May 7, 1963 R. K. WILMER 3,088,440

IMPACT TOOLS

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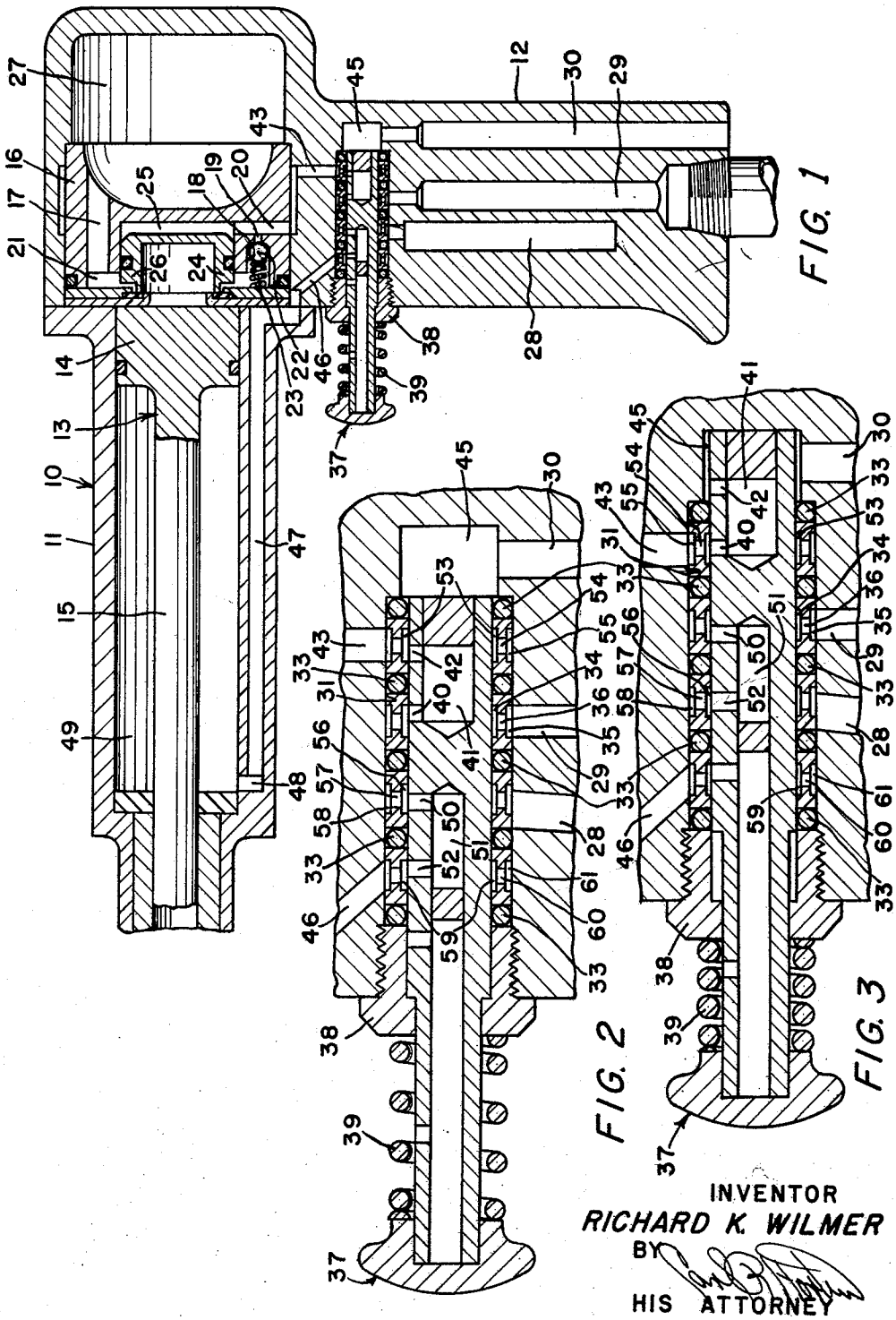


FIG. 1

FIG. 2

FIG. 3

INVENTOR
RICHARD K. WILMER
BY
HIS ATTORNEY

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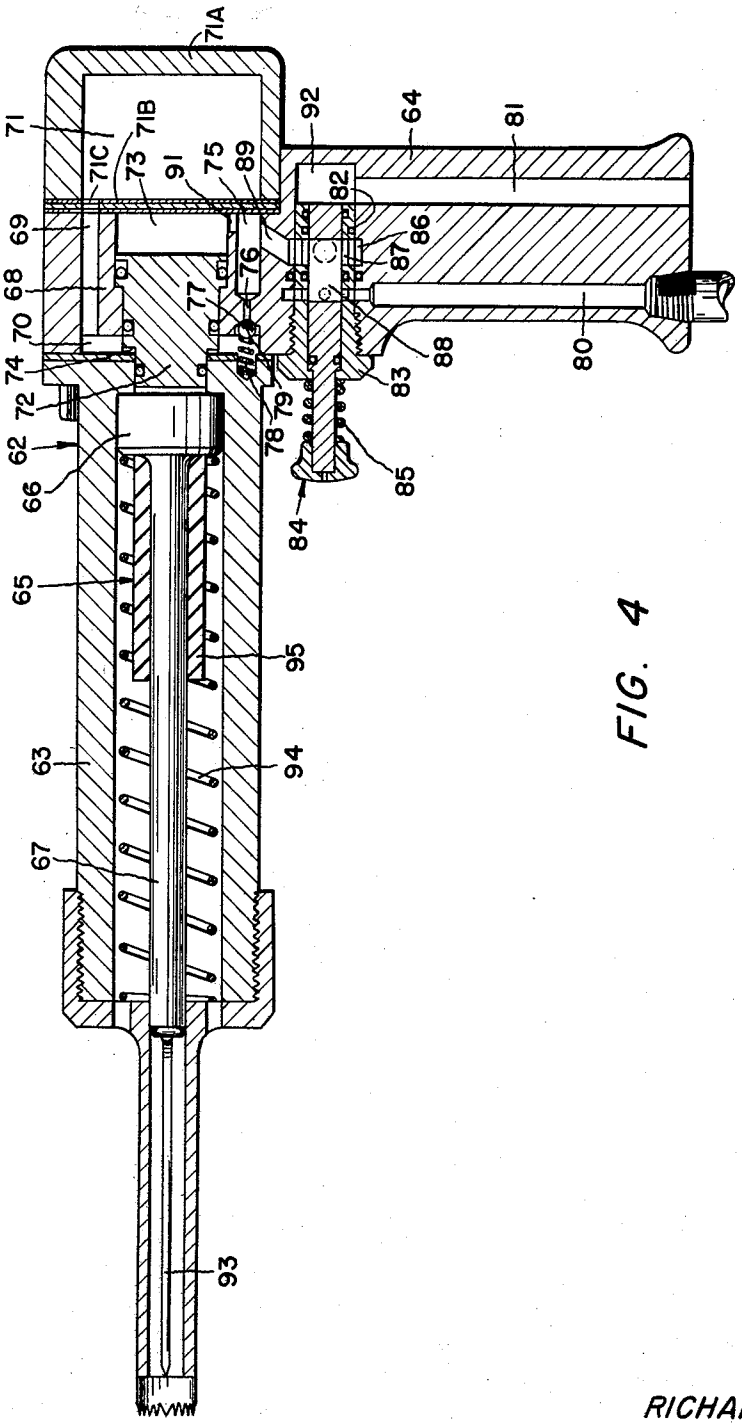


