

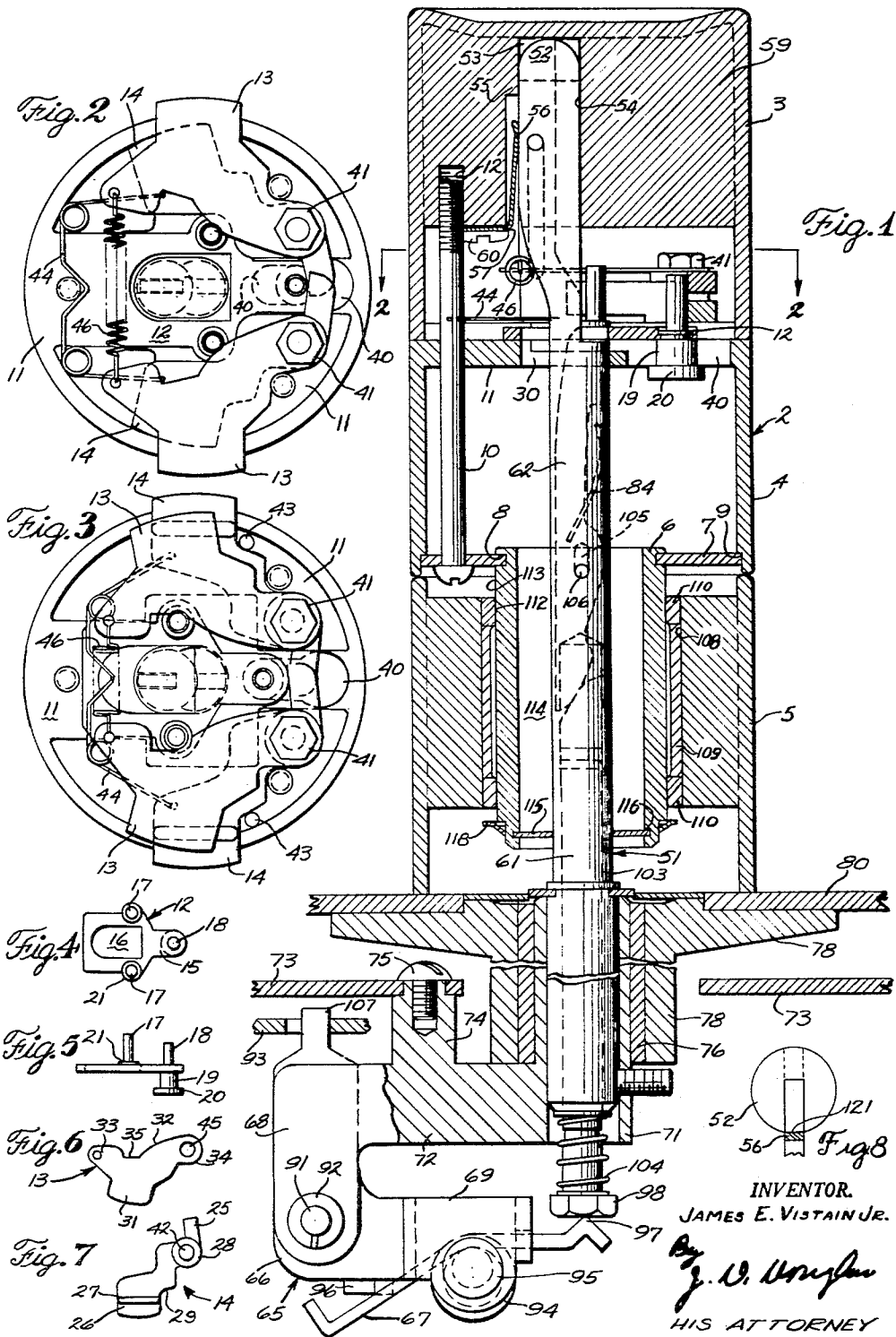
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RECORD PLAYER SPINDLE ADAPTER

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RECORD PLAYER SPINDLE ADAPTER

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This invention relates to automatic record players and more particularly to a center post device that is slidably attached to the record player, and adapted to provide means for stacking and singly playing records having large center holes.

