Aug. 28, 1962 J. T. IVY 3,051,057

AUTOMATIC HAMMER COCKING AND CYLINDER INDEXING MEANS FOR REVOLVERS

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Fig. 1

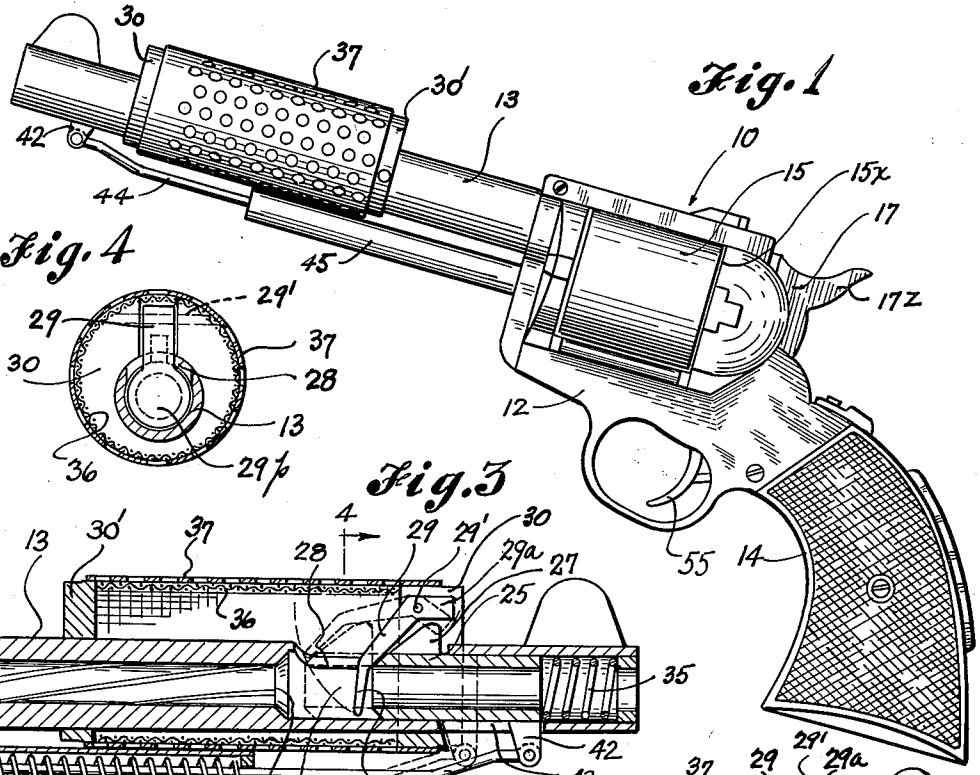

Fig. 4

Fig. 3

Fig. 2

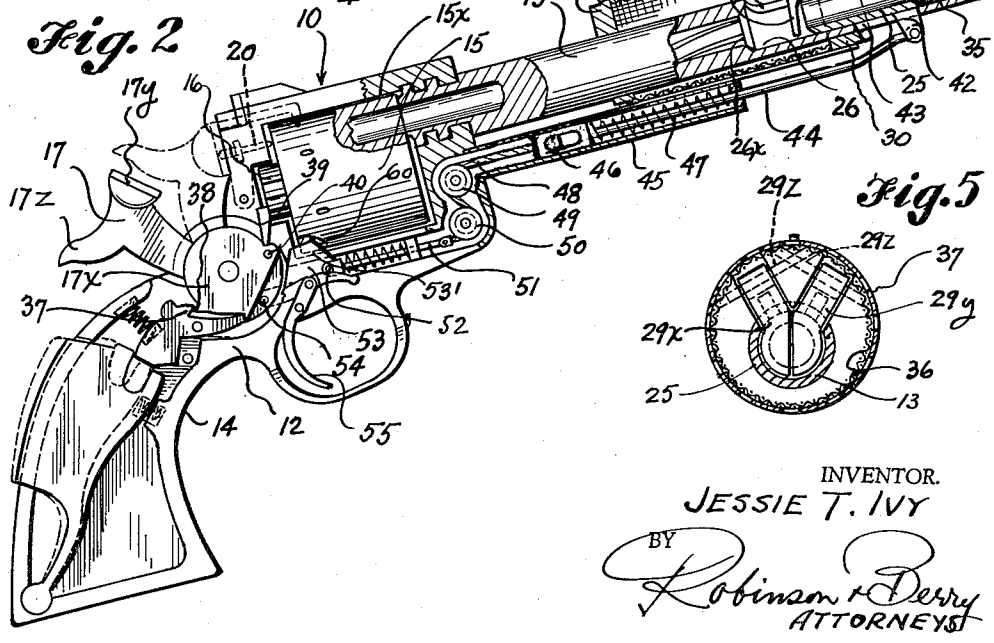

Fig. 5

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Fig. 6

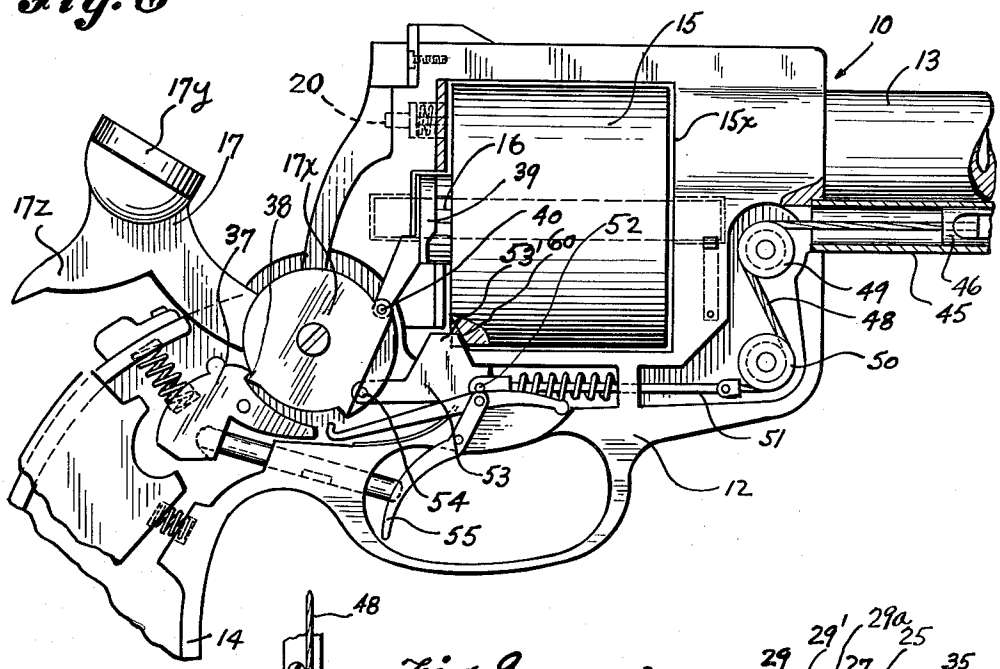

Fig. 9

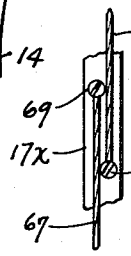

Fig. 7

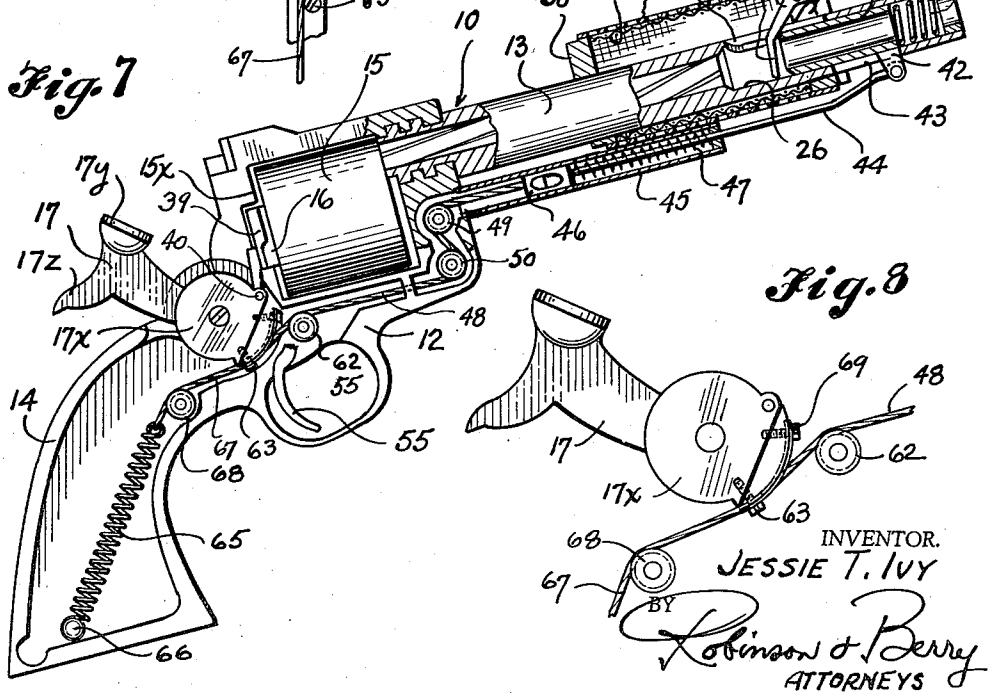

Fig. 8

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AUTOMATIC HAMMER COCKING AND CYLINDER INDEXING MEANS FOR REVOLVERS

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Fig. 10

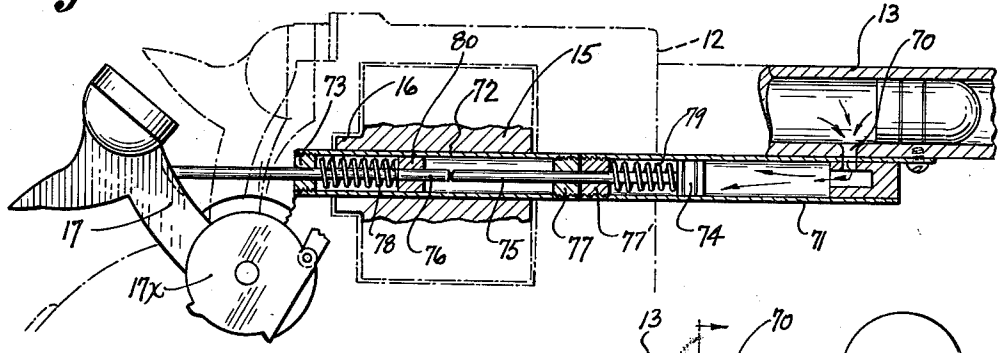


Fig. 11

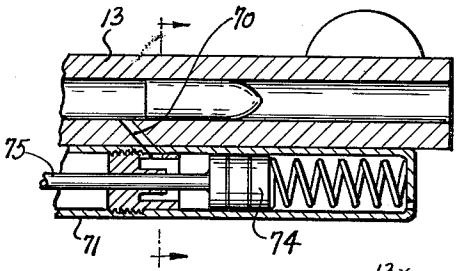


Fig. 14

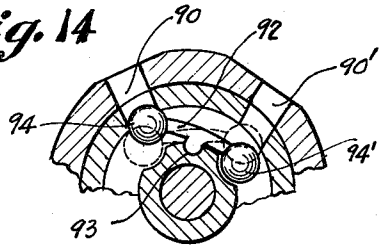


Fig. 12

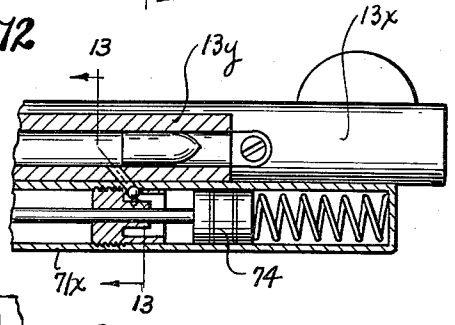


Fig. 15

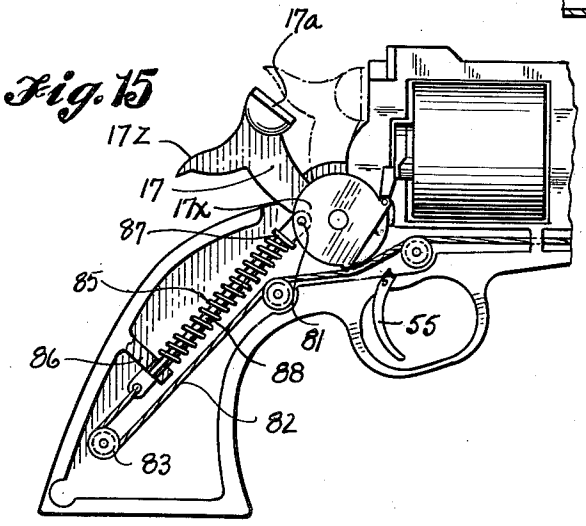
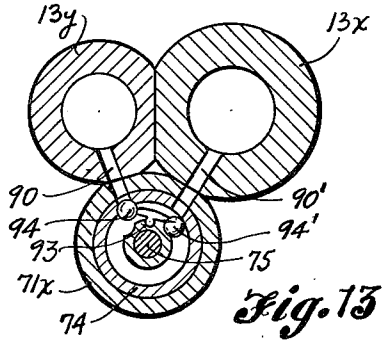


Fig. 13