FIG. 4

INVENTOR
RICHARD K. WILMER
BY
HIS ATTORNEY

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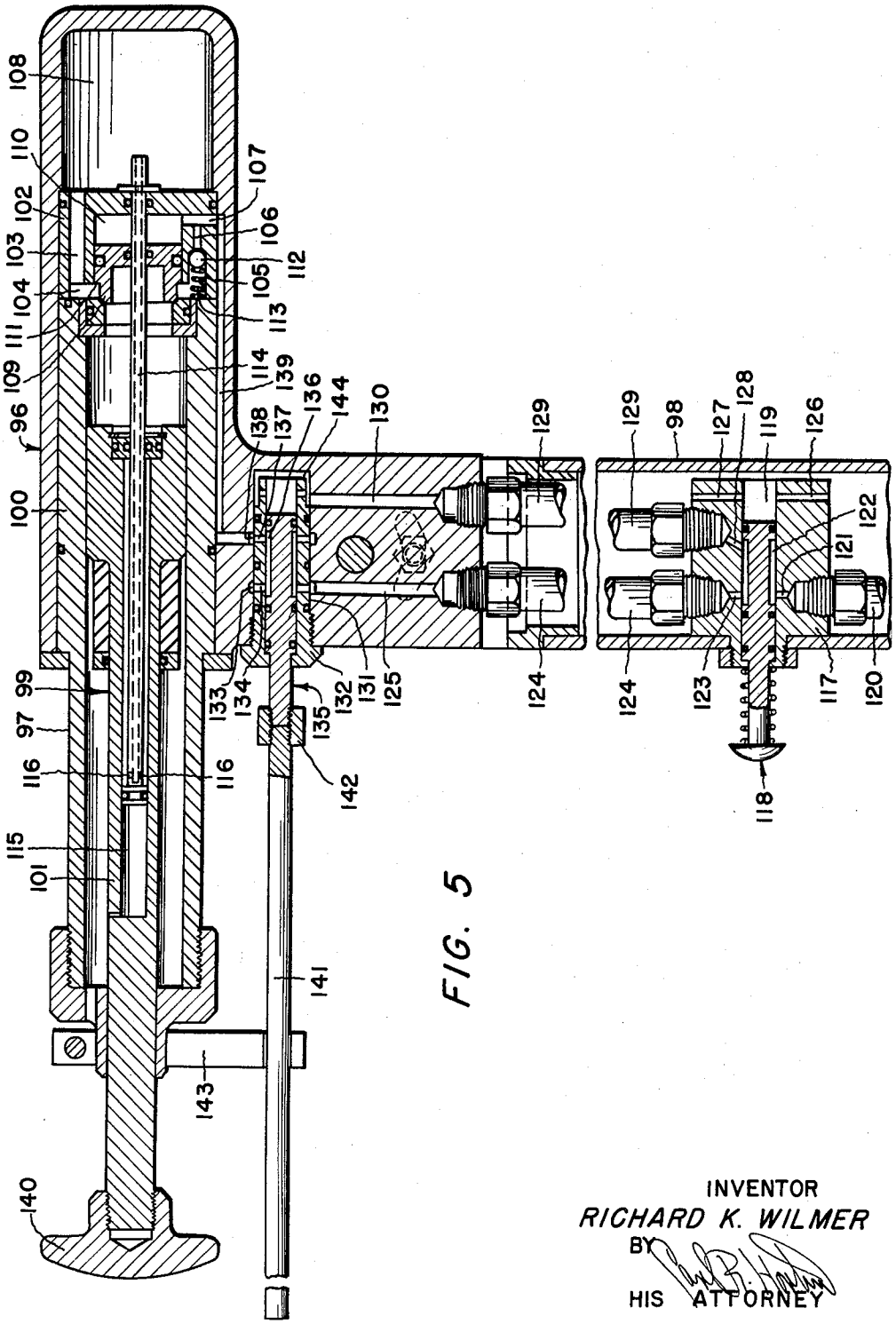