Heretofore in the standard multiple speed record player there has been no provision made for records having large center holes and adapted to be played at 45 r.p.m. This type of record is usually of small diameter and much lighter than those records of standard usage, and it is becoming more or less common in the field today to manufacture a separate unit for handling records of this type.

More specifically my invention comprises a device that can be slid over the centerpost used for records having small center holes and which is adapted to hold a stack of records having large center holes and which is operated by said center post to release the bottom record of the stack to playing position on the turntable.

An advantage of my invention resides in the fact that no additional elements need be added to the standard record player in order to have my novel spindle operate.

Another advantage is the small number of elements necessary in the assembly of my device, and the simplicity of construction thereof.

Other advantages will become apparent to those skilled in the art, and a more comprehensive understanding thereof will be realized by referring to the accompanying description of an embodiment which is illustrated by the drawings herein and included as a part of the specification.

In the drawings:

Fig. 1 is an elevational view partly in section showing an embodiment of my invention and its operational relationship to the standard record center post, and turntable.

Fig. 2 is a top view taken along line 2—2 of Fig. 1.

Fig. 3 is similar to Fig. 2 showing the elements in another position.

Fig. 4 is a top plan view of the pusher plate.

Fig. 5 is an elevational view of the pusher plate.

Fig. 6 is a top plan view of one of the separator blades.

Fig. 7 is a top plan view of one of the record support blades.

Fig. 8 is a top view of the pilot shaft of the spindle, and the spring associated therewith.

Referring now to the drawings, throughout which like elements are designated by like reference characters, the numeral 2 refers to the elongated cylindrical spindle in which are disposed the elements comprising the device. The spindle may be constructed from any suitable material, preferably one of a plastic substance that is both easy and economical to work with. The embodiment of Fig. 1 shows the spindle as being comprised of a cap 3, an intermediate part 4, and a base 5. The base 5 rests upon the turntable surface and is rotatable therewith. A sleeve bearing 6 extends upward through the rotating base 5, and carries a plate 7, which is seated on a shoulder 8 on the upper end of the bearing. The plate extends radially outward therefrom and seats in a recess 9 formed on the lower edge of the inner surface of the base 4. The spindle

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cap 3 is seated upon the top of the base 4, and secured thereto by means of screws 10 extending upward through holes in the plate 7 and a platform 11 of the base 4 and terminating in threaded engagement in holes 12 in the cap 3.

The base 5 is formed with a central opening 108 into which an elongated bushing 109 is pressed and therein secured. The bushing is formed with bosses 110 on the top and bottom portions thereof, having bearing surfaces 112 that are in slidable engagement with the outside cylindrical surface 113 of the bearing 6. By this construction, the base 5 and disposed bushing 109 are rotatable about the bearing with a minimum drag, due to the friction encountered between the engaging surfaces of the bearing and bushing. The bosses 110 also function to align the bearing 6 within the base 5.

The bearing 6 is formed with a central opening 114 thereby enabling the centerpost 51 to be slidable there-through. A thin washer 115 is placed into a circular slot 116 in the bottom of the bearing member, and a hole is placed therein, being of slightly larger diameter than the guide shaft 103 of the centerpost 51, and thereby provides a means for centrally positioning the spindle 2 over the centerpost 51. A circular retaining spring member 118 is placed about the periphery of the lower portion of the bearing member 6, and prevents the bearing member from being drawn out of the base 5 upon removal of the spindle 2 from the centerpost 51. The base 4 and attached bearing 6 are capable of a slight vertical displacement with respect to the rotatable base 5 to enable the spindle 2 to be used with centerposts having small differences in their respective vertical heights.

The base 4 is generally hollow throughout its interior being bounded upon the lower end by the plate 7 and the upper end by the platform 11 which may be cast as an integral part of the base 4. The platform 11 provides a means for mounting the record ejector mechanism within the spindle, which includes, a pusher plate 12, a pair of record separator members 13, and a pair of record support members 14.

