

R. FITTIPALDI.
AUTOMATIC REPEATING FIREARM.
APPLICATION FILED JAN. 10, 1912.

1,099,245.

Patented June 9, 1914.

2 SHEETS—SHEET 1.

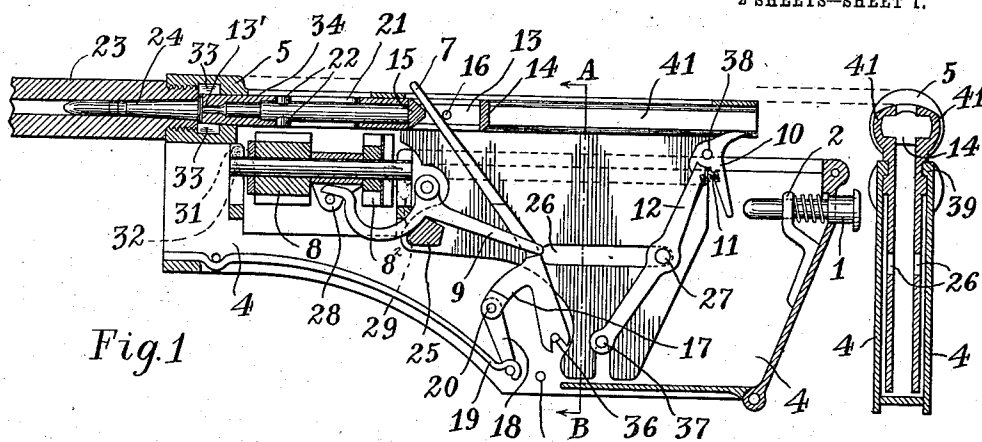


Fig. 1

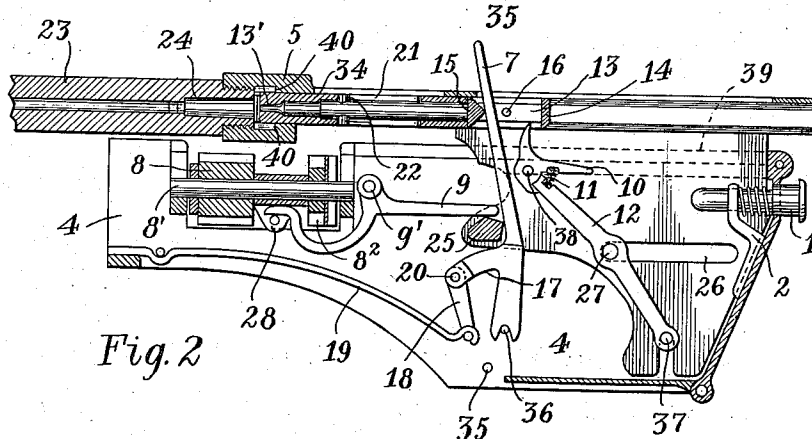


Fig. 2

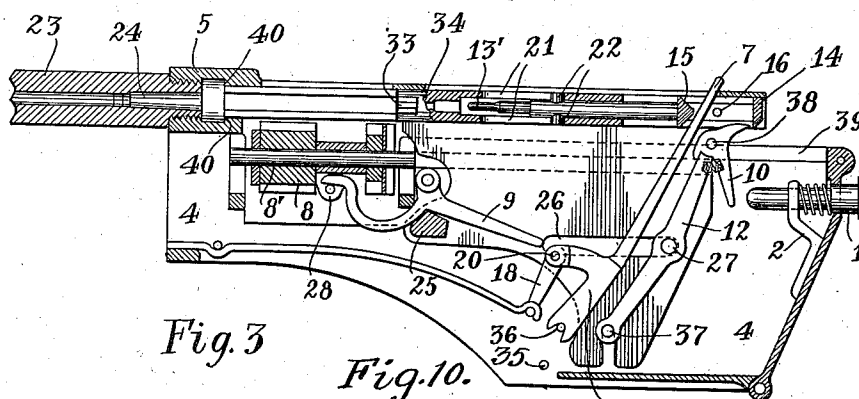


Fig. 3

Fig. 10.

