Nov. 13, 1956 S. G. GERDIN 2,770,169

DEPTH-CHARGE LAUNCHER

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Fig. 1

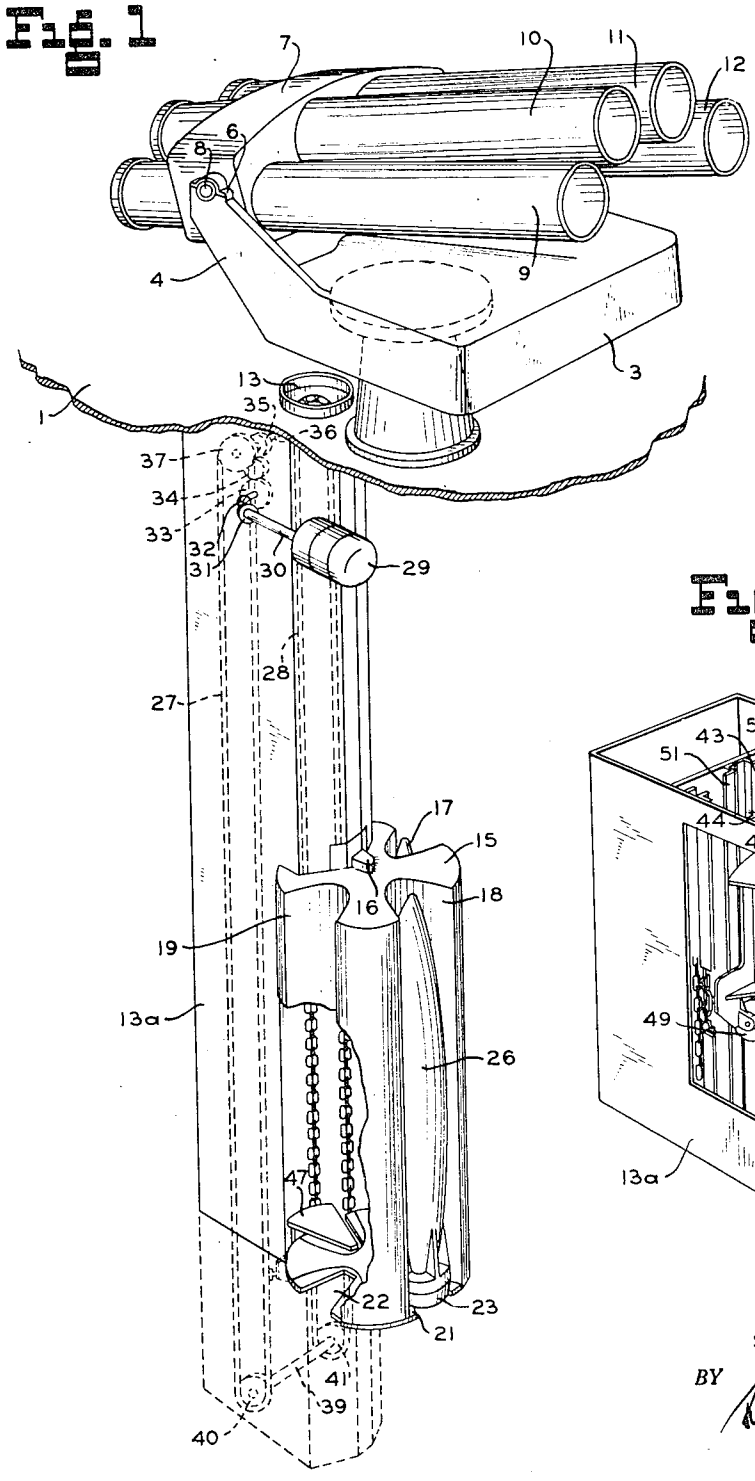

Fig. 2

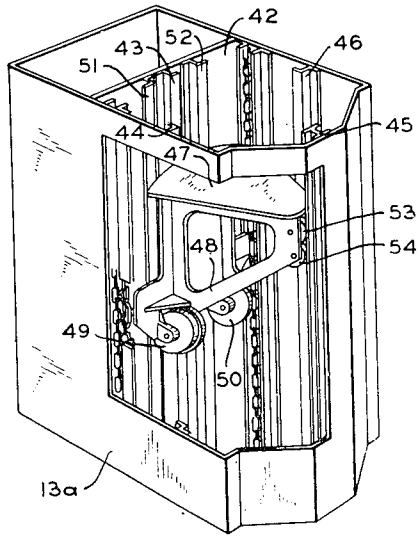