The pusher plate 12 is substantially rectangular in form having a tongue 15 jutting outward from one end. A slot or aperture 16 is formed in the central portion of the plate, and vertical posts 17 are located on each side of the slot diametrically opposite each other, and approximately at the midpoint of the plate length. A pin 18, is placed at the extremity of the tongue 15, and extends upward from the top surface of the plate 12. Below the tongue the pin is enlarged to provide a guide part 19 extending downward from the underside of the plate and terminating in a head 20. The posts 17 each have a narrow circumferential flange 21 at their bases providing a narrow horizontal ledge upon which the record support members 14 are seated, thereby preventing the pusher plate 12 and support members 14 from being pushed together and becoming inoperative.

The record support members 14 each comprise a lever arm 25, record support blade 26, record separator support shelf 27, mounting boss 28, and cam surface 29. The embodiment illustrated in the drawings shows two support members being used, one a right hand member, and the other a left hand member.

The record separator members 13 each comprise, a separator blade 31, cam surface 32, spring engaging arm 33, rocker arm 34, and a notch 35. The construction of both members is exactly the same which is advantageous to the manufacturer in the making and assembling the device.

The pusher plate 12, is disposed on the platform 11 so that the slot 16 is directly over a corresponding aperture 30 in the platform 11, and the guide pin 19 is disposed in a key hole shaped guide way 40 also provided

in the platform, thereby guiding the pusher plate 12 for rectilinear movement from left to right as depicted in Figs. 1, 2 and 3.

The record support members 14 are disposed over the pusher plate 11, and pivotally secured by hex head bolts 41, that extend through holes 42, Fig. 7, in the boss 28 of each support member, and which are in threaded engagement with the platform 11. The lever arm 26 of either support member may be over the other, and each are in the course of travel of the pin 13 located on the tongue 15 of the pusher plate 12, thereby enabling both support members 14 to be operable as one unit.

Stop pins 43 extending vertically upward from the platform 11 are in the path of the support members 14, and engage a surface 29 thereon. A spring 44 attached to each support member biases each member against the stop pins 43 so that the blade 26 of each member extends outward from the periphery of the spindle where they support the stack of records during the playing cycle.

The record separator members 13 are placed on top of the support members 14, and secured by means of hex head bolts 41 inserted in holes 45, Fig. 6, in the arm 34 of each member, thereby providing a common pivot for the record support and separator members. The bottom surface of each of the separator members rests upon the support shelf 27 and boss 28 of the support members 14, thereby allowing the separator members to have rotational movement substantially independent of the lower support members. The boss 28 and shelf 27 extend sufficiently above the support shelf 26, that the separator member supported thereon, may enter between the lowermost record and the one next above it.

A coil spring 46 connected between the separator members 13 biases said members about their pivot toward the axis of the spindle. In their inoperative position as depicted in Fig. 3, a notched part 35 on each member engages with the fingers 17 of the pusher plate 12 which impedes the inward swing of said members.

The center post 51 is similar to that structure shown in my copending application, Serial No. 218,493, filed March 30, 1951, and is comprised generally of a hollow cylindrical guide shaft 103 having therein, a cam rod 61, record ejector dog 62, ejector dog return spring 84, and pilot shaft 52. The center post is secured in place by means of a bearing member 71, having a horizontal leg 72, and a boss 74 which is rigidly secured to the base plate 73 by a screw 75 which extends through the base plate into threaded engagement with the boss 74. A bushing 76 is placed over the periphery of the bearing member, and is slidably engaged by the hub of the turntable 80.

The spindle 2 is slid over the center post 51 so that the rotatable base 5 rests upon the turntable, and is rotated therewith. The pilot shaft 52 of the center post 51 is partially encased within the cap 3 by means of a shallow hole 53 formed by a circular inner wall 54, and a circular ridge 55 extending downwardly from the top of the cap 3. The spindle is resiliently secured by a leaf spring 56 that engages a flat portion 121 of the pilot shaft 52, and presses the pilot shaft against the inner wall 54. A horizontal portion 57 of the leaf spring 56 extends along the bottom surface of the cap 3, and is secured by a cap screw 60. A boss, not shown, is formed on the bottom surface of the cap 3, and engages a hole in the horizontal portion 57 of the spring 56 preventing the spring from swinging axially about the screw 60.