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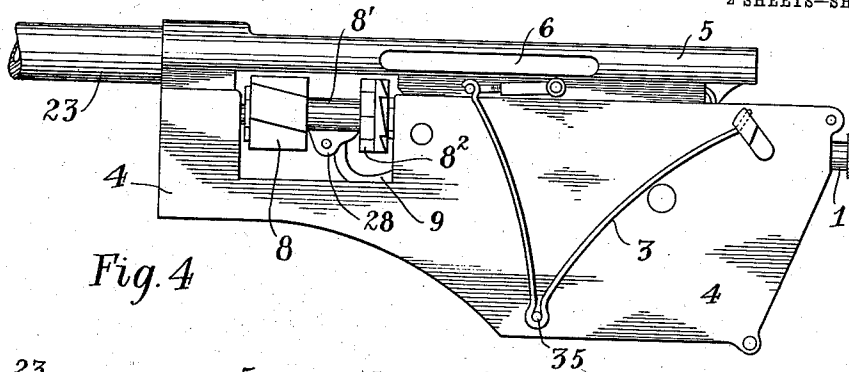


Fig. 4

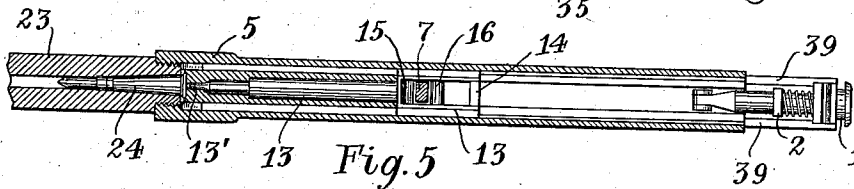


Fig. 5

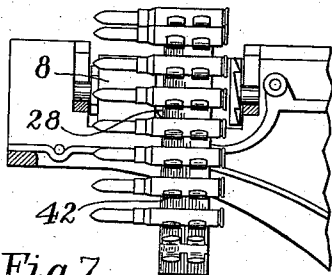


Fig. 7

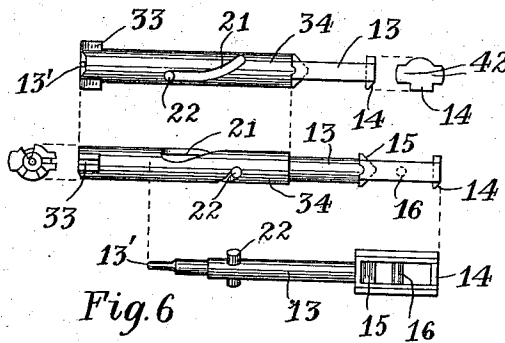


Fig. 6

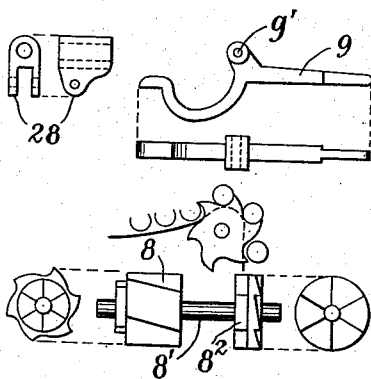


Fig. 8

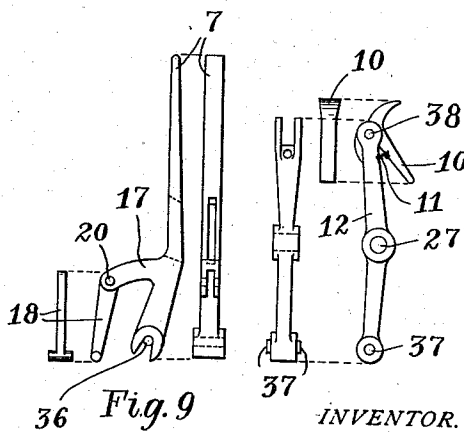


Fig. 9

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UNITED STATES PATENT OFFICE.

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AUTOMATIC REPEATING FIREARM.

1,099,245.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RAFAEL FITTIPALDI, a subject of the King of Italy, and resident of No. 832 Carlos Pellegrini street, Buenos Aires, Argentina, have invented certain new and useful Improvements in Automatic Repeating Firearms, of which the following is a specification.

