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