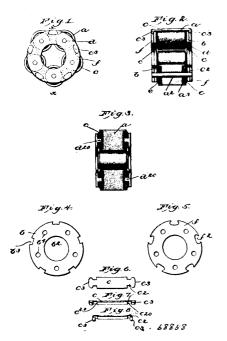
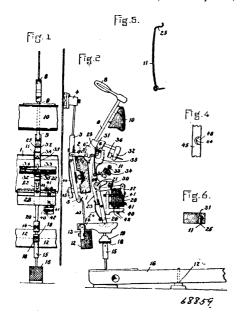
tongues, said projections and tongues entering peripheral spaces of said members. 8th. A cage for roller bearings, comprising end



members consisting of end plates having recesses cut along their peripheries, cross pieces provided with shoulders to engage the surface of said members and projections beyond said shoulders to enter the recesses, tongues at the ends of said projections to overlie said plates and retain them in engagement with the shoulders, and locking plates to engage said tongues and prevent lateral displacement of the cross pieces, substantially as described. 9th. The combination with the plates b provided with peripheral recesses b^3 , of the cross pieces c having the projections c^2 and tongues c^3 , and the locking plates f, having peripheral recesses of such shape as to fit said tongues, substantially as described. 10th. The combination with the plates b, of the spindles d, the rollers a and the washers c, affording means for keeping said rollers out of contact with said spindles, the cross pieces c connecting the plates b, and a locking plate f to co-operate with said pieces c, substantially as described.

No. 68,859. Pianoforte Action. (Action de piano.)



Louis Adams Guild, assignee of George Morse Guild, both of Boston, Massachusetts, U.S.A., 29th September, 1900; 6 years. (Filed 20th June, 1900.)

Claim. -1st. In a piano action, the combination with the hammer and the hammer butt, the latter having the jack butt formed thereon. of a jack having a downwardly extending lifter rod pivoted thereto, a key for actuating said lifter rod, and a connecting arm pivoted at a key for actuating said lifter rod, and a connecting arm pivoted at its front end to a rail or support, and extending rearwardly therefrom, and connected at its inner end to the lifter rod, said connecting arm as it moves upward from a horizontal toward a vertical position in describing the are of a circle, serving to draw forward the lifter rod and jack as they are raised by the key to operate the hammer, substantially as described. 2nd. In a piano action, the combination with the hammer and the hammer butt, the latter having the jack butt formed thereon, of a jack having jointed thereto a downward extension or lifter rod, a key for actuating the thereto a downward extension or lifter rod, a key for actuating the same, a spring for stiffening the joint and keeping the jack in line with the lifter rod as it is raised by the key, and a connecting arm with the litter rot as it is faised by the key, and a connecting arm pivoted at one end to a stationary support and extending rearwardly therefrom and connected at the opposite end to the jack extension or lifter rod, said connecting arm as it moves upward from a horizontal toward a vertical position in describing the arc of a circle, serving to draw forward the lifter rod and jack as they are raised by the key to operate the hammer, substantially as described. 3rd. In a piano action, the combination with the hammer and the hammer butt, the latter having the jack butt formed thereon, of a jack provided with a throw-off projection adapted to contact with a station vided with a throw-oft projection adapted to contact with a stationary stop or button, the jack extension jointed to the jack, a spring for stiffening the joint and keeping the jack and jack extension in line as they are raised by the key, and a connecting arm having one end pivoted to a rail or stationary support and extending rearwardly therefrom, and the other end pivoted to the jack extension, said arm as it moves upward from a horizontal toward a vertical position in describing the are of a circle serving to draw forward the lifton in describing the arc of a circle, serving to draw forward the lifter rod and jack as they are raised by the key to operate the hammer, the jack being thereby kept beneath the jack butt during the greater part of its upward movement, and then suddenly withdrawn with a part of its upward movement, and then suddenly withdrawn with a quick outward movement, substantially as described. 4th. In a piano action, the combination with the hammer and the hammer butt, the latter having the jack butt formed thereon, of a jack having a downward extension or 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, and a radial connecting arm pivoted at one end to a stationary support and extending rearwardly therefrom, and connected at its opposite end to the ing 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 an acceleration. to draw forward the jack extension and the jack with an accelerating forward movement as they are raised to operate the hammer, and 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, substantially as described. 5th. In a piano action, the combination with the hammer and hammer butt, the latter having the jack butt formed thereon, of a jack having a lateral throw-off projection at its lower and a stationary extra lateral throw-off projection at its lower end, a stationary stop or button with which said throw-off projection is brought into contact as the jack is raised, a downward extension connected with the jack by a joint permitting movement in one direction only, and having a spring for keeping the jack in line therewith as it is raised by the spring for keeping the jack in line therewith as it is raised by the key, and a connecting arm pivoted at one end to a rail or stationary support, and extending rearwardly therefrom and connected at its opposite end to the jack extension, said connecting arm as it moves upward from a horizontal toward a vertical position in describing the arc of an circle, serving to draw forward the jack as it is raised, substantially as described. 6th. In a piano action, the combination with the harmor and harmor but the latter having the jack but with the hammer and hammer butt, the latter having the jack butt formed thereon, of the jack provided with a throw-off projection adapted to contact with a stationary stop or button, a downward extension connected with the jack by a joint permitting movement extension connected with the jack by a joint permitting movement in one direction only, a spring for stiffening the joint and keeping the jack in line with the jack extension as it is raised by the key, a connecting arm pivoted at one end to a rail or stationary support, and extending rearwardly therefrom and connected at the other 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 as it is raised, and a back catch for holding the hammer close to the string, substantially as described serving to draw forward the jack as it is raised, and a back catch for holding the hammer close to the string, substantially as described. 7th. In a piano action, the combination with the hammer and hammer butt, the latter having the jack butt formed thereon, of the jack provided with a throw-off projection adapted to contact with a stationary stop or button, a downward extension connected with the jack by a joint requirement in one direction and the stationary stop or button, a downward extension connected with the stationary stop or button, a downward extension connected with the jack by a joint permitting movement in one direction only, a spring for stiffening the joint and keeping the jack in line with the jack extension as it is raised by the key, a connecting arm pivoted at one end to a rail or stationary support and extending rearwardly therefrom and connected at the other 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 as it is raised, and a back catch for holding the hammer close to the string, consisting of an arm extending upwardly from the jack, and an arm projecting from the hammer butt and with which the arm projecting from the jack contacts on the release of the hammer, substantially as described. 8th. In a piano action, the combination with the hammer and the hammer butt, the latter having the jack butt formed thereon, of a jack having a downward extension or