This invention relates to automatic repeating fire arms and one of its objects is certain improvements whereby the escape of the gases through the breech is prevented absolutely and great efficiency in the working of the arm is obtained. Besides this, the present invention provides an easily handled weapon of reduced weight, small dimensions and great precision and speed in firing.

The simplicity of the mechanism and construction of the device, permit the same to be applied to any fire arm, whatever be its caliber or dimensions.

Generally speaking, the invention is characterized by the fact that the movement of the mechanism for bringing about the firing causes, first of all, the obturation or closure of the breech of the arm, and only after this can the explosion of the cartridge take place, the breech remaining closed until the compressed gases have been entirely evacuated through the barrel of the gun, so that complete advantage may be taken of the force developed by the explosion of the gases. The performance of this characteristic which constitutes the principle of this invention is obtained by effecting the obturation of the breech by means of a cylindrical piece and arranging the striker or firing pin within this cylindrical piece in such a way that after the firing and just before firing again, the striker when advancing, shall push before it the said piece until the same comes into contact with the breech, after which, owing to stops provided on the striker and which move in curved grooves formed on the cylindrical piece, the striker compels said piece to effect a rotary motion which causes the same to be locked in the breech, and only after this locking action takes place will the striker continue its forward movement in order to strike the cap of the cartridge.

The explosion causes a backward movement of the movable part of the mechanism and this recoil brings the arm back to its original position for automatically repeat-

ing the operation. When this backward movement is taking place, the joint between the closing or obturating cylinder and the breech, remains entirely closed and only opens when the obturating cylinder returns to receive a reverse rotary motion which liberates the same from the breech and as this reverse motion only takes place when there is no longer any pressure of gases in the barrel all of the pressure will have been used for the discharge of the projectile.

The invention will more readily be understood by referring to the following detailed description, reference being made to the accompanying drawings.

In said drawings, the invention has been represented as being applied to a rapid fire gun.

Figure 1 shows a longitudinal vertical section of the arm just after firing. Fig. 2 is a view similar to Fig. 1, the mechanism being in its position of complete recoil. Fig. 3 is another view similar to Fig. 1 but with the mechanism completely cocked. Fig. 4 is a side elevation of the arm. Fig. 5 is a central longitudinal sectional view, the parts being disposed as shown in Fig. 1. Fig. 6 shows details of the striker and obturating cylinder. Figs. 7 and 8 show details of the feeding mechanism of the rapid fire gun, and Fig. 9 represents details of the firing, reacting and obturating mechanism. Fig. 10 is a fragmental elevation partly in section, the forward section being taken behind the central longitudinal plane of the fire-arm, while the rear section is taken in front of said plane.

Similar reference numerals indicate like parts throughout the several views of the drawings.

The rapid fire gun consists of a fixed and a movable part, the fixed part comprising the guide casing 4, and the movable part comprising the reciprocating casing 5, the obturating cylinder 34 and the striker 13.

1 designates the firing device, applied to the rear part of the gun, being supported by a bracket-piece 2. Between the piece 2 and the rear wall of the casing 4, is interposed a spiral spring adapted to hold the firing device 1 normally projected outwardly.

3 (Fig. 4) designates the reaction spring which compels the movable part to return to its forward position after the cessation

of the pressure of the gases which caused the recoil. This spring is supported by the stud 35.

12 designates the reacting lever fulcrumed on the pin 27 and which carries at its upper part, pivoted thereto by means of a stud 38, a stop 10 which aids in the firing and re-cocking of the arm, as will be seen later on.

11 designates a spring which keeps said stop 10 normally in the position indicated at Fig. 1.

7 designates the closing and striking lever, engaging the pin 36 which serves as fulcrum to the same. This lever has an arm 17, connected to the spring 19 by means of the small link 18. The upper part of this lever projects upward through the reciprocating casing 5 (see Fig. 5).

The loading mechanism consists of a drum 8, mounted on the axle 8'. The drum is provided with teeth on its front end and to the rear of it there is a toothed disk 8². This mechanism is disposed below the breech of the arm and there is provided a stop 29, pivoted at 29' at the rear of the drum and another stop 31, is pivoted at 31' at the front of the drum. The purpose of these stops is to cause the drum to rotate in the manner hereinafter set forth.