FIG. 5

INVENTOR
RICHARD K. WILMER
BY
HIS ATTORNEY

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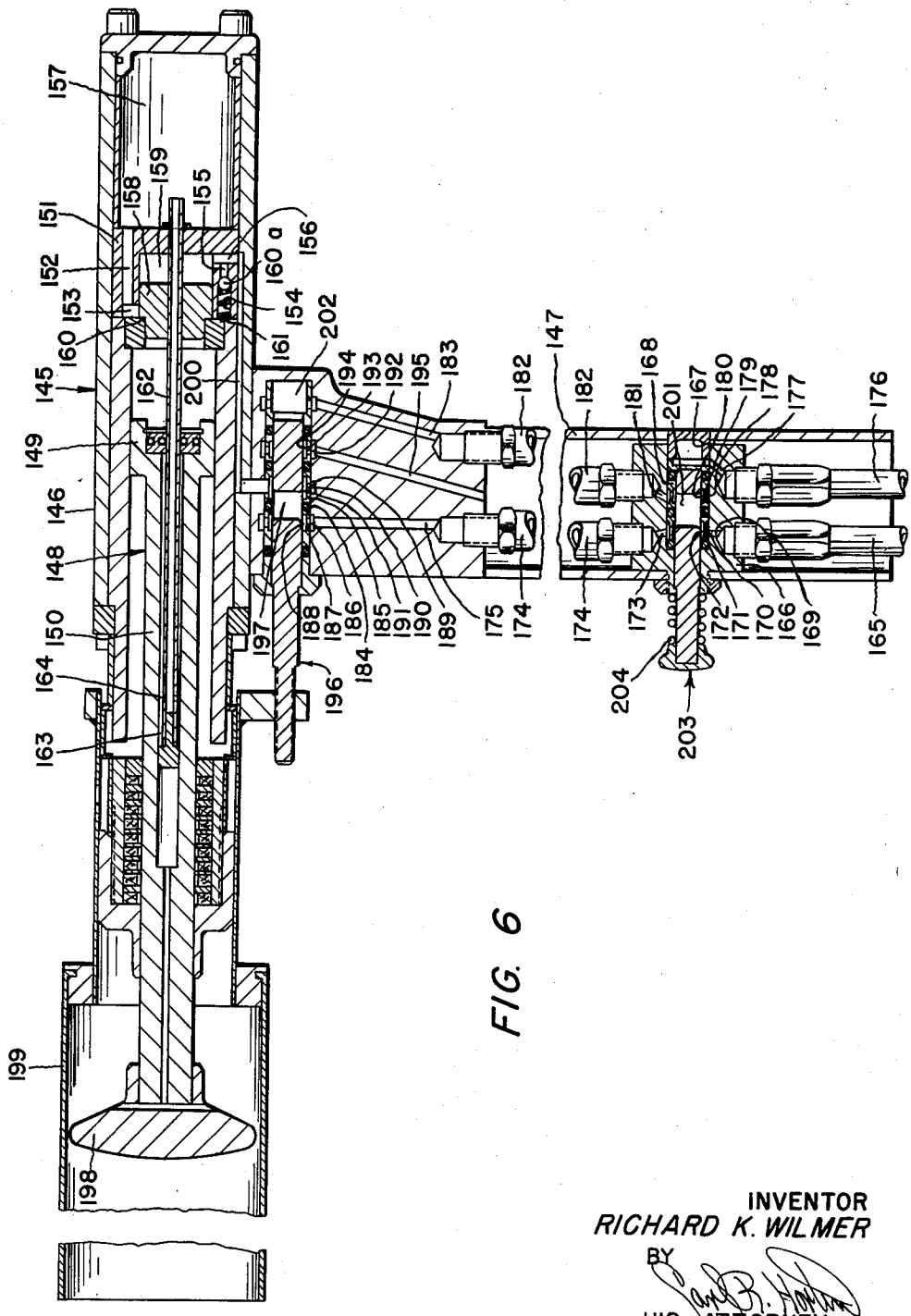


FIG. 6

INVENTOR
RICHARD K. WILMER
BY
HIS ATTORNEY

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IMPACT TOOLS

Richard K. Wilmer, Mohegan Lake, N.Y., assignor to Ingersoll-Rand Company, New York, N.Y., a corporation of New Jersey

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12 Claims. (Cl. 122—456)

This invention relates to impact tools and more particularly to an impact tool of the type having a longitudinally movable plunger therein.

In the past one nail driver was made like a pistol. A cartridge was placed in the pistol and a stud to be driven was inserted in the pistol. When the cartridge exploded and expanded behind the stud, it drove the stud entirely into the material. After the cartridge was fired, it had to be removed by the operator and a new cartridge had to be inserted in the pistol. Most nail drivers used in the past are multiple blow. That, is requires a plurality of blows to drive a nail entirely into the material.

In the past one animal stunner was made like a pistol. The pistol had a firing pin which was adapted to strike a cartridge positioned in the pistol to ignite the powder charge in the cartridge. The pistol was provided with suitable passage means for conducting the expanding gases generated by the ignited powder charge behind a piston to drive the latter down a barrel and thereby deliver a blow against an animal. The piston in the pistol had to be manually returned to its initial starting position in the barrel to properly position it for refiring. One cartridge was placed in the pistol and fired and then extracted from the pistol and then a new cartridge had to be inserted in the pistol.

The invention is comprised of an impact tool having a barrel and a handle secured to the barrel. A plunger is slidably mounted in the barrel and a member is disposed between the plunger and the rear end of the barrel and is fixedly secured to the barrel to form a reservoir in the barrel. A valve element is movably mounted in the barrel and a chamber is formed between the valve element and the member. A control valve is movably mounted in the handle and when actuated, fluid under pressure in the chamber exhausts to atmosphere, allowing the fluid under pressure in the reservoir to rush in behind the plunger and drive the plunger toward the front end of the barrel. Means are also provided to return the plunger back into the barrel after it has been moved outwardly of the barrel. In the nail drivers the nail is entirely driven into the material with one blow which saves time and the plunger is automatically returned to its original position after driving each nail. The nail drivers are simple in construction which means there will be less maintenance than that required in other nail drivers. In the animal stunners no loading is necessary and the animal is stunned by actuating the control valve. The animal stunner may be operated as many times as is desired because, as soon as the control valve is released, the animal stunner may be again operated since there is an automatic plunger return.

An object of the invention is to provide an impact tool that does not have to be loaded.

