arm 26 pivoted at one end to the lifter rod and at its opposite end to the flange of the rail 28, the lever 14 pivoted to the flange of the rail 12 and having the lifter rod pivoted thereto, said lever 14 having an upwardly projecting arm 43, the key 16 acting upon the lever 14, the damper 4, the damper lever 3 pivoted to the flange 2 and adapted to be actuated by the arm 43 of the lever 14, the rail 45, and the damper spring 44 secured to the outside of the damper lever below its pivotal point and bearing at its lower end against the rail 45, all constructed and arranged to operate, substantially as described.

No. 68,860. Computing Machine. (*Machine à compter.*)

Fig. 1



W. P. Shattuck, C. M. Amsden and William S. Nott, all of Minneapolis, Minnesota, U.S.A., 29th September, 1900; 6 years. (Filed 29th June, 1900.)

Claim.—1st. The combination, with a key board provided with a series of movable keys, of a series of type wheels and connections and a support therefor, a transmitting mechanism thereon, said key board and said support with the parts thereon being relatively movable to accomplish proportional movement of said wheels and the return thereof to gers, for the purpose set forth. 2nd. The combination, with a movable carriage, a series of type wheels mounted upon said carriage, and actuating devices therefor, of a series of movable keys for each type wheel, selected keys, when moved, producing rotary movement in said actuating devices that is transmitted to corresponding type wheels and causes said type wheels to be turned, for the purpose set forth. 3rd. The combination with a key board provided with a series of movable keys, of a series of type wheels and a support therefor carrying a transmitting mechanism, and means for moving said type wheel support along said key board and thereby causing said type wheels to be operated by selected and previously operated keys of said key board. 4th. The combination with a key board provided with a row of independent keys numbered from 1 to 9, of a sliding carriage provided with a spiral shaft in line with said keys and engageable with said keys, a type wheel carried by said carriage, and connections between said type wheel and said spiral shaft whereby as said carriage is moved said type wheel is rotated by engagement of said spiral shaft with any previously operated key of said row. 5th. The combination, with a key board provided with a series of movable keys, of a sliding carriage, a series of type wheels mounted on said carriage, and a series of spiral shafts connected with said type wheels and adapted, as said carriage is moved, to engage previously operated keys of said key board, for the purposes set forth. 6th. The combination, with a reciprocating carriage, and type wheels mounted thereon, of means for operating said wheels the same distance in both directions, as said carriage is reciprocated, for the purpose set forth. 7th. The combination, with a reciprocating carriage and type wheels mounted thereon, of a stationary key board, movable keys on said key board, and means movable with relation to the keys causing said wheels to be turned by said keys as said carriage is reciprocated to bring into recording position type on said wheels corresponding to previously moved keys, for the purpose set forth. 8th. The combination with a key board provided with a series of rows of numbered keys, of a reciprocating carriage, a series of spirally grooved shafts mounted upon and carried by said carriage, said shafts being adapted to be rotated as said carriage is moved, by engagement with previously operated keys in respective rows of said key board, type wheels connected with and rotated by said grooved shafts, and means for recording the numbers registered on said type wheels at each movement of said carriage, substantially as described. 9th. The combination, with a key board and keys, of the movable carriage, the primary or listing and the total result type wheels, both mounted upon said carriage, and means movable with said carriage for operating said wheels from previously operated keys of said key board as said carriage is moved, substantially as described. 10th. The combination, with the key board provided with a series of rows of numbered keys, of a reciprocating carriage, a series of spirally grooved shafts mounted upon and carried by said carriage, said shafts being held against longitudinal movement in said carriage but adapted to be rotated as said carriage is moved by engagement with previously operated keys of said key board, and a series of type wheels connected with and rotated by said spirally grooved shafts, for the purpose set forth. 11th. The combination, with the key board and keys, of the movable carriage, the listing type wheels and the total result type wheels mounted thereon, transfer wheels between said listing wheels and total result wheels, and means for moving said total result wheels into engagement with said transfer wheels during one movement of said carriage and holding them out of engagement with said transfer wheels during the other movement of said carriage, for the purpose set forth. 12th. The combination, with the listing wheels, the total result wheels and the interposed transfer wheels, of means for rotating said listing wheels, means for axially moving said transfer wheels for the purpose of carrying from each total result wheel to the wheel of the next higher denomination, and means for moving said total result wheels into and out of engagement with said transfer wheels, for the purpose set forth. 13th. The combination, with the listing wheels, the total result wheels and the interposed transfer wheels, of means for rotating said listing wheels, and means for moving said total result wheels into and out of engagement with said transfer wheels to be moved by or permit the independent rotation of said transfer wheels, for the purpose set forth. 14th. The combination with the keyboard and keys, of the movable carriage, the listing wheels, the total result wheels, and the interposed transfer wheels, all mounted upon said carriage, means operated by said keys for rotating said listing wheels, and means for moving said total result wheels into and out of engagement with said transfer wheels, for the purpose set forth. 15th. The combination, with the keyboard and keys, of the movable carriage, the listing wheels and the total result wheels mounted upon said carriage, means operated by said keys for rotating said listing wheels, means for transferring indicated amounts from said listing wheels to said total result wheels, and means for printing the indicated amounts from either the listing or total result wheels. 16th. The combination with the keyboard and keys, of the movable carriage, the listing, the total result and the interposed transfer wheels, all mounted upon said carriage, means operated by said keys for rotating said listing wheels, means for moving said total result wheels into and out of engagement with said transfer wheels