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3,051,057

AUTOMATIC HAMMER COCKING AND CYLINDER INDEXING MEANS FOR REVOLVERS

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Filed Aug. 18, 1960, Ser. No. 50,507
5 Claims. (Cl. 89—191)

This invention relates to firearms and it has reference more particularly to improvements in revolvers; this application being a continuation-in-part of my U.S. application filed under Serial No. 831,288 on August 3, 1959, from which claims embodying the present subject matter were divided by an amendment in the parent case filed under date of March 21, 1960.

It is a principal object of this invention to provide improvements in means as applied in a firearm such as a revolver, for effecting an automatic indexing of the revolver cylinder and cocking of the hammer incident to each firing of a cartridge in the revolver.

Another object of the invention is to provide a mechanism, for the automatic indexing of the cylinder and the cocking of the hammer, that is powered by the pressure of exploding gas of each detonation.

A further object of the present invention is to provide means, in conjunction with the automatic indexing and hammer cocking devices, for effecting an upward deflection of flame and gas from the revolver barrel as the cartridges are fired, to counter act the jumping or bucking of the barrel in firing the revolver, and to hide the flash and muffle the sound of the explosion.

Yet another object of the invention is to provide automatic mechanism of the above stated character, including a gas actuated sleeve that is reciprocally fitted in the barrel or an extension thereof, and which has an operating connection with those parts that are employed for effecting the cocking of the hammer and cylinder indexing operations.

Still further objects and advantages reside in the details of construction and combination of various parts and in their mode of operation, as will be hereinafter described and claimed.

In accomplishing the above mentioned and other objects of the invention, I have provided the improved details of construction the preferred forms of which are illustrated in the accompanying drawings, wherein:

FIG. 1 is a side view of a typical revolver as equipped with cylinder indexing and hammer cocking mechanisms embodied by the present invention.

FIG. 2 is a side view of the revolver of FIG. 1 as seen from the side opposite that shown in FIG. 1, and with certain parts broken away or removed for explanatory purposes and better understanding of parts shown.

FIG. 3 is an enlarged, longitudinal section of the outer end portion of the revolver barrel, as equipped with flame deflector elements and the gas actuated sleeve of this invention.

FIG. 4 is a cross-section taken on line 4—4 in FIG. 3.

FIG. 5 is a cross-sectional view, similar to that of FIG. 4, but showing the revolver barrel as equipped with flame deflecting elements of an alternative type.