Another object of the invention is to provide an impact tool that reloads itself automatically after each impact so as to be ready for the next impact instantly.

The foregoing and other objects of the invention will be obvious from the description and drawings in which:

FIGURE 1 is a longitudinal sectional view through a nail driver,

FIGURE 2 is an enlarged view of the control valve of FIGURE 1 with the control valve being in its non-firing position,

FIGURE 3 is a view similar to FIGURE 2 with the control valve being in its firing position,

FIGURE 4 is a longitudinal sectional view of a modified form of nail driver,

FIGURE 5 is a longitudinal sectional view of a cattle stunner, and

FIGURE 6 is a longitudinal sectional view of a modified form of cattle stunner.

In FIGURES 1–3 of the drawings 10 generally designates a nail driver having a barrel 11 and a handle 12 secured to the barrel. A plunger 13 made up of a piston 14 and a piston rod 15 is slidably mounted in the barrel. A member 16 is fixedly secured in the barrel and has a plurality of holes 17 extending longitudinally therethrough. The member 16 also has a recess 18 therein and an aperture 19 extending from the recess to a passage 20. The member 16 also has an annular groove 21 therein. A check valve in the form of a ball 22 is disposed in the recess 18 and a coil spring 23 urges the ball against the bottom of the recess. A valve element 24 is slidably mounted in a recess in the member 16 to form a chamber 25 between the valve element and the member. The valve element 24 has an annular groove therein to form a shoulder 26. A reservoir 27 is formed between the member 16 and the rear end of the barrel 11. The handle 12 has a chamber 28 therein and a passage 29 extends from the bottom of the handle and is connected to a source of fluid under pressure. A passage 30 extends from the bottom of the handle 12 and is in communication with the atmosphere. The handle 12 has a transversely extending recess 31 therein and a plurality of bushing pieces 32 which O rings 33 alternating between the bushing pieces. Each bushing piece has an inner annular groove 34 and an outer annular groove 35 and a plurality of holes 36 connecting the inner and outer annular grooves. A control valve 37 is slidably mounted in the handle 12, in the bushing pieces, and a nut 38 threaded in the handle 12 prevents the control valve 37 from being pulled out of the handle; and a coil spring 39 urges the control valve 37 outwardly of the handle.

The operation of the nail driver shown in FIGURES 1–3 as follows: When the control valve 37 is disposed outwardly of the handle 12, as shown in FIGURES 1 and 2, fluid under pressure flows through the passage 29, the outer annular groove 35, holes 36, the inner annular groove 34, a hole 40 into a space 41 in the control valve, through a hole 42 and out the inner annular groove 53, through the holes 54 and out the outer annular groove 55 into a passage 43 in the handle 12. From passage 43, the fluid flows into the passage 20 and chamber 25 in the member 16. The fluid under pressure opens the check valve 22 and flows into the annular groove 21 and thence through the holes 17 to fill the reservoir 27 with fluid under pressure. The spring 23 closes the check valve when reservoir pressure reaches inlet pressure. When it is desired to drive a nail, the control valve 37 is moved to the position shown in FIGURE 3 which causes the chamber 25 to be brought into communication with the atmosphere through passage 20, passage 43, outer annular groove 55, holes 54, inner annular groove 53, hole 40, space 41, hole 42, annular groove 45, and passage 30 so that the fluid under pressure in the chamber 25 is exhausted to the atmosphere. Upon exhaustion of fluid from chamber 25, the fluid exerts a greater pressure against the shoulder 26 of the valve element 24 which causes the valve element to move to the right, as viewed in FIGURE 1, and allows the fluid under pressure in the reservoir 27 to rush in behind the piston 14 through holes 17 and annular groove 21 to thereby drive the piston 14 toward the front end of the barrel 11 so that the nail is entirely driven into the

material. The handle 12 has a passage 46 extending from the recess 31 to a passage 47 in the barrel 11, and a hole 48 extends from the passage 47 to a space 49 in the barrel 11 surrounding the piston rod 15. When the control valve 37 is in the position shown in FIGURE 3 fluid, under pressure flows from the passage 29 through the outer annular groove 35, holes 36, inner annular groove 34, through hole 50, space 51, hole 52, the inner annular groove 56, the holes 57, the outer annular groove 58, and thence into the chamber 28 to thereby exhaust fluid from space 49 in front of piston 14 as the piston moves forwardly. When the control valve 37 is returned to the position as shown in FIGURE 2 by the coil spring 39, fluid under pressure flows from the chamber 28 through the outer annular groove 58, the holes 57, the inner annular groove 56 in the bushing piece 32, into hole 50, space 51, out of hole 52 and into the inner annular groove 59, the holes 60, and the outer annular groove 61 in the bushing piece 32 to the passage 46. From passage 46, the fluid flows into passage 47 through hole 48 and into space 49 to move the piston 14 to its original position as shown in FIGURE 1 so that the nail driver is in a condition to be again operated.

A modified form of nail driver is shown in FIGURE 4. The nail driver 62 is made up of a barrel 63 and a handle 64. A plunger 65 is disposed in the barrel 63 and is made up of a piston 66 and a piston rod 67. A member 68 forms part of the handle and extends into the barrel. Barrel 63 has an end cap 71A which is suitably secured to the barrel and the handle. Interposed between end cap 71A, the handle, and the barrel is a sealing disc 71B. The member 68, and the barrel, end cap 71A, and seal disc 71B together form a reservoir 71. Member 68 is provided with an annular groove 70 and a plurality of holes 69 which register with holes 71C in seal disc 71B to communicate reservoir 71 with groove 70. A valve element 72 is slidably mounted in the member 68 to form a chamber 73 between the valve element 72 and the member 68. Valve element 72 has a reduced end portion forming a shoulder 74. The member 68 has a passage 75 therein and an aperture 76 extending from the passage to a recess 77. A coil spring 78 is disposed in a recess in the barrel 63 and bears against a ball 79 which seats in the recess 77. The handle 64 has a passage 80 therein in communication with a source of fluid under pressure, and a passage 81 extends from the bottom of the handle 64 and is in communication with the atmosphere. The handle 64 has a transversely extending recess 82 therein, and a bushing 83 is threaded into the recess 82, and a control valve 84 is slidably mounted in the bushing 83. A coil spring 85 is disposed between the bushing and a cap on the end of the control valve 84 to normally urge the control valve outwardly of the handle 64. The handle 64 has an annular groove 86 therein while bushing 83 has a plurality of holes 87 therein communicating with the annular groove 86. Control valve 84 has a slot 88 therein which communicates with a passage 89 extending from the annular groove 86 to the passage 75.