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Fig. 2

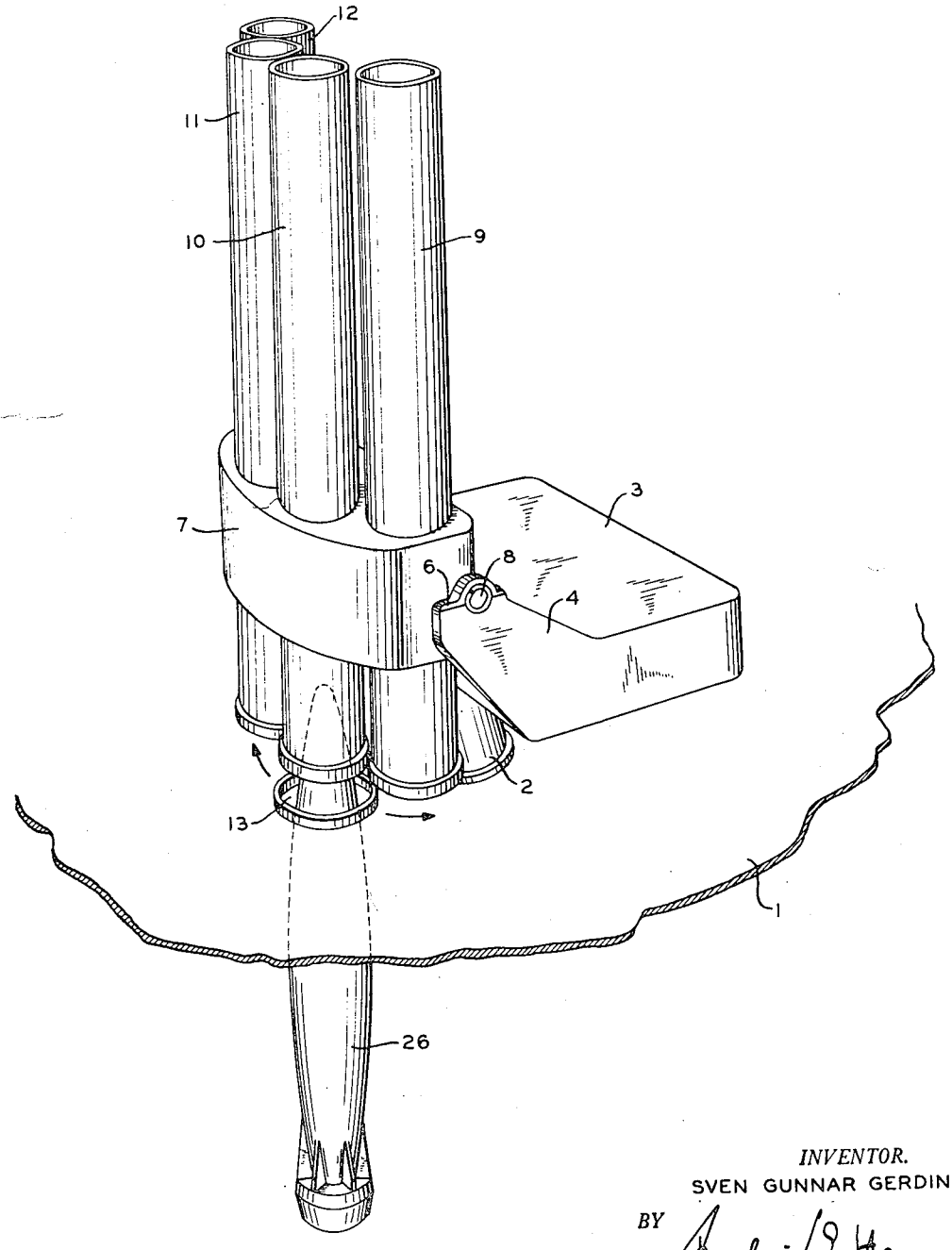

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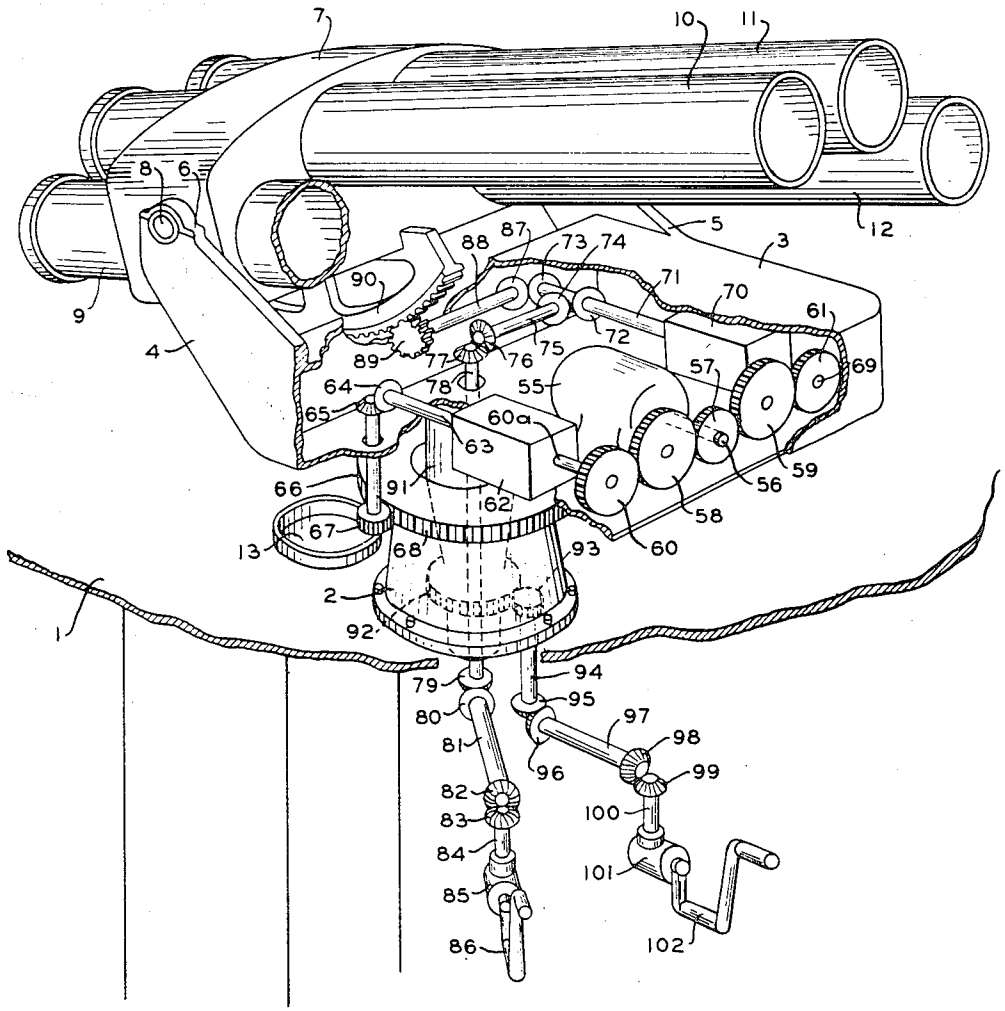
Fig. 4



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DEPTH-CHARGE LAUNCHER

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4 Claims. (Cl. 89—1)

The present invention refers to a depth-charge launcher, and then to the arrangement of the launching tubes.