FIG. 6 is an enlarged, fragmental view, showing a side view of the hammer, its latching sear, and sear releasing means, as associated with parts of the hammer cocking means.

FIG. 7 is a side view of the present revolver, shown partly in section and as equipped with an alternative hammer cocking mechanism.

FIG. 8 is a side view of the hammer of FIG. 7, showing the cable connections made therewith for use in effecting its automatic actuation.

FIG. 9 is an edge view of the mounting end portion of

the hammer of FIG. 8 showing the relationship of cable connections as made therewith.

FIG. 10 is a sectional detail and diagrammatic illustration of parts of a revolver showing an alternative form of gas operated hammer cocking means as applied thereto.

FIG. 11 is an enlarged sectional detail showing a modification of the barrel and gas expansion chamber as associated with the revolver barrel.

FIG. 12 is a sectional view of a fragmental portion of a double barreled revolver, equipped with automatic mechanism of this invention.

FIG. 13 is an enlarged, cross-section, taken on line 13—13 in FIG. 12 showing the relationship of the two barrels and the gas chamber with which they are associated.

FIG. 14 is an enlarged sectional detail of the valve mechanism shown in FIG. 13.

FIG. 15 is a side view of a part of a revolver showing another alternative hammer cocking and firing means.

Referring more in detail to the drawings, and first to the revolver disclosed in FIGS. 1 and 2:

The revolver is designated in its entirety by reference numeral **10** and it comprises the usual frame structure **12**, barrel **13** and handle or grip portion **14**. Mounted rotatably in the cylinder recess **15***x* of the frame **12** is a cylinder **15** that is chambered in the usual manner and may be equipped at its rear end with the usual indexing, ratchet gear **16** as shown in FIG. 2. Also, mounted in the frame **12** is a hammer **17** that is pivoted for movement between its full line, cocked position, as shown in FIG. 2 to dash line down position shown in that same view, for striking the firing pin **20** for firing the cartridges as successively brought, by indexing rotation of the cylinder, to firing position in alignment with the barrel.

One of the features residing in the present invention pertains to means for causing the automatic indexing of the cylinder **15** and cocking of the hammer **17** incident to the firing of the cartridges by trigger pull, but it is not the intent that this particular inventive concept shall be restricted to or limited by the specific forms of the various parts shown or confined to revolvers exclusively.

The indexing and hammer cocking means, herein best shown in FIG. 2, comprises a short cylindrical sleeve **25** with a bore that is slightly larger than that of the barrel **13** and is coaxial therewith. Normally, this sleeve **25** is retracted to the dash line position in which it is shown in the enlargement of FIG. 3; and it is actuated, by the firing of a cartridge, to its full line position in that same view.

Formed on the topside of this sleeve adjacent its inner end portion is a cam or lug **27** which projects upwardly therefrom through and is movable with the sleeve in a slot **28** that is formed in and along the top side of the barrel, as shown best in FIG. 3. When a cartridge is fired in the revolver, the sleeve **25** is driven forwardly from its "retracted" position to the extended position in which it is shown in full lines in FIG. 3; this movement being effected by the pressure of expanding and exploding gas as it acts against the bullet in driving it through the barrel and through the bore of sleeve **25**. This action occurs the instant the bullet leaves the rifled portion of the barrel at **26***x* and enters the bore of sleeve **25**, thus closing the bore for an instant and causing gas pressure to be applied to the end of sleeve **25**.

It will be mentioned that the sleeve **25** could be used for its intended purpose without the use of or in association with the gas diverter arm, or its equivalent, which will now be described.

