March 29, 1960 JEAN-MARIE F. MASSACRIER 2,930,041

CARTRIDGE OPERATED FASTENING GUN

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Fig.1

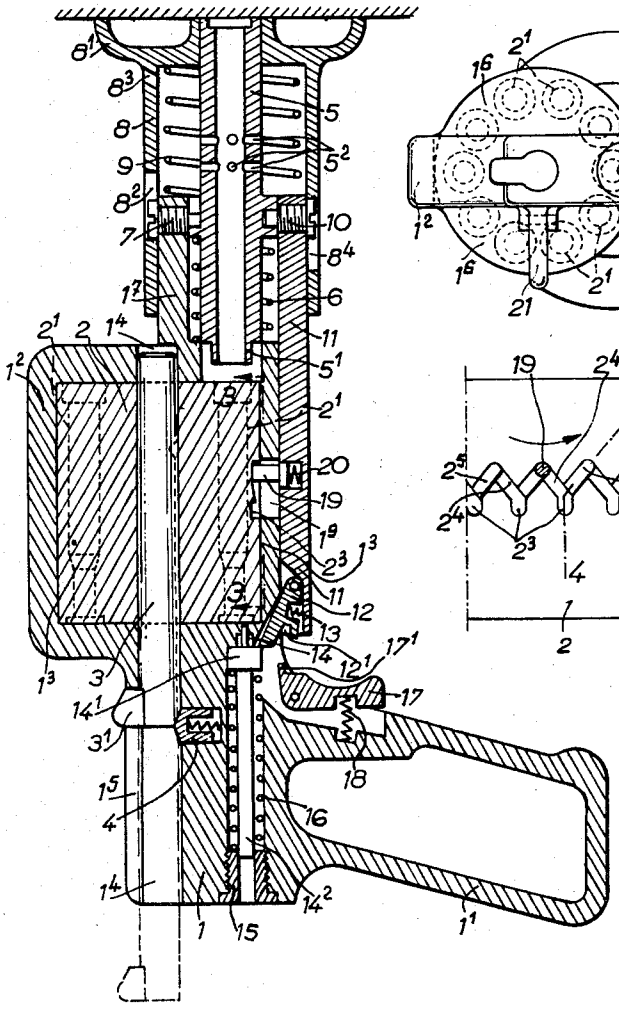
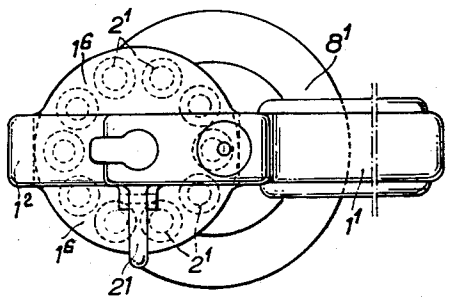


Fig.2



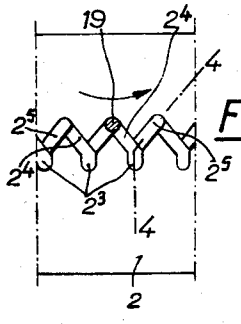
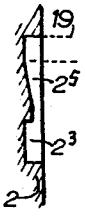


Fig.3

Fig.4



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CARTRIDGE OPERATED FASTENING GUN