Depth-charge launchers are known, which consist of an amount of charging tubes which are arranged in a fixed frame. In this frame the launching tubes have been given a fixed, non-adjustable direction. When these launching tubes are to be supplied with depth charges, the charges are inserted into the tubes either through the muzzle of the tube or through the ends of the tube. For the insertion of the depth charges in the launching tubes, a hoist machinery is required, which is movable around the depth-charge launcher itself. Furthermore, service personnel is required, which is stationed at the depth-charge launcher. When the depth charges are to be launched, either one depth charge at a time or all at once, the hoist machinery has to be moved away and the service personnel must leave its position. This moving is very impractical, and time-absorbing. Furthermore it is difficult to have service personnel which must leave the depth-charge launcher after loading.

The present invention has as an object to provide a depth-charge launcher where the personnel can insert the depth charges in all the launching tubes from a place which is situated under the depth-charge launcher, whereby the said hoist machinery at the depth-charge launcher is not required.

A depth-charge launcher, consisting of a number of parallel launching tubes, arranged in a common supporting structure, is characterized according to the present invention by the said supporting structure being movably arranged in such a way that the said launching tubes are elevatable and traversable, that the axes of the launching tubes intersect one and the same arc and that the said axes are parallel to the normal through the bending centre of the said arc.

The present invention will be described more in detail in connection with the three enclosed drawings, where Fig. 1 shows a depth-charge launcher with a hoist machinery for the hoisting of depth-charges, Fig. 2, a part of the hoist shaft, Fig. 3, the depth-charge launcher under loading, and Fig. 4, the depth-charge launcher partly sectionalized to illustrate the operating machinery.

In the Fig. 1, 1 is a floor, which for example can consist of the deck of a ship. On the floor there is a base 2 arranged, around which a parallelepipedical body 3 is rotatably arranged. From the body 3, two arms 4 and 5 extend which arms at their ends are provided with supporting means 6 for trunnions arranged in a supporting frame 7. Of the said trunnions only one is visible. This one has been given the reference number 8. In the supporting frame 7, four launching tubes 9–12 are arranged. These tubes are at their back ends provided with means not shown for the supporting of the depth charges. Furthermore, these tubes are parallel and their axes situated on an arc, the center of which is situated in the turning centre of a body 3 when the axes of the tubes are parallel to the vertical axis through the turning centre of the body 3 as is shown in Fig. 3. In the figure there are shown four launching tubes, but it should be self evident that one can also use more or fewer tubes. In the floor there is a hole, 13, which can be covered by a door. From the said hole and from the underside of the floor a substantial rectangular hoist shaft, 13*a*, extends for hoisting depth charges. In one wall of the hoist shaft there is a hole. In that hole a body protrudes, preferably a cylinder 15, the end of which is supported by supporting means of which the upper one, which is given the reference number 16, is visible. The said cylinder 15 is rotatable in the said supporting means. The side wall of the cylinder is provided with a number of axial recesses 17–20. At the lower end of the cylinder 15, a disk 21 is arranged, which has the same diameter as the cylinder. In the said disk, the recesses 22–25 are arranged, which are symmetrical in relation to the recesses previously mentioned, i. e. the recesses of the cylinder. The recesses 22–25 are a little smaller than the recesses previously mentioned. Because of that there is created at the lower end of each recess of the cylinder 15 two supporting edges. On these supporting edges the end of the depth-charge 26 can rest. In the hoist shaft, two endless chains 27 and 28 run. The two chains are parallel to each other and are driven by a motor 29 having a motor shaft 30 which drives over two conical gear wheels 31 and 32 a gear wheel 33, which in turn over a middle wheel 34 drives a gear wheel 35 which is arranged on a shaft 36. In the ends of the shaft two sprocket wheels 37 are arranged. Over each of these sprocket wheels 37 the two chains 27 and 28 run. At the very bottom of the hoist shaft parallel to the shaft 36, a shaft 39 is arraned, which at its ends is provided with sprocket wheels 40 and 41. The two chains 27 and 28 also run over these wheels. The motor 29 with its shaft, as well as the shafts 36 and 39 and the shafts of the gear wheels 33 and 34 are supported in a suitable manner in supporting means not shown. Within the hoist shaft a vertical wall 42 is arranged, which is situated in the same plane as the shafts 36 and 39. Through this wall there are obtained in effect two hoist shafts, the larger one of which is intended for hoisting charges. In this part hoist shaft a number of guide rails 43–46 are arranged. At the two chains 27 and 28 there is fastened a hoisting device in the form of a disk 47, fixed at a bracket device 48, which at its lower part is provided with two wheels 49 and 50, which run along the rails 51 and 52 which are fastened at the wall 42. When thus running, the wheels 49 and 50 lie close to the rails 51 and 52. The bracket device is also at its right part provided with two trundles 53 and 54 which run along the rail 45. When running, the trundles lie close to the rail 45. The disk 47 has a surface form which is very nearly like the surface form of the recesses 22–25. When the cylinder is turned into a position in which one of its recesses is aligned with disk 47 this disk will, when it is situated in the same plane as the disk 21, very nearly fill out the respective recess in the disk 21.