9 designates a lever, fulcrumed at 9' and connected to the drum by means of the piece 28. The object of this lever 9 is to raise the drum to present a projectile to the breech after each discharge, and to lower the drum to provide passage for the movable mechanism. This movement of the lever 9 is brought about by means of a stop 25, fixed to the brackets of the gun and which move with said brackets and causes the lever to rise when occupying the position of Fig. 1, and to descend when being in the position of Fig. 2.

The movable casing 5 of the arm is provided at its upper part with the grooves 41. In said upper part, of a slightly oval shape, is arranged the closing or obturating cylinder 34, and in the interior of the cylinder is the striker 13 provided with the firing pin 13'. The striker is provided with stops 22 which by passing through the slots 21, placed in said closing cylinder, guide the same in forward or backward direction. Said grooves are curved so that when the obturating cylinder comes into contact with the breech and its forward motion is intercepted, the striker which is being driven by the lever 7, and which cannot rotate, on exerting pressure against said slots, will cause the closing cylinder to rotate and lock itself within the breech, as will now be explained. Within the breech (near reference numeral 5, Figs. 2 and 3) are two shoulders 40, arranged vertically one above the other. The projections 33 of the ob-

turating cylinder, on the other hand, are arranged horizontally and remain in horizontal position until they have moved forwardly beyond the shoulders 40 (Figs. 2 and 3) when the cylinder, receiving a rotary motion caused by the stops 22 and slots 21, causes the said projections to place themselves in vertical position before said shoulders 40, thus positively locking the obturating cylinder. From the above description, the general working of the arm will readily be understood.

The *modus operandi* is as follows: Suppose the mechanism to be in the position shown at Fig. 1; when now the closing and striking lever 7 is engaged by the end of the piece which projects from the casing of the mechanism 5, and said lever is pushed backward to the end of the opening or passage provided at the upper part of the casing of the mechanism, that is to say, until the shoulder 14 of the rear part of the striker 13 has got beyond the stop 10, as clearly shown in Fig. 3.

When carrying out this movement, the closing and percussion lever 7 turns on the pin 36, arranged at the lower part and draws with it the striker 13 by means of the pin 16; as the striker 13 recedes, with its two stops 22 lodged in the guiding grooves 21 of the obturating cylinder 34, it will impart, owing to the curved shape of the said guide grooves 21 (Fig. 6) the necessary rotary motion to the obturating cylinder 34 in order that the two projections 33 may take a horizontal position and get out of contact with the shoulders 40 of the casing of the mechanism. After rotation of the obturating cylinder 34 and the projections 33 being disengaged from the shoulders 40 of the casing of the mechanism 5, said projections 33 will coincide in their horizontal position with the guide ways 41 of the casing of the mechanism and will slide along the same as the obturating cylinder 34 is being carried along by the stops 22 of the striker 13, this latter being pushed backward in its turn by the closing and striking lever 7, Fig. 3. As the obturating cylinder 34 and the striker 13 withdraw in a backward direction, the shoulder 14 of the striker passes over and is caught by the spring pressed stop 10, which holds the striker and the obturating cylinder in their cocked position, as shown at Fig. 3. When rotating backward, the closing and striking lever 7 cocks the spring 19. After effecting the above described movement, the mechanism will be in position to be loaded and fired, as shown in Fig. 3.

A cartridge is now inserted into the breech 24, by introducing the same through the upper part of the casing of the mechanism 5, Fig. 3, after which the firing device 1 is pressed upon, which depresses the

stop 10 which then moves out of engagement with the shoulder 14 which retains the striker. The striker, on being released from the catch 10 moves forward, being 5 pushed by the lever 7 actuated by the spring 19. The striker 13, with its stops 22 engaged in the curved slots 21, propels the obturating cylinder 34, which moves forward without turning owing to the projections 33, being engaged in the grooves 41 10 in which they slide. As the obturating cylinder is stopped at the end of its forward motion, on account of its contact with the rear of the barrel 23, the striker 13 and the stops 22 continue their forward motion 15 and owing to the curved shape of the openings 21, said stops will cause the obturating cylinder to rotate until its two projections 32 are placed in vertical relation (see Fig. 20 1). The breech or seat of the cartridge 24 will then be completely obturated and the breech locked by the projections 33 having engaged against the shoulders 40 of the casing of the device. The striker 13, after 25 having turned the obturating cylinder 34 and locked the breech, continues its advance until its firing pin 13' strikes the cap and causes the discharge of the gun. The back pressure of the gases brings about the recoil 30 of the entire movable part, which then takes the position shown at Fig. 2, compressing and cocking the reaction spring 3 (Fig. 4).