The operation of the nail driver shown in FIGURE 4 is as follows: In the FIGURE 4 position fluid under pressure flows through the passage 80, the slot 88 in the control valve 84, the holes 87 in the bushing and the annular groove 86, and thence into passage 89 and passage 75. The fluid in passage 75 acts against ball 79 to unseat the latter to let fluid under pressure flow through annular groove 70 and holes 69 into reservoir 71 until the pressure in the reservoir reaches inlet pressure, at which time spring 78 will close the check valve and fluid under pressure will flow through hole 91 into chamber 73 so that the chamber contains fluid under pressure. When the control valve 84 is moved inwardly of the handle 64, annular groove 86 and slot 88 are brought into communication with space 92 in the handle so that the fluid under pressure in chamber 73 is drained through passage 81 to the atmosphere. The greater fluid pressure on the shoulder 74 of the valve element 72 moves the valve element to the right as shown in FIGURE 4, allowing fluid under pressure from the reservoir 71 to rush through holes 69 and annular groove 70 behind the piston 66 and drive the piston 66 toward the front end of the barrel to drive the nail 93 entirely into the material. A coil spring 94 surrounds the piston rod 67 and engages the barrel 63 and the piston 66 and urges the piston to its original position after operation so that the plunger 65 is in position ready to be operated again. A resilient buffer 95 is secured to the piston rod and prevents the piston 66 from colliding with the front end of the barrel 63.

A further modified form of the invention is shown in FIGURE 5. A cattle stunner 96 is made up of a barrel 97 and a handle 98. A plunger 99 made up of a piston 100 and a piston rod 101 is slidably mounted in the barrel 97. A member 102 is fixedly secured in the barrel and has a plurality of openings 103 extending longitudinally therethrough and an annular groove 104 and a recess 105 and an aperture 106 extending from the recess to the passage 107. The member 102 and the rear end of the barrel 97 together form a reservoir 108. A valve element 109 is slidably mounted in the member 102 and the valve element and the member together form a chamber 110. The valve element 109 has an annular groove therein forming a shoulder 111 on the valve element. A ball 112 is disposed in the recess 105 and the coil spring 113 urges the ball against the bottom of the recess. A tube 114 is in communication with the reservoir 108 and extends through the member 102 and the valve element 109 and into the plunger 99 and is slidably disposed in a space 115 in the piston rod 101. The tube 114 has a plurality of holes 116 therein adjacent the end thereof which is disposed in the space 115 in the plunger 99. The handle 98 has a block 117 secured therein and a safety device 118 is slidably mounted in a bore 119 in the block. A conduit 120 is connected to a source fluid under pressure and is threaded in the block 117 and leads to a passage 121 which is in communication with an annular groove 122 in the safety device and this annular groove is in communication with a passage 123. A conduit 124 is threaded into the block 117 so as to communicate at one end with passage 123 and is threaded at its other end into the handle to communicate with a passage 125. A passage 126 in the block 117 is in communication with the atmosphere and communicates with bore 119. Another passage 127 in the block is also in communication with the atmosphere and leads to the bore 119. A passage 128 in the block 117 leads from the bore 119 to a conduit 129 which is threaded into the block, and the other end of the conduit is threaded into the handle 98 and is in communication with a passage 130. The handle 98 is provided with a transversely extending recess 131 therein and a bushing 132 is threaded into the recess in the handle. An annular groove 133 is provided in the handle 98 and a plurality of holes 134 is provided in the bushing 132. A control valve 135 has an annular groove 136 therein, the bushing 132 also has another plurality of holes 137 therein, and the handle also has another annular groove 138 therein. A passage 139 is in communication with the annular groove 138 in the handle 98 and with the passage 107 in the member 102.

A butt 140 is secured on the outer end of the piston rod 101 and is adapted to strike the head of the animal. A rod 141 is secured to the control valve 135 by means of an internally threaded collar 142. The rod 141 is guided by a guide means 143 fixedly secured to the front end of the barrel.

The operation of the cattle stunner shown in FIGURE 5 is as follows: When the safety device 118 is in the position shown in FIGURE 5, fluid under pressure flows through the conduit 120, passage 121, annular groove 122,

passage 123, conduit 124, passage 125, through annular groove 133 and holes 134, annular groove 136, holes 137 and annular groove 138. From groove 138, the fluid flows into passage 139 and into passage 107 to cause check valve 112 to open and allow fluid under pressure flow through annular groove 104, holes 103 and into reservoir 108 until the fluid pressure in the reservoir reaches inlet pressure, at which time the spring 113 closes the check valve. Simultaneously with flow of fluid into reservoir 108, fluid under pressure flows into the chamber 110 so that the chamber contains fluid under pressure. Fluid under pressure also flows from the conduit 120, passage 121 through annular groove 122, passage 128, conduit 129, passage 130 and into the space 144 behind the control valve 135 so that the control valve cannot be fired because the fluid under pressure in the space 144 prevents movement of the control valve into the handle 98. When it is desired to strike an animal, the safety device 118 is moved inwardly of the handle 98 to connect the annular groove 122 with passage 127 and also connect annular groove 122 with passage 126 so that the fluid under pressure in space 144 is exhausted to the atmosphere. The control valve 135 may now be moved inwardly of the handle. The rod 141 is then placed against the head of the animal and moved inwardly so that passage 139 is brought into communication with annular groove 136, passage 130, conduit 129, passage 128, annular groove 122 and passages 126 and 127 so that the fluid under pressure in chamber 110 is exhausted to the atmosphere. The fluid under pressure in the annular groove 104 acting against shoulder 111 moves the valve element 109 toward the right, as viewed in FIGURE 5, allowing the fluid under pressure in the reservoir 108 to rush through the openings 103 into the space behind the plunger 99 to drive the plunger 99 toward the front end of the barrel, causing the butt 140 to strike the head of the animal. As soon as the safety device 118 and the control valve 135 are released, fluid under pressure flows to the reservoir and through the tube 114 by way of the holes 116 into the space 115 in the plunger 99. This pressure in the space 115 moves the piston toward the rear end of the barrel 97 to its original position ready for the next operation.