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Fig.7

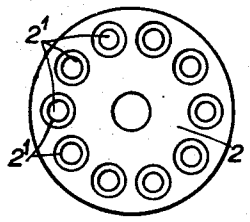


Fig.9

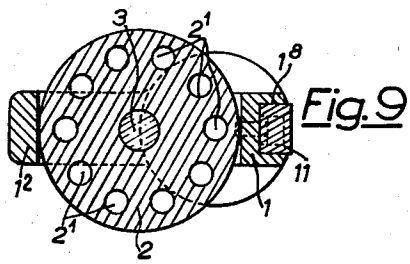


Fig.5

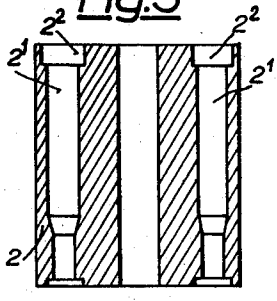


Fig.8

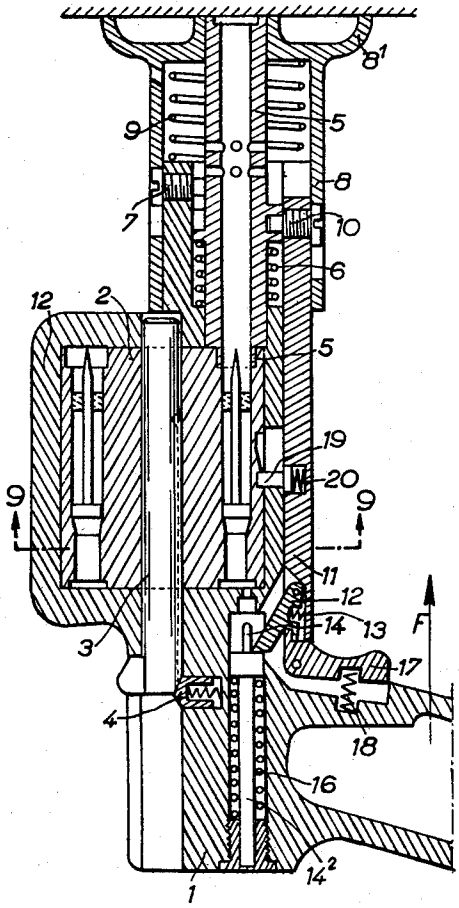
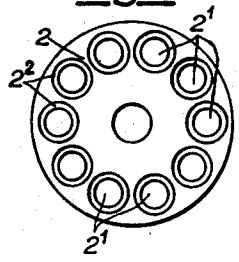


Fig.6



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CARTRIDGE OPERATED FASTENING GUN

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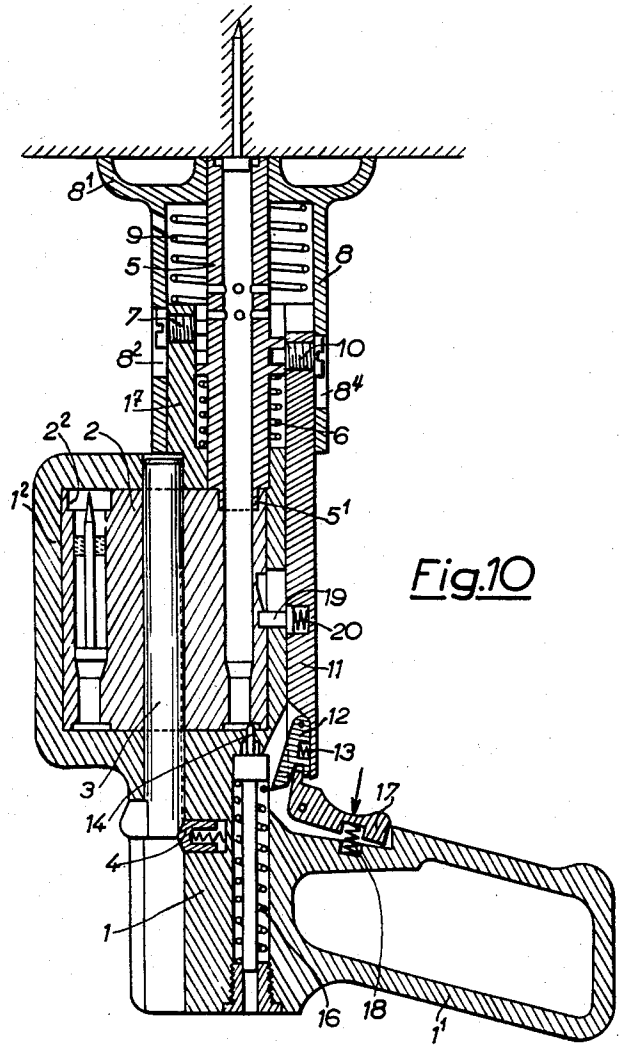

Fig.10

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CARTRIDGE OPERATED FASTENING GUN

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Application December 19, 1956, Serial No. 629,299

Claims priority, application France December 22, 1955

3 Claims. (Cl. 1—44.5)

This invention relates to driving guns. Driving guns are known which are used for fixing pins, hooks and any other attaching and fixing means instantaneously and permanently in the hardest materials, incluuding steel, by perforating the said materials under pressure from an explosion.

The present invention has as its object the provision of a repeating driving gun by means of which it is possible to drive instantaneously and successively a series of pins or other fastening elements in a wholly automatic or semi-automatic manner, without having to reload the gun for every shot. This avoids having to carry out manipulations which may present some danger in themselves and which are generally inconvenient in view of the often insecure positions in which the operator is situated (on top of a ladder etc.). The rate of driving is also increased very advantageously.

In order to show the subject of the invention clearly, without however limiting it, in the accompanying drawings:

Fig. 1 is a general sectional view of one embodiment of the repeating driving gun. In the position illustrated the gun is not cocked, the shield and the end of the barrel are simply placed against the surface into which the projectiles are to be driven; the cylinder is in an intermediate position. The chain line illustrates the rearward sliding of the cylinder pivot pin when it is desired to withdraw or position the said cylinder.

Fig. 2 is a side view corresponding to Fig. 1.

Fig. 3 is the partial view of the cylinder as seen from below, taken along the line 3—3 of Fig. 1.