As the movable casing 5 together with the barrel, obturating cylinder and striker recoils the shoulder 15 of the striker engages 35 and moves horizontally the striking and closing lever 7. At the same time the stop 25 engages the lever 9. At the commencement of its backward motion, said stop 25 causes the lever 9 to turn on its pivot, thus 40 raising its rear part and lowering the front part which latter carries along and lowers the loading drum 8, in order to give passage to the casing of the mechanism. After firing and recoil being completed, the barrel with the casing of the mechanism returns to its forward position, Fig. 3, under the influence of the spring 3, Fig. 4, which 45 was cocked by the action of recoil.

As the casing of the mechanism after the recoil, returns to its forward position, the lever part of the reacting lever 12 advances—owing to the arrangement of its pin 27 fixed to the brackets of the fixed guide 50 casing 4, and to its two sliding studs 37 (Fig. 3) disposed in the openings of the casing of the mechanism, while at the same time its upper part recedes; thus carrying 55 backward the obturating cylinder and the striker by means of the stop 10 engaging the shoulder 14 (Fig. 3).

When withdrawing from the breech, the obturating cylinder 34 with its extractor carries along with it the spent cartridge up 65 to the end of its action where is arranged

the ejector 6 (Fig. 4) which by means of its point which passes through the groove of the projection 35 of the obturating cylinder, ejects the empty shell from the casing of the device.

When returning forward, the stop 25 70 strikes the lever 9 of the loading drum 8 and causes said lever to oscillate on its axle and raises the loading drum 8 (Fig. 3). Therefore, after the gun has been fired and 75 the recoil has taken place, the mechanism automatically cocks itself, with the breech open, ready for receiving a fresh cartridge (see Fig. 3). The foregoing explains the operation of the gun when use as single 80 loader.

For automatic firing, the gun is operated in the following manner: The mechanism being in the position shown at Fig. 3, the end of the cartridge band is inserted through 85 the left part of the casing of the mechanism and is passed through the opening between the loading drum 8 and the obturating cylinder 34.

When owing to the backward movement 90 of the stop 25 the drum 8 descends, one of its teeth engages with the stop 29, to the left of the axle and causes the drum to rotate a short distance, while when rising, the other stop 31, situated to the right engages 95 the teeth of the drum and causes it to rotate through the distance still wanting, so that the loading drum 8 will present to the front of the closing cylinder 34 each succeeding cartridge of the band for the successive discharges. 100

On depressing the firing button 1 for firing, the obturating cylinder 34 moves forward and pushes the cartridge from the edge of the band to the interior of the 105 breech, the mechanism then performing the obturation, firing, recoil and all the other movements in the same way when the gun is used as automatic repeater as when used as single loader, as above described. When 110 the firing button 1 is being depressed continuously, the discharges will automatically succeed the other as long as there are cartridges remaining in the cartridge band. In order to stop firing, the firing button 1 is 115 released thus causing the stop 10 to engage with the projection 14 and hold the striker in rearmost position. From the foregoing description it will be seen that by depressing the firing button, loading, obturating, locking 120 and firing will be automatically and successively performed, being followed by the recoil during which the breech will be kept completely obturated, thus obliging the gases of the powder to impel the bullet and 125 to escape entirely by way of the barrel.

When there are no gases in the interior of the barrel and recoil having been completed, the reacting spring through its tension causes the barrel and the casing of the 130

mechanism to return to its forward position, during which movement the breech is opened, the empty shell extracted and ejected, and loading, obturating, locking and firing are again automatically performed, as long as the cartridge band contains cartridges and the firing button is held depressed.

When applying the mechanism to rapid fire guns for ordnance use, it will be necessary to provide the same with the usual fittings of this kind of arm, such as the refrigerator for the gun barrel, the connecting device for mounting the gun on a tripod, gun-carriage or limber, sight device, etc., all of which have not been described in this specification, being well known to any person familiar with the art.