A modified form of cattle stunner is shown in FIGURE 6. A cattle stunner 145 has a barrel 146 and a handle 147. A plunger 148 made up of a piston 149 and a piston rod 150 is slidably mounted in the barrel. A member 151 is fixedly secured in the barrel 146 and has a plurality of openings 152 extending therethrough and an annular groove 153 in communication with the openings. The member 151 also has a recess 154 and an aperture 155 in communication with the recess and the passage 156 in communication with the aperture. The member 151 and the barrel 146 together form a reservoir 157. A valve element 158 is slidably mounted in the member 151 so that a chamber 159 is formed between the valve element and the member. The valve element has an annular groove therein to form a shoulder 160 thereon. A ball 160*a* is disposed in the bottom of the recess 154 and a coil spring 161 urges the ball against the bottom of the recess. A tube 162 is in communication with the reservoir 157 and extends through the member 151 and the valve element 158 and into a space 163 in the plunger 148. The tube 162 has a plurality of holes 164 therein adjacent the end that is disposed in the space 163 in the plunger 148. A conduit 165 is in communication with a source of fluid under pressure and is secured to a block 166 that is mounted in the handle 147. A bore 167 is provided in the block 166 and bushing pieces 168 are disposed in the bore. The block 166 has passage 169 therein which communicates with conduit 165 and an outer annular groove 170 formed in the bushing pieces 168. A plurality of holes 171 is in communication at one end with the outer annular groove 170 and at the other end with an inner annular groove 172. A passage 173 in the block 166 leads from the outer annular groove 170 to a conduit 174 which is threaded in the block. Conduit 174 is threaded into the handle 147 so as to communicate with a passage 175. A conduit 176 is in communication with the atmosphere and is threaded in the block 166. A passage 177 is in communication with the conduit 176 and an outer annular groove 178 provided in one of the bushing pieces 168. A plurality of holes 179 is provided in the same bushing piece 168 as groove 178 as well as an inner annular groove 180. A passage 181 is provided in the block 166 and a conduit 182 is threaded in the block so as to communicate at one end with the passage 181. The other end of the conduit 182 is threaded into the handle and is in communication with the passage 183 in the handle. The handle 147 is provided with a transversely extending recess 184. A plurality of bushing pieces 185 is disposed in the recess. The handle has an annular groove 186. One of the bushing pieces 185 has an inner annular groove 188 and a plurality of holes 187 which communicate with inner annular groove 188 and annular groove 186. The handle 147 also has an annular groove 189, and another of the bushing pieces 185 has a plurality of holes 190 as well as an inner annular groove 191. The handle 147 has another annular groove 192. A plurality of holes 193 is provided in a third bushing piece 185 communicating with an inner annular groove 194 provided in the same bushing piece. A passage 195 is provided in the handle and is in communication at one end with holes 193 and with the atmosphere at the opposite end thereof. A control valve 196 is slidably mounted in the bushing pieces and has a slot 197 therein. A butt 198 is fixedly secured on the outer end of the piston rod 150. A sleeve 199 is slidably mounted on the barrel 146 and this sleeve is also fixedly secured to the control valve 196.

The operation of the cattle stunner shown in FIGURE 6 is as follows: In the position shown in FIGURE 6, fluid under pressure flows through conduit 165, passage 169, groove 170, holes 171, groove 172, passage 173, conduit 174, passage 175, groove 186, holes 187, groove 188, through slot 197, passage 200, and passage 156. The fluid acts against the check valve 160*a* to unseat the latter and allow fluid under pressure to flow through recess 154, annular groove 153, holes 152 and into the reservoir 157. When the pressure in reservoir 157 reaches the inlet pressure, the spring 161 re-seats the check valve. Simultaneously with the flow of fluid into reservoir 157, fluid flows into the chamber 159 so that the chamber contains fluid under pressure. The conduit 165 also supplies fluid under pressure through passage 169, groove 170, holes 171, groove 172, slot 201, groove 178, holes 179, groove 180, passage 181, conduit 182, passage 183, and into the space 202 behind the control valve 196 so that the space 202 prevents movement of the control valve 196 until the safety device 203 has been actuated. When it is desired to strike an animal, the safety device 203 is moved inwardly of the handle 147 so that passage 181, groove 178, holes 179, passage 181, slot 201, and passage 177 are in communication, thus allowing the fluid under pressure in the space 202 behind the control valve 196 to exhaust to atmosphere through conduit 176. With the safety device 203 pressed inwardly of the handle 147, the sleeve 199 is placed against the head of the animal and the tool is pressed forwardly, causing the sleeve to move rearwardly, which in turn causes the control valve 196 to move inwardly of the handle to connect chamber 159, passage 156, passage 200, groove 189, hole 190, groove 191, and slot 197 with groove 194, holes 193, groove 192, and passage 195 so that the fluid under pressure in chamber 159 is exhausted to atmosphere. The fluid under pressure in annular groove 153 acting against the shoulder 160 moves the valve element 158 to the right, as viewed in FIGURE 6, and allows fluid under pressure in the reservoir 157 to rush in behind the plunger 148 and drive the plunger forward to strike the animal. As soon as

the safety device **203** is released, spring **204** moves it outwardly and allows fluid under pressure to again go through the conduit **165**, the safety device **203**, conduit **174**, passage **175**, the control valve **196**, passage **200**, passage **156**, and aperture **155**. The fluid in aperture **155** again opens the check valve **160***a* against the force of the spring so that the fluid under pressure flows into the recess **154**, annular groove **153** and through the openings **152** into the reservoir **157** to fill the reservoir. The fluid under pressure in the reservoir **157** flows through the tube **162**, the holes **164** and into the space **163** in the plunger **148** to move the plunger to its original position ready for the next firing. The advantage of disposing the sleeve **199** in FIGURE 6 over the rod **141** in FIGURE 5 is that the sleeve allows the operator to center the tool on the head of the animal quickly despite the movement of the animal.