In Fig. 3, there is shown the same depth-charge launcher as in Fig. 1, which depth-charge launcher is elevated in such a way that the axes of the launching tubes are parallel to the rotating axis of the body 3. The tubes are traversed in such a way that the tube 10 is situated opposite the hole 13. In the figure there is also shown a depth-charge 26 being inserted. As the hoist machinery is shown so clearly in the foregoing figure, it has been left out in the present figure, in order to make the present figure more simple and more clear.

In Fig. 4, the depth-charge launcher of Fig. 1 is shown partially in section. Also here the hoist machinery is left out, as it is not considered necessary for making clear the present figure, and as it has been shown in connection with Fig. 1. The parallelpipedical body 3 contains an electrical motor 55, which is provided with a shaft 56, at the end of which a gear wheel 57 is arranged. This gear wheel drives, over two middle wheels 58 and 59, two gear wheels 60 and 61. The middle wheels 58 and 59 are supported in a suitable way in supporting means not shown. The gear wheel 60 is fixed in the one end of a shaft 60*a*, which consists of an input shaft to a regulatable gear-shift device 62. The output shaft 63 from the said

gear-shift device is provided, on its free end, with a conical gear wheel **64**, which is in mesh with a conical gear wheel **65**, which is arranged on one end of a vertical shaft **66** which on its other end seats a gear wheel **67**, which is in mesh with a gear arc **68**, fixed at the base **2**. The gear wheel **61** is arranged at the one end of a shaft **69**, which forms the input shaft of a regulatable gear-shift device **70**. The output shaft **71** of the said gear-shift device is provided with two conical gear wheels **72** and **73**, the conical wheel **72** of which is in mesh with the conical wheel **74** of a shaft **75**, which on its other end supports a conical gear wheel **76**, which is in mesh with a conical wheel **77**, arranged on the one end of a vertical shaft **78**, which on its lower end supports a conical gear wheel **79**, which is in mesh with a conical gear wheel **80**, arranged at one end of a shaft **81**. The shaft **81** is connected over the elements **82–85** with a control handle **86**, for turning the shaft **81** by hand. The gear wheel **73** engages a conical gear wheel **87** on the one end of a shaft **88**, which on its other end supports a gear wheel **89**, which is in mesh with a toothed sector **90**, fixed at the supporting frame **7**. The parallelepipedical body **3** is fixed to the cylinder-shaped member **91**, which is rotatably supported in the base **2**. In the lower part the member **91** is provided with a gear arc **92**, which is in mesh with a gear wheel **93**, arranged at one end of the shaft **94**, which on its other end is provided with a conical gear wheel **95**, which is in mesh with a conical gear wheel **96**, which is arranged on one end of a gear shaft **97**. The last-mentioned shaft is over the elements **98–101** connected with a control handle **102** for turning the shaft by hand.