The fitting and minor details of the mechanism may of course be varied in accordance with the system of rapid fire arm to which this invention is to be applied, but all such modifications do not in any way affect the nature of the invention, the essential features of which are pointed out in the claims.

What I claim is:

1. In an automatic repeating fire arm, the combination of a fixed casing; a movable casing having a vertical slot in its lower part; an obturating cylinder, a striker in the obturating cylinder; a striking lever adapted to move the striker forwardly or rearwardly; means for yieldably pressing the striking lever forwardly; a reacting lever pivoted near its middle part to the fixed casing and having a stud at its lower end engaging in said slot of the movable casing; a pivoted stop on the upper end of the reacting lever and adapted to engage and move rearwardly the rear end of the striker; and a yieldable plunger for at will disengaging said pivoted stop.

2. In an automatic repeating fire arm, the combination of a fixed casing; a movable casing yieldably pressed forwardly in the fixed casing; a barrel secured to the movable casing; an obturating cylinder slidable in the movable casing and adapted to be engaged with the barrel as the cylinder is rotated; a striker in the obturating cylinder and adapted to rotate the cylinder when the strike is pressed forwardly; a striking lever adapted to move the strike forwardly or rearwardly; yieldable means for pressing the striker forwardly; a reacting lever associated with said casings and adapted to have its upper end moved rearwardly when the movable casing moves forwardly; a pivoted stop on said upper end adapted to engage the striker; means for disengaging the pivoted stop; and means for feeding cartridges to the barrel.

3. In an automatic repeating fire arm, the combination of a fixed casing; a movable casing yieldably pressed forwardly in the

fixed casing; a barrel fixed to the movable casing and provided with shoulders; an obturating cylinder slidable in the movable casing and provided with spiral slots and with projections adapted to engage said shoulders; a striker slidable longitudinally in said cylinder and provided with stops in said slots; a striking lever adapted to move said striker forwardly or rearwardly; means for pressing the striking lever forwardly; a reacting lever pivoted near its middle part to the fixed casing and having its lower part positively engaged by the lower part of the movable casing; a pivoted stop on the upper end of the reacting lever and adapted to engage the rear end of the striker; means for at will disengaging the pivoted stop; and means for feeding cartridges to the barrel.

4. In an automatic repeating fire arm, the combination of a fixed casing; a movable casing slidable in the fixed casing; a reacting spring pressing said movable casing forwardly; a barrel fixed to the movable casing and having opposite shoulders in its breech; an obturating cylinder slidable in the upper part of the movable casing and provided with spiral slots and with opposite projections engaging said shoulders; a striker in said cylinder and provided with stops in said slots, and at the rear with a stop and a shoulder; a striking lever pivoted to the fixed casing and yieldably pressed on the rear end of the striker between said end and said stop of the rear end; a reacting lever pivoted at an intermediate point to the fixed casing, and positively engaged by said movable casing at its lower part; a pivoted stop at the upper end of the reacting lever and adapted to engage said shoulder of the striker; means for at will disengaging said pivoted stop; and means for feeding cartridges into the breech of the barrel.

5. In combination with an automatic repeating fire arm, a projectile feeding mechanism substantially comprising an axle; a toothed drum and a toothed disk mounted on the axle; a lever for raising and lowering the drum; and two pivoted stops adapted to be engaged by the drum for causing the rotation of said drum; each stop imparting to the same one half of the movement required for the presentation of each cartridge to the breech, the one acting when the drum descends, and the latter when the drum rises, substantially as described and for the purposes set forth.

6. In an automatic repeating fire arm, the combination of a fixed casing; a movable casing slidable therein and yieldably pressed forwardly; a barrel secured to the movable casing; an obturating cylinder; means associated with the movable casing for moving the obturating cylinder to and away from the breech of the barrel; a vertically mov-

able axle; a toothed drum and a toothed
disk on said axle; a two-armed lever pivoted
to the fixed casing and connected to the axle;
a stop carried by the movable casing and
5 engaging the two-armed lever for raising
and lowering said axle, drum and disk; and
a pair of means adapted to be engaged by
said drum and disk, for moving the drum

and disk on the upward and downward
movement thereof respectively.

Signed at Buenos Aires, Argentina, this 10
27th day of November A. D. 1911.

RAFAEL FITTIPALDI.

Witnesses:

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J. H. AINSWORTH.