The flame and gas diverter employed with this revolver comprises a lever arm **29** of angular formation that is pivoted by a pivot pin **29'**, between its ends in a collar **30** that is fixed about the barrel as seen in FIG. 3. The

lever 29 extends in the longitudinal direction of the barrel to swing at its inner end into and from the counter bored portion 26 thereof through slot 28. This lever has an angularly down-turned forward end portion 29*a* that is disposed to be engaged and actuated upwardly by the cam lug 27 as the sleeve 25 is actuated forwardly thus to swing the opposite end portion of the lever into the counter bore; this end portion of the lever being equipped with a flat gas deflecting plate or end portion 29*p* whereby the expanding gas of the detonation will be deflected from the barrel upwardly through the slot 23. When the gas pressure has been dissipated, the sleeve 25 is returned to its retracted position by expanding pressure of a coil spring 35 that is contained in the forward end portion of the counter bore. The return of the sleeve causes the cam 27 to engage the lever 29 and actuate it to the horizontal position of its dash line showing in FIG. 3, leaving the barrel and bore open and the sleeve 25 fully retracted.

It is also shown in these views that the slotted outer end portion of the barrel 13 is enclosed by a surrounding sleeve 36 of screen mesh material; this being mounted at its forward end by the collar 30 and at its inner end by a similar collar 30'. The sleeve is substantially larger in diameter than the barrel and it receives the gas and flame of the explosion from the barrel through slot 28 and causes it to be dissipated from the sleeve without flash and with little noise. The screen tube is enclosed by a perforated sleeve 37, to give strength thereto.

In FIG. 5, I have illustrated an alternative form of gas and flame diverter in which two paired levers 29*x* and 29*y* are employed. These are arranged side by side with their outer end portions pivotally mounted on pivot pins 29*z*, to permit their inner ends to swing into and from the bore of the barrel through slot 28 in the same manner as described in connection with lever 29. The screen sleeve in this alternative, also may be enclosed in the perforated sleeve 37.

It is by reason of the forward actuation of the sleeve 25 with the firing of each cartridge that the automatic indexing of the cylinder and the cocking of the hammer is effected; this being through actuating and connecting means that will now be described.

It is to be observed in the several views, that the hammer 17 is shown to be formed with or to include a circular mounting hub member 17*x* at its inner end that is equipped with trunnions for its pivotal mounting in sockets formed in the frame. At its outer end the hammer has a pin striking head 17*y* and a thumb cocking ear 17*z*. When the hammer is pulled back or otherwise actuated to its cocked position, as in FIG. 6, it is releasably held in that position by the holding engagement of a spring pressed sear 37 with a peripheral shoulder 38 on the hub 17*x*.

It is further to be understood that, with the cocking action of the hammer, the cylinder 15 is forwardly indexed; this being effected through a pawl 39 that is pivoted at its lower end, as at 40 in FIG. 6, to the periphery of hub 17*x* and at its other end has ratcheting engagement with the ratchet gear 16 on the mounting hub portion of the cylinder; it being understood that with the cocking movement of the hammer this pawl advances the gear 16 and cylinder one interval to bring a loaded chamber of the cylinder into alignment with the barrel. When the hammer is released and actuated through its striking arc, the pawl is retracted. Insofar as this cylinder indexing is concerned, it is the same as in the parent application, Serial No. 831,288 previously mentioned.

The specific means for automatically cocking the hammer, and incidentally indexing the cylinder forwardly, is, in a preferred form as shown in FIG. 2 shown to comprise the sleeve 25 as contained in the counter bore of the barrel 13. The sleeve has a depending ear 42 at its forward end with limited movement in a slot 43 in the under side of the barrel. A rod 44 is attached to the

ear 42 and extends rearwardly along the barrel and axially within a tubular guide 45 and at its end is fixed within the tube to a piston like block 46. A coil spring 47 is confined in the tube 45 under compression to yieldably urge the block 46 rearwardly. Attached to the block 46 is a cable 48 which passes about guide sheaves 49 and 50 mounted on the frame 12 and at its end is attached to a pull rod 51 that is pivotally attached, as at 52, to a link 53 which, in turn, is pivotally attached to the periphery of the hub portion 17*x* of the hammer, as at 54.

Through the rod and cable connection as above described, the forward driving of sleeve 25 with the firing of a cartridge, pulls the cable 48 and link 53 forwardly and the link effects the cocking swing of the hammer to a position at which it is engaged and held by the sear 37 in cocked position. Release of the sear for firing is by finger pull on the trigger 55 in the usual way.