The depth-charge launcher described above functions as follows. We presume that the hoisting device containing the disk **47** is situated a little below the disk **21**, and that the recesses **17–20** are empty. In this initial position, three depth-charges are placed in the recesses **17**, **18**, and **19** in such a way that the lower ends of these charges rest against the supports which the disk **21** forms in each recess. Thereafter the cylinder **15** is rotated in such a manner that for example the recess **19** with the charge therein protrudes into the hoist shaft **13***a*. In the empty recess **20**, there is now placed another charge, the magazine which is formed by the cylinder **15** is now fully loaded. The charges in the magazine can now one after one be hoisted through the hoist shaft. Before this, however, the launching tubes must be turned in such a way that they can receive the charges. For turning the launching tubes the motor **55** is used, which rotates the gear-shift devices **62** and **70**, whereby first the gear-shift device **70** is adjusted in such a way that the axes of the launching tubes become vertical. By means of the gear-shift device **62** the depth-charge launcher is then traversed in such a way that the launching tubes one by one will be situated exactly opposite the hole **13**, in such a way that each launching tube forms an extension of the hoist shaft **13***a*. It is then appropriate to first let the tube **9** be situated over the hole **13** and thereafter in turn the tubes **10**, **11**, and **12**. It is also possible to start with the tube **10** as shown in Fig. 3. We start from that the tube **10** forms a continuation of the hoist shaft. In this position we start the motor **29**, whereby the hoist device with the disk **47** will move upwards, whereby the disk **47** will come into close contact with the end of the charge and lifts the charge upwards. When the charge has left its recess in the cylinder **15**, it will be guided by the rails **43–46** in the right part hoist shaft. In order to make it possible to insert the projectile in the tube **10**, the hoist device has to pass through the hole **13** and to extend slightly into the tube **10** until the mentioned but not shown fastening device snap is behind the end of the charge. From the Fig. 2 it is clear and distinct that the hoisting device is of such a design that it can protrude through the hole **13** and into one of the launching tubes. When all the launching tubes of the depth-charge launcher are provided with depth-charge, the depth-charge launcher by means of the

motor **55** and the gear-shift devices **62** and **70** can be elevated or traversed as desired, whereafter the depth-charges by means of conventional discharge devices not shown can be launched either at one time, or one by one, or in any other desired succession. In case the aiming machinery for one reason or another should not function, there are possibilities to elevate as well as to traverse the depth-charge launcher by the control handles **86** and **102**.

I claim:

1. A launcher for depth charges comprising a plurality of launching tubes, a support structure fixedly supporting said tubes in a spatial relationship such that the axes of the tubes are parallel to each other and disposed in arcuate arrangement, a frame structure mounted rotatably about an axis perpendicular to the horizontal and supporting said support structure pivotally about a horizontal axis for traversing and elevating said launching tubes, the said tube support structure and the said frame support structure being disposed in a spatial relationship such that the center of the arc as defined by the tube axes coincides with the rotational center axis of the frame structure in the perpendicular position of the tubes, and a loading mechanism for loading depth charges into said tubes when in perpendicular position, said loading mechanism including a loading station situated in registry with said arc whereby said tubes, when perpendicularly disposed, are rotatable one by one into alignment with said loading station for successively loading said tubes.

2. A launcher for depth charges comprising a plurality of launching tubes, a support structure fixedly supporting said tubes in a spatial relationship such that the axes of the tubes are parallel to each other and disposed in arcuate arrangement, a frame structure mounted rotatably about an axis perpendicular to the horizontal and supporting said support structure pivotally about a horizontal axis for traversing and elevating said launching tubes, the said tube support structure and the said frame support structure being disposed in a spatial relationship such that the center of the arc as defined by the tube axes coincides with the rotational center axis of the frame structure in the perpendicular position of the tubes, and a hoisting mechanism for hoisting depth charges disposed below said frame structure, the said mechanism including an upwardly extending perpendicular hoist shaft having an axis intersecting the arc as defined by said tube axes whereby the said tubes, when perpendicularly disposed, are rotatable one by one into alignment with said shaft for loading said tubes with depth charges through said hoist shaft.

3. A launcher according to claim 2 and further comprising a horizontal partition wall, the said support structure, the tubes supported thereon and the frame structure supporting the support structure being disposed above said wall and the said hoisting mechanism being disposed below said wall, the said partition wall being formed with an aperture for passage of said hoist shaft therethrough.

4. A launcher according to claim 3 and further comprising drive means disposed below said partition wall and coacting with said frame structure and said support structure for rotating said frame structure and pivoting said support structure respectively independently of each other to move the tubes into the loading position and the discharge position respectively from a location below said partition wall.

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