Fig. 4 is a partial sectional view on a larger scale of the cylinder taken on the broken line 4—4 of Fig. 3.

Fig. 5 is an axial sectional view of the detachable cylinder of the gun.

Figs. 6 and 7 are side views corresponding to Fig. 5.

Fig. 8 is a general sectional view of the gun when pressure is exerted on the butt and on the breech, with a view to cocking the gun, and to bringing a cartridge and the projectile from the cylinder into the axis of the barrel (where the weapon is to operate in a fully automatic fashion).

Fig. 9 is a side view in axial section taken on the line 9—9 of Fig. 8.

Fig. 10 is a general sectional view of the gun similar to Fig. 8, after percussion has taken place and the projectile has been driven home.

Referring now to the drawings, which illustrate an embodiment of the repeating driving gun according to the invention, 1 is a body formed with a butt grip 1^1. The body 1 also comprises at its upper portion the projecting bridge portion 1^2, and a substantially rectangular recess 1^3 which partially follows the shape of the bridge portion 1^2, within the latter.

A cylinder 2, which is for example of circular cross-section, is adapted to fit into the recess 1^3. The cylinder 2 is rotatably mounted relatively to the body 1 on

a spindle or pin 3 which is adapted to slide in the hole 1^4 in which it is engaged. A lug 3^1 on the pin 3 is guided in a slot 1^5 extending into the hole 1^4 over part of its length. A spring-loaded member 4 which has a conical end for example, is adapted to locate the pin 3 in two positions namely: a position in which the cylinder 2 is mounted in the body 1 (Figs. 1, 8, 10), and a position in which the cylinder 2 is freed in order that it can be detached from the body or placed in position (chain lines representing the pin 3 in Fig. 1). Notches of conical shape are formed in the pin 3 for co-operating with the spring-loaded push member 4 for the purpose of locating these two positions.

The rear portion of the cylinder 2 and the chambers for housing the cartridges are masked and protected by circular swellings 1^6 formed on each side of the body 1.

Chambers or housings 2^1 for receiving the cartridges and the projectiles are formed at regular intervals with their axes lying in a common circle about the axis of the cylinder 2. These chambers are of any appropriate form and dimensions corresponding to the calibres and the types of cartridges and projectiles which are used.

The front end of each of the chambers 2^1 has a cylindrical recess 2^2 for centering and accommodating the end of the bearing element 5^1 on the rear end of the barrel 5.

The body 1 has at the front a cylindrical support 1^7 in whose bore the barrel 5 is slidable. A spring 6 is interposed, in the compressed state, between a shoulder in the bore of the body and a shoulder on the barrel 5 in order to exert permanent pressure against the barrel 5, in the direction towards the front of the gun in order to move the barrel away from the cylinder 2.

Displacement of the barrel 5 in the former direction is limited by an abutment screw 7 which is screwed into the support 1^7, and whose end is adapted to arrest the shoulder of the barrel 5.

A sleeve 8 is slidably mounted above cylindrical support 1^7. The front end of the sleeve constitutes at 8^1 an anti-flash shield. The spring 9 interposed in a compressed state in the sleeve 8 between a shoulder of the said sleeve and the end of the support 1^7, exerts permanent pressure tending to drive the sleeve towards the front of the gun. The head of the screw 7 forms a stop limiting this forward movement. The sleeve has a slot at 8^2 to allow the passage of the head of the screw 7, and in order to allow it to slide.

It should also be noted that the barrel comprises holes or vents 5^2 for evacuating the gases, and a hole 8^3 for the same purpose is provided in the sleeve.

A screw 10 renders the barrel 5 fast with a slide 11 which is in the form of a tongue slidably mounted in a slot 1^8 formed in the lower portion of the body 1. The sleeve 8 also comprises a slot at 8^4 in order to allow it to slide relatively to the head of the screw 10.

Arranged in articulated fashion in a slot at the rear end of the slide 11 is a sear 12 which is acted upon by the pressure of a spring 13 tending to pivot the said sear in the upward direction.

The end of the sear 12 is adapted to engage the shoulder 14^1 of a striker 14. The latter is slidably arranged with its shoulder 14^1 and rear stem 14^2 in its housing formed in the body 1, the said housing being closed at the rear by the bushing plug 15. A compression spring 16 is arranged between the shoulder 14^1 and bushing plug 15 tends to drive the striker forwards into the percussion position at the opening into one of the chambers 2^1 of the cylinder.

The pivoting of the sear 12 in the upward direction can be controlled manually by a trigger 17 which is

articulated in the body, in front of the butt 1^1. A nose 17^1 on the trigger then acts on a corresponding recess 12^1 in the sear. A spring 18 tends to pivot the trigger in the forward direction.