The mechanism 65 adapted to operate the center post 51, includes a bell crank lever 66, and a spring member 67. The bell crank lever is placed juxtaposed to a downward vertical extension 68 of the horizontal leg 72 of the bearing member 71, and rotatably secured thereto by a pin 91 extending through holes placed in each member, and which is held in place by a split lock ring 92.

A lug 107, extending upward from the bell crank lever 66 engages a lever 93 which is connected to cyclically

operated mechanism similar to that set forth in the aforesaid copending application. During a record changing cycle, the lever 93 is operated to impart a force upon the bell crank member 66 to rotate said member about the pin 91.

A spring 67 having a coil portion 94 is attached to the bell crank lever 66 by means of a pin 95 which is placed into the coil portion, and inserted through a hole in the bell crank lever, and secured by a split lock ring. One end of the spring takes on the form of an inverted V, the apex 97 of which is in pressure engagement with an adjustment stud 98 extending downward from and in threaded engagement with the cam rod 61. A spring 104 is placed over the shank of the adjustment stud 98 and is retained in place by the bottom edge of the guide shaft 103 and head of the stud 98. The spring 104 is adapted to bias the cam rod 61 to its lowest position in the guide shaft, the bias effect becoming greater as the stud 98 is rotated into greater threaded engagement with the cam rod 61.

In operation, a stack of records having large center holes is placed onto the spindle 2, the stack resting upon the upper surface of the support members 13. The record player is turned on and the record changing mechanism that is adapted to operate the center post 51 is put into operation. The lever 93 engages the lug 107 on the bell crank lever 66 rotating said lever about pin 91 counterclockwise. The spring 67 rotates with the bell crank lever 66 due to the lug 96 being in pressure engagement therewith. The inverted V shaped end portion 97 of the spring forces the adjustment stud 98 and cam rod 61 carried therewith upward into the guide shaft 103. The resiliency of the spring 67 is such as to provide for raising of the cam rod 61 but yet to prevent the bell crank lever movement from raising said rod more than is necessary to trigger the pusher plate and thereby damaging the associated elements.

A cam surface on the top of the cam rod pushes the record ejector dog 62 upward against the resistance of the spring 104; the movement being limited by the slot 105 and disposed pin 106. The ejector dog 62 passes through the slot 30 in the platform 11, and enters into the slot 16 located in the pusher plate 12, whereby the upward travel of said dog is stopped by said beforementioned slot 105 and pin 106. The cam rod 61 continues its upward travel whereby the ejector dog 62 is forced by a second cam surface to rotate clockwise about pin 106. The top of the ejector dog strikes the edge of the slot 16 in the pusher plate 12, and moves said plate rectilinearly from left to right, Fig. 3 showing the positions of the elements just prior to the beginning of the plate travel and Fig. 2 showing the same elements at the end of the plate travel.

The pusher plate 12 is adapted to perform two functions, namely, to extend the separator members 13 between the bottom record and the remainder of the stack, and to retract the support members 14 thereby allowing the bottom record to fall to the turntable.

As the pusher plate 12 is moved by the ejector dog 62, the posts 17 engage the cam surface 32 of each separator member 13, whereby said members are rotated about their respective pivot pin 41 outward toward the periphery of the spindle 2, and against the force of the spring 46. As the separator blade 31 of each member is entered between the bottom record and the remainder of the stack, the vertically extending pin 18 on the tongue 15 presses against the ends of lever arms 25 of the record support members 14, whereby an equal force is imparted to both members simultaneously to rotate said members toward the axis of the spindle 2, and against the force of the leaf spring 44. This rotational movement brings the support blade 26 of each member within the periphery of the spindle 2, thereby allowing the bottom record to fall to the turntable.