What is claimed is:

1. An impact tool comprising a barrel, means fixedly secured in the barrel forming a reservoir in the barrel, a valve element movably mounted in the barrel, a handle secured to the barrel, a control valve movably mounted in the handle, a rod having one end secured to the control valve and having its other end projecting beyond the front end of the barrel, a safety device movably mounted in the handle and in one position locking the control valve against movement, and upon movement to a second position unlocking said control valve so as to allow movement of said control valve upon pushing the rod toward the handle to cause the valve element to move and allow fluid under pressure from the reservoir to rush in behind the piston and drive the piston toward the front end of the barrel.

2. An impact tool comprising a barrel, a piston slidably mounted in the barrel, a member fixedly secured in the barrel between the piston and the rear end of the barrel to form a reservoir between the member and the rear end of the barrel and the member being provided with a plurality of holes therein in communication with the reservoir and in communication with the space in the barrel behind the piston, a valve element slidably mounted in the member between the member and the piston and having a shoulder thereon in communication with the plurality of holes in the member, a sleeve slidably mounted on the barrel, a handle secured to the barrel, a control valve slidably mounted in the handle and secured to the sleeve and in communication with the chamber, a safety device slidably mounted in the handle and in communication with the control valve, means for supplying a source of fluid under pressure to the safety device, in one position of the safety device fluid under pressure passing through the safety device and the control valve through the holes in the member to fill the reservoir with fluid under pressure and upon moving the safety device to a second position the control valve being unlocked and upon moving the sleeve toward the rear end of the barrel the control valve being moved in the handle to bring the chamber in communication with the atmosphere and the greater than atmospheric pressure in the reservoir acting against the shoulder of the valve element to move the valve element toward the rear end of the barrel allowing fluid in the reservoir to rush into the space behind the piston and drive the piston toward the front end of the barrel.

3. An impact tool comprising a barrel, a piston slidably mounted in the barrel, a member having a plurality of holes and an opening therein fixedly secured in the barrel between the piston and the rear end of the barrel to form a reservoir between the member and the rear end of the barrel, a valve element slidably mounted in the member between the member and the piston and having a shoulder thereon in communication with the holes in the member and a chamber being formed between the member and the valve element, a check valve in the member, a first passage in the barrel in communication with the check valve, a sleeve slidably mounted on the front end of the barrel, the opening in the member being in communication with the chamber and the first passage, a handle secured to the barrel and provided with a transverse recess therein and a second passage in communication with the recess and a third passage in communication with the recess and open to the atmosphere and a fourth passage in communication with the recess, a control valve slidably mounted in the transverse recess in the handle and provided with a slot therein and secured to the sleeve, a first conduit disposed in the handle in communication with the second passage and in communication with a source of fluid under pressure, a second conduit in communication with the fourth passage and in communication with the atmosphere, and a safety device slidably mounted in the handle and passing across and through the first and second conduits and provided with a slot therein, in one position fluid under pressure moving into the first conduit and through the slot in the safety device through the second passage and through the slot in the control valve through the first passage into the opening in the member and opening the check valve to allow fluid under pressure to enter the holes in the member and fill the reservoir with fluid under pressure and upon moving the safety device to a second position the slot in the safety device being in communication with the sections of the second conduit on opposite sides of the safety device to drain the fluid in the recess behind the control valve to atmosphere so that the control valve can be actuated and upon moving the sleeve toward the rear end of the barrel the control valve being moved in the recess in the handle so that the slot in the control valve is in communication with the first and third passages allowing the fluid in the chamber to drain to atmosphere through the third passage and fluid pressure acting against the shoulder of the valve element moving the valve element toward the rear end of the barrel allowing the fluid in the reservoir to rush through the holes in the member against the piston and driving the piston toward the front end of the barrel.

4. In an impact tool for delivering an impact blow to a member and having a piston reciprocably mounted in a cylinder and a reservoir for fluid under pressure, the combination of a control valve normally positioned to communicate a source of fluid under pressure with said reservoir to provide pressurized fluid to the latter and operative to cause pressurized fluid to flow from said reservoir into said cylinder to move said piston in a direction to deliver an impact blow to said member, actuating means extending at one end beyond said cylinder and mounted for movement relative to said cylinder, said actuating means being movable when said actuating means abuts said member and a force is applied to said tool in a direction toward said member, said actuating means being connected to said control valve to actuate the same, and a safety device associated with said control valve to prevent actuation of said control valve, said safety device operative to release said control valve for actuation by said actuating means to cause pressurized fluid to flow from the reservoir into said cylinder and thereby drive said piston to deliver an impact blow to said member.

5. In the combination of claim 4 wherein said actuating means is a sleeve slidably mounted on said cylinder.

6. In the combination of claim 4 wherein said actuating means is an elongated member slidably supported by said cylinder and extending parallel to the latter.