It is further to be observed, by reference more particularly to FIG. 6, that the link 53, is formed on its top side with an upwardly projecting ear 53' that is adapted, when the link is pulled forwardly by rod 51 for hammer cocking, to enter a notch 60 in the rear end periphery of the cylinder 15 thus to accurately register the cylinder chamber with the barrel and retain it against any possible slipping from position. Notches 60 are provided at regular intervals about the cylinder, to correspond to the spacing of the cartridge chambers in the cylinder.

Another means for hammer cocking and cylinder indexing has been shown in FIGS. 7, 8 and 9 wherein the link 53 as used in the mechanism of FIG. 6 has been omitted and the cable 48 has been extended beyond the sheave 50, over another sheave 62 and has a fixed connection as at 63 with the periphery of the hammer hub. By this cable connection, the forward driving of sleeve 25 incident to firing a cartridge pulls the hammer from a down position back to cocked position where it is caught and held by the sear 37 as in the device of FIG. 2. When trigger pull releases the sear, the hammer is then driven down against the firing pin by a coil spring 65 contained in the grip portion 14 and which is fixed at its lower end in the grip as at 66. At its other end the spring is attached under tension to a short cable 67 that extends from the spring, over a sheave 68 and is attached to the hammer hub as at 69.

Yet another automatic hammer cocking means and cylinder indexing means has been illustrated in FIG. 10 in which the frame portion of the revolver has been merely indicated in dash lines and the novel parts only have been shown in full lines. In this view the outer portion of the barrel 13 is shown as being formed near its outer end at its under side with a gas discharge port 70 that opens into the forward, closed end of a small diameter cylindrical tube 71 that extends rearwardly along the underside of the barrel into the frame 12 where it is coaxially aligned with a tube 72 of like diameter that extends axially through the cylinder and indexing gear 16 to serve as a mounting axle therefor. The rear end of the tube 72 opens rearwardly through the frame and is there fitted with a bearing plug 73. The hammer 17 is positioned as previously described and is adapted to be latched in cocked position by a suitable sear that is released for firing, by trigger pull.

Reciprocally contained in the tube 71 is a piston 74 with a rod 75 that extends rearwardly therefrom, slidably through bearing plugs 77 and 77' applied in the aligned and abutted ends of tubes 71 and 72, and into the tube 72 where it abuts against the forward end of a push rod 76 that extends from the rear end of tube 72 to engage the hammer 17 as shown.

When a cartridge is fired in the revolver, the exploding gas is discharged through the passage 70 and drives piston 74 rearwardly in tube 71, causing rod 75 to push rod 76 rearwardly and swing the hammer from down to

cocked position where it will be releasably retained by the sear in the usual way. Then with the dissipation of the force of the gas charge, coil springs **78** and **79** act, respectively, against a collar **80** fixed to rod **76** and piston **74** as fixed to rod **75**, to return the rods to their forward positions at which the engaged ends of the rods **75** and **76** are brought into alignment with the abutted ends of tubes **71** and **72** so that they will not interfere with removal of the cylinder from the frame in the usual way.

In FIG. 11, I have shown an arrangement wherein the gas discharge port **70** of the barrel **13** opens into the tube **71** at a point rearwardly of the piston **74**. In such case the rod **75** is pulled forwardly and its rear end connection would be similar to that of rod **44** in FIGS. 2 and 6 so that the forward driving force of the gas against the piston **74** operates to cock the hammer and index the cylinder. Alternatively, the operating connection might be as in FIG. 15 where it is shown that a pull rod **88** is pivotally attached at its upper end eccentrically to the hub **17***x* of the hammer, as at **81**, and has a cable **82** attached to its lower end passing therefrom downwardly, about a sheave **83** and up to a connection with the pull rod **75**. The pull cable from the gas actuated piston is so connected to the hub of the hammer that when a cartridge is fired, it actuates the piston to cock the hammer. Then when the trigger is pulled, the coil spring **85** acting under compression against a rod guide **86** and a collar **87** on the rod, drives the hammer down against the firing pin.