The triggering action of the center post 51 is sustained

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for only a time sufficient to operate the pusher plate 12, and is slidably attached to cyclic mechanism that is operable only during a record changing cycle. When the bottom record has been released, the lever 93 is moved to the right by the cyclic mechanism and enables the coil spring 104 on the cam rod 61 to force said rod downward and in turn to force the bell crank lever 66 to rotate clockwise about pin 95, thereby positioning the bell crank lever for a subsequent record changing cycle.

As the cam rod 61 is moved downward by the spring 104, the ejector dog 62 is free to rotate counterclockwise about pin 106 and lower edge of slot 105 by the action of spring 84. The ejector dog is also free to fall downward within the guide shaft 103 as the cam rod is removed from its operative position; the downward movement being limited by the slot 105 and disposed pin 106.

When the ejector dog 62 rotates counterclockwise, the top of said dog is removed from pressure engagement with the pusher plate 12 by the springs 44 and 46 connected between the record supports 14 and separators 13 respectively, which combine to impart a resultant force through the lever arms 25, and cam surfaces 32 of said members upon the lever 18 and fingers 17 of the pusher plate 12 to move said plate from its operative position as shown in Fig. 2 to its inoperative position as shown in Fig. 3. The spring 44 forces the support members 14 to rotate about the pins 41, toward the periphery of the spindle 2 whereby the support blades 26 are placed so as to engage the underside of the bottom record, and thereafter provide supporting means for the stack during a playing cycle. The spring 46 forces the separator members 13 to rotate about pins 41 toward the axis of the spindle 2 whereby the separator blades 31 are drawn within the cylindrical body of the spindle, and allow the stack to fall downward a distance substantially equal to the thickness of a record to rest upon the support blades 26.

The device remains in this position as shown in Fig. 3 until a subsequent record changing cycle is initiated whereby a duplication of the above described operation is carried out.

Although I have shown and described but one embodiment of my invention, I understand that extensive departures therefrom can be made without departing from the true spirit and scope thereof.

I claim:

1. A phonograph record playing device having a rotatable turntable and a center post adapted to support a stack of records, trigger means in said center post to singly provide records to said turntable, means to enable records having large center holes to be similarly played by said device comprising a cylindrical spindle member slidably mounted over said center post and operable therewith during a record changing cycle, record support and separator members in said spindle member first spring means for biasing said record support members outwardly of said spindle member, second spring means for biasing said record separator members inwardly of said spindle member, pivotal members arranged to secure said support and separator members to said spindle member and to provide pivot means for said members about which they are rotatable in a horizontal plane, said separator members and said support members having camming portions, a slidable pusher plate member mounted for rectilinear movement in said spindle member and including camming elements engageable with said support and separator members, said pusher plate member being movable by said center post trigger means to cause said camming elements to respectively coast with said camming portions and pivot said separator members away from one another against the action of said second spring means so as to cause the separator members to move outwardly of the spindle member between the bottom record and the adjacent record on the stack while simultaneously pivoting said

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support members toward one another against the action of said first spring means so as to cause the support members to move inwardly of the spindle member out of engagement with the bottom record of the stack, said support and separator members operating to separate the bottom record from said stack and to allow said record to fall to the turntable.

2. A spindle adapter member for adapting a record changer center post for changing records having small center holes to change records having large center holes wherein the center post has an operating member therein operable to dislodge records from a stack on the center post, said spindle adapter member comprising a cylindrical spindle member slidably mounted over said center post and operable therewith during a record changing cycle, record support and separator members in said spindle member first spring means for biasing said record support members outwardly of said spindle member, second spring means for biasing said record separator members inwardly of said spindle member, pivotal members arranged to secure said support and separator members to said spindle member and to provide pivot means for said members about which they are rotatable in a horizontal plane, said separator members and said support members having camming portions, a slidable pusher plate member mounted for rectilinear movement in said spindle member and including camming elements engageable with said support and separator members, said pusher plate member being movable by said center post trigger means to cause said camming elements to respectively coast with said camming portions and pivot said separator members away from one another against the action of said spring means so as to cause the separator members to move outwardly of the spindle member between the bottom record and the adjacent record on the stack while simultaneously pivoting said support members toward one another against the action of said first spring means so as to cause the support members to move inwardly of the spindle member out of engagement with the bottom record of the stack, said support and separator members operating to separate the bottom record from said stack and to allow said record to fall to the turntable.