7. In an impact tool for delivering an impact blow to a member and having a piston reciprocably mounted in a cylinder and a reservoir for fluid under pressure, the combination of a control valve slidably mounted to control flow of pressurized fluid from a source thereof to said reservoir, said control valve positioned normally to provide pressurized fluid to said reservoir and slidably movable to a position to cause pressurized fluid to flow

from said reservoir to said cylinder so that said piston is driven in a direction toward said member, actuating means slidably mounted for movement relative to said cylinder and connected to said control valve to provide conjoined movement of the latter and said actuating means, said actuating means projecting at one end beyond the tool so as to abut said member and to be slidably moved relative to said cylinder when force is applied to said tool in a direction toward said member, and a safety device operatively associated with said control valve to maintain said control valve in its normal position, said safety device operative to release said control valve for movement by said actuating means to a position to cause pressurized fluid to flow from the reservoir into said cylinder so that said piston moves to deliver an impact blow to said member.

8. In an impact tool for delivering an impact blow to a member and having a pressure responsive valve disposed between a pressurized fluid reservoir and a cylinder to control flow of pressurized fluid from said reservoir to said cylinder, the cylinder having a piston reciprocably disposed therein, the combination of a control valve in one position communicating a source of pressurized fluid with said pressure responsive valve and said reservoir to provide flow of pressurized fluid to said reservoir and to said pressure responsive valve to maintain the latter in a position to prevent flow of fluid from said reservoir to said cylinder, said control valve operative to another position to prevent flow of pressurized fluid to said reservoir and to allow flow of pressurized fluid from said pressure responsive valve thereby causing movement of said pressure responsive valve to a position to allow flow of pressurized fluid from the reservoir to said cylinder so that said piston is driven in a direction toward said member to deliver an impact blow to the latter, actuating means extending beyond the tool to engage said member and mounted for movement relative to said cylinder, said actuating means being connected to said control valve to actuate the latter to said another position when said actuating means is moved relative to said cylinder upon a force exerted on the tool in a direction toward said member, and a safety device operatively associated with said control valve to communicate in one position the latter with a source of pressurized fluid and to prevent actuation of said control valve to said another position and said safety device in another position communicating said control valve to atmosphere to allow actuation of said control valve to said another position.

9. In an impact tool for delivering an impact blow to a member and having a pressure responsive valve disposed between a pressurized fluid reservoir and a cylinder in which a piston is reciprocably disposed, which valve controls flow of pressurized fluid from said reservoir into said cylinder, the combination of passage means communicating a source of pressurized fluid with said reservoir and said pressure responsive valve to provide pressurized fluid to the reservoir and valve, said passage means including an exhaust passage means for providing flow of pressurized fluid from said pressure responsive valve, a control valve disposed to control flow of pressurized fluid in said passage means, said control valve being slidably mounted to provide in one position communication of said source of pressurized fluid with said reservoir to provide flow of pressurized fluid to the latter through said passage means and to said pressure responsive valve to maintain the latter in a position to prevent flow of fluid from said reservoir to said cylinder, and in another position preventing pressurized fluid from flowing through said passage means to said reservoir and allowing pressurized fluid flow from said pressure responsive valve through said exhaust passage means to thereby cause the latter to respond and permit flow of pressurized fluid from said reservoir to said cylinder, a safety device disposed in said passage means upstream from said control valve with respect to the flow of pressurized fluid from said source to control flow of pressurized fluid through said passage means, and means defining with said control valve a pressure chamber, said safety device in one position allowing pressurized fluid to flow through said passage means to said control valve and to said pressure chamber to thereby prevent actuation of the control valve to said another position, said safety device operative to another position to prevent flow of pressurized fluid to said control valve through said passage means and communicating said pressure chamber with the atmosphere to allow flow of pressurized fluid from said pressure chamber thereby allowing actuation of said control valve to said another position.

10. In an impact tool for delivering an impact blow to a member and having a pressure responsive valve disposed between a pressurized fluid reservoir and a cylinder in which a piston is reciprocably disposed, which valve controls flow of pressurized fluid from said reservoir into said cylinder, the combination of a valve housing connected to said cylinder, inlet passage means in said valve housing and said cylinder communicating a source of pressurized fluid with said reservoir and said pressure responsive valve to provide pressurized fluid to said reservoir and said pressure responsive valve, exhaust passage means in said valve housing communicating with atmosphere, a control valve disposed in a recess in said valve housing to control flow of pressurized fluid through said inlet passage means and said exhaust passage means, said control valve being slidably disposed in said recess to provide in one position communication of said source of pressurized fluid with said reservoir and said pressure responsive valve through said inlet passage means to provide pressurized fluid to the reservoir and said pressure responsive valve to maintain the latter in a position to prevent flow of pressurized fluid from the reservoir to the cylinder and in another position preventing pressurized fluid from flowing through said inlet passage means to said reservoir and allowing flow of pressurized fluid from said pressure responsive valve through said exhaust passage means to thereby cause the pressure responsive valve to be actuated to an open position and allow pressurized fluid to flow from the reservoir into the cylinder, a safety device slidably disposed in said valve housing to control flow of pressurized fluid from said source to said control valve through said inlet passage means, means in said recess forming with said control valve a pressure chamber, conduit means in said valve housing communicating at one end with said pressure chamber and at the opposite end with the atmosphere, said safety device being constructed and arranged to communicate in one position said source of pressurized fluid with said control valve and said pressure chamber to provide flow of pressure fluid to the latter through said conduit means to thereby prevent slidable movement of said control valve to said another position, said safety device being slidable to another position to prevent flow of pressurized fluid through said inlet passage means to said control valve and communicating said pressure chamber through said conduit means with the atmosphere to thereby permit said control valve to be moved to said another position.

11. The combination of claim 10 including an actuating means slidably supported by said cylinder for movement relative to said cylinder and valve housing, said actuating means extending beyond said cylinder to abut said member and connected to said control valve so that upon a force applied to said tool in a direction of said member and said safety device actuated to its another position said control valve is moved in said recess to said another position of said control valve.

12. The combination of claim 11 including a rod slidably supported by said cylinder for movement relative to said cylinder and valve housing, said rod extending at one

end beyond said cylinder to abut said member and connected at the other end to said control valve so that upon a force being applied to said tool in a direction toward said member and said safety device actuated to its another position said control valve is moved in said recess to said another position of the control valve.

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