In FIG. 12, I have represented the outer end portion of a revolver having two barrels **13***x* and **13***y* in parallel side by side relationship as observed in enlarged cross-section in FIG. 13. Each of these barrels has a gas discharge port **90** near its outer end that opens into the same gas tube **71***x*, corresponding to tube **71** of FIG. 10. Tube **71***x* would be fitted with a piston **74** as in FIGS. 10 or 11 and have the same or an equivalent operating connection with the hammer as in FIG. 10 or FIG. 15. Therefore, upon firing either barrel, the hammer would be automatically cocked and the cylinder **15** forwardly indexed.

In the two barrel arrangement it is necessary that means be provided to automatically close off the gas passage **90** leading from the barrel not being used, in order that the force of the exploding gas in the fired barrel will not be dissipated through the unused barrel without hammer cocking. For this purpose I employ a rocker valve as best shown in FIG. 14 comprising the lever **92** which is pivotally supported between its ends, as at **93**, for vertical cocking. At its ends the lever carries ball valves **94—94'**, each adapted to be closed against the discharge ends of the corresponding gas discharge channels **90** with the firing of a cartridge in the opposite barrel.

With revolvers so equipped with the automatic hammer cocking and cylinder indexing means, it is only necessary for the user of the revolver to pull the trigger for firing, and with the firing, the parts are reset in readiness for the next shot.

The mechanism of this invention could, in a similar way, be used to cock the hammer of a rifle and to slightly rotate the bolt, for unlocking it, through the use therewith of the bolt rotating mechanism which has been disclosed in my U.S. patent application pending under Serial No. 696,738, filed on November 15, 1957, now Patent No. 2,967,367.

What I claim as new is:

1. In a firearm having a frame, a barrel fixed in said frame, a cartridge firing hammer movable between "down" and "cocked" positons, a releasable sear for retaining the hammer in cocked position, a trigger mechanism for releasing said sear; a hammer cocking means comprising a gas chamber formed in the outer end portions of the barrel as a counter bore, said counterbored portion of the barrel having a slot formed longitudinally thereof, a coaxially positioned sleeve reciprocally fitted in the counterbore and bored for the passage of bullets of fired cartridges therethrough, a flame deflecting means comprising a lever pivotally mounted on the barrel and formed at one end with a flame deflecting baffle and at its other end with an angular actuating arm, a cam lug projecting from said sleeve, and movable along said slot with the movement of said sleeve, to engage the angular arm of said lever to swing said baffle into and from the barrel for the outward deflection of flame of expanding gas through said slot.

2. A firearm according to claim 1 wherein said hammer cocking means includes spring means for return of said tubular sleeve and hammer cocking connection to their normal positions with the dissipation of the gas pressure from the chamber.

3. A firearm according to claim 1 wherein the hammer cocking means includes a pull rod connected at one end to said tubular sleeve and having operative connection at its other end with said hammer whereby forward actuation of the pull rod by the sleeve rotates the hammer from down to cocked position.

4. A firearm according to claim 1 wherein said slotted end portion of the barrel is enclosed within a perforate cylinder providing a chamber into which burning gas from fired cartridges is dissipated.

5. In a firearm having a frame with a barrel fixed thereto in which cartridges may be fired, a spring loaded cartridge firing hammer, a releasable sear for holding the hammer cocked when returned from down to cocked position and a trigger mechanism operable for releasing the sear from the hammer for firing, a hammer cocking means comprising a cylindrical gas chamber formed in and coaxially of the barrel along its outer end portion, a sleeve reciprocally fitted in said cylindrical chamber and bored for passage of the bullet of each fired cartridge therethrough and said sleeve being movable outwardly along the gas chamber under the influence of the bullet propelling gas, interconnecting means between said sleeve and said hammer whereby such outward movement of the tubular sleeve effects the return of the hammer to cocked position after firing each cartridge, said interconnecting means including a pull rod connected at one end to said sleeve, a flexible connecting means secured to the other end of said rod and to said hammer and a spring acting on said rod to urge said rod toward said hammer.

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