3. A spindle adapter member for adapting a record changer center post for changing records having small center holes to change records having large center holes wherein the center post has a lever therein operable to remove records from a stack on the center post, said spindle adapter member comprising a body having a diameter for guiding engagement with records of the large center holes telescoped over the center post, said body being provided with a horizontal wall adjacent the operating lever of the center post, a slidable cam member including camming elements carried by said wall engageable with and movable by said lever, a pair of record support members pivotally supported on said wall and having record support portions normally biased outwardly of the body for supporting records having large center holes adjacent the center holes, said support members further including camming portions, a pair of record separator members pivotally connected to said wall and normally biased inwardly of the body, said separator members including camming portions, first means for pivotally supporting from the wall a first one of each pair of said support and separator members, second means for pivotally supporting from the wall a second one of each pair of said support and separator members, said support members having upwardly extending portions for slidably engaging and spacing said separator members above said record support means, said cam member being movable by said lever to cause said camming elements to respectively coast with said camming portions and pivot said separator members away from one another so as to cause the separator members to move outwardly of the spindle member between the bottom record and the adjacent record on the stack

while simultaneously pivoting said support members toward one another so as to cause the support members to move inwardly of the spindle member out of engagement with the bottom record of the stack, whereby the bottom record is separated from the stack and is permitted to drop onto the turntable.

4. A spindle adapter member for adapting a record changer center post for changing records having small center holes to change records having large center holes wherein the center post has an operating member therein operable to dislodge records from a stack on the center post, said spindle adapter member comprising a body having a diameter for guiding engagement with records of the large center holes telescoped over the center post, said body being provided with a horizontal wall adjacent the operating member of the center post, a slidable cam member carried by said wall and including cam portions, a pair of record support members pivotally supported on said wall and having record support portions normally biased outwardly of the body for supporting records having large center holes adjacent the center holes and a pair of arms extending into a path of travel and engageable by the cam member, a pair of record separator members pivotally connected to said wall and normally biased inwardly of said body, said support members having upwardly extending portions for supporting and spacing said separator members above said record support portions, said cam member being movable by said operating member to cause said cam portions to engage said support and separator members for simultaneously moving said separator members in opposite directions to the movement of the support members, thereby to effect extension of the separator members outwardly of the spindle adapter member and retraction of the support member inwardly into the spindle adapter member to cause the lowermost record to be separated from the stack and drop onto the turntable.

5. A spindle adapter member for adapting a record changer center post for changing records having small center holes to change records having large center holes wherein the center post has an operating member therein

operable to dislodge records from a stack on the center post, said spindle adapter member comprising a body having a diameter for guiding engagement with records of the large center holes telescoped over the center post, said body being provided with a horizontal wall adjacent the operating member of the center post, a slidable cam member carried by said wall engaged with and movable by said operating member, a pair of record support members pivotally supported on said wall and having record support portions normally biased outwardly of the body for supporting records having large center holes adjacent the center holes and a pair of arms extending into the path of travel and engageable by the cam member, a pair of record separator members pivotally connected to said wall and normally biased inwardly of the body, said support members having upwardly extending portions for supporting and spacing said separator members above said record support portions, said cam member having first cam portions for engagement with said separator members and second cam portions for engagement with said support member arms for simultaneously moving said separator members in opposite directions to the movement of the support members to cause the separator members to move between the bottom record and adjacent record of the stack and to cause the support members to move out of engagement with the bottom record in the stack to permit it to fall onto the turntable, and spring means connected to the separator and support members for holding them in operative engagement with said cam member, said spring means being operable to bias said separator and support members into their normal positions after a second changing cycle.

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