The rotation of the cylinder after each shot is fired can be brought about, for example, in two ways:

(1) Automatically—In this case the cylinder 2 comprises peripheral zig-zag grooves (Figs. 3 and 4) whose ends 2^3 mark the position of each of the chambers 2^1 in the axis of the barrel 5 at the position of firing. These positions 2^3 are connected by V-shaped grooves whose arms are designated as 2^4 and 2^5 respectively. The end of a finger 19 is engaged in the peripheral grooves of the cylinder. The finger 19 is urged into the grooves by a spring 20 and is capable of slight displacement in the axial sense. Since the finger 19 is fast with the movements of the slide 11, for two reciprocating movements of the said slide the finger 19 will engage successively an oblique groove 2^4 and groove 2^5, shifting the cylinder from one position 2^3 to the following, that is to say from one chamber 2^1 to the other. The grooves 2^4–2^5 are ratchet shaped and have different levels at their ends, and also inclinations for obliging the finger 19 to follow their course. A slot 1^9 in the body is provided in order to allow the movements of the finger 19.

(2) The cylinder 2 can be rotated manually after each shot is fired and, in this case as distinguished from the above case, there is provided a system comprising a lever or press-stud 21 which is mounted for example on a swelling 1^6 and which can co-operate with holes or notches of the cylinder in order to locate each of the chambers 2^1 in strict alignment with the axis of the barrel.

The operation of the gun is illustrated by Figs. 1, 8 and 10. These show, besides the mounting of the cylinder, the advantage of the important feature formed by connecting the sear 12 to the barrel 5. The advantage of this is that the gun is never cocked except for the very instant when it is fired. Thus in Fig. 1 the end of the barrel 5 and the shield 8^1 are brought into contact with the surface into which the projectile is to be driven. The gun is not cocked, the striker not being at its rearmost position relative to the body 1. The cylinder is in an intermediate position, since the finger 19 has simply displaced it rotationally through an angle corresponding to the oblique groove 2^4.

In Fig. 8, pressure has been exerted in the direction of the arrow F on the butt and the body 1, bringing about a relative displacement between the sleeve 8 and barrel 5, and the body 1 in opposition to the springs 6 and 9. The relative displacement between the barrel 5 and body 1 also affects the slide 11 and the sear 12 mounted thereon. The sear 12 brings about a relative displacement between the body 1 and the striker 14 and cocks the gun only at the instant when the gun is in the firing position, firmly pressed against the surface into which the projectile is to be fired. In other words, it can be stated that pressure applied to the butt end of the gun (in the direction indicated by arrow F in Figure 8) brings about a displacement of gun body 1 relative to sleeve 8 and barrel 5 against the resistance of springs 6 and 9 as well as spring 16. With respect to positive movement, sleeve 8 and barrel 5 do not move since they are in contact with a fixed surface into which a projectile is to be driven. Slide 11 and sear 12 do not move, since slide 11 is fixed to barrel 5, and consequently sear 12 prevents the striker 14 from moving with the gun body 1 as the gun body is displaced relative to sleeve 8 and barrel 5. During the displacement of the body 1 with respect to the slide, the finger 19 has moved the cylinder rotationally through an angle corresponding to the oblique groove 2^5. A chamber 2^1 is therefore situated in alignment with the barrel at the same time as the gun is cocked.

Fig. 10 shows how percussion is effected by pressing on the trigger 17. This pivots the sear, releasing the striker 14.

As will be apparent, and has been brought out already from the foregoing, the invention is in no way limited to that mode of application nor to those forms of embodiment of its various parts which have been indicated more particularly; on the contrary it covers all possible modifications thereof.

I claim:

1. A fastening gun comprising a body, a cylinder rotatable in said body and provided with a circular array of equally spaced bores adapted to accommodate cartridges, each of said bores having an enlarged section at one end thereof, a barrel slidably supported by said body and having a bore for alignment with the bores of said array whereby the bores of said array are selectively alignable with the bore of said barrel by rotation of said cylinder, said barrel being engageable in said enlarged section, a spring urging said barrel axially away from said cylinder, trigger means in said body for causing percussion of a cartridge in a cylinder bore which is aligned with said barrel bore, a slide on said barrel and slidable with the same, said slide carrying a sear for engaging and cocking said trigger means as said barrel engages in the enlarged section of a cylinder bore, a zig-zag peripheral groove encircling said cylinder, and a pin on said slide and engaging in said groove so that when said slide is displaced said cylinder is rotated, said groove being correlated with said array so that a cylinder bore is aligned with the barrel bore and thus with said trigger means only on relative axial displacement between said barrel and said body against the action of said spring.

2. A fastening gun as claimed in claim 1, wherein the zig-zag groove has the shape of a ratchet.

3. A fastening gun as claimed in claim 2, comprising a spring engaging said pin and yieldably maintaining said pin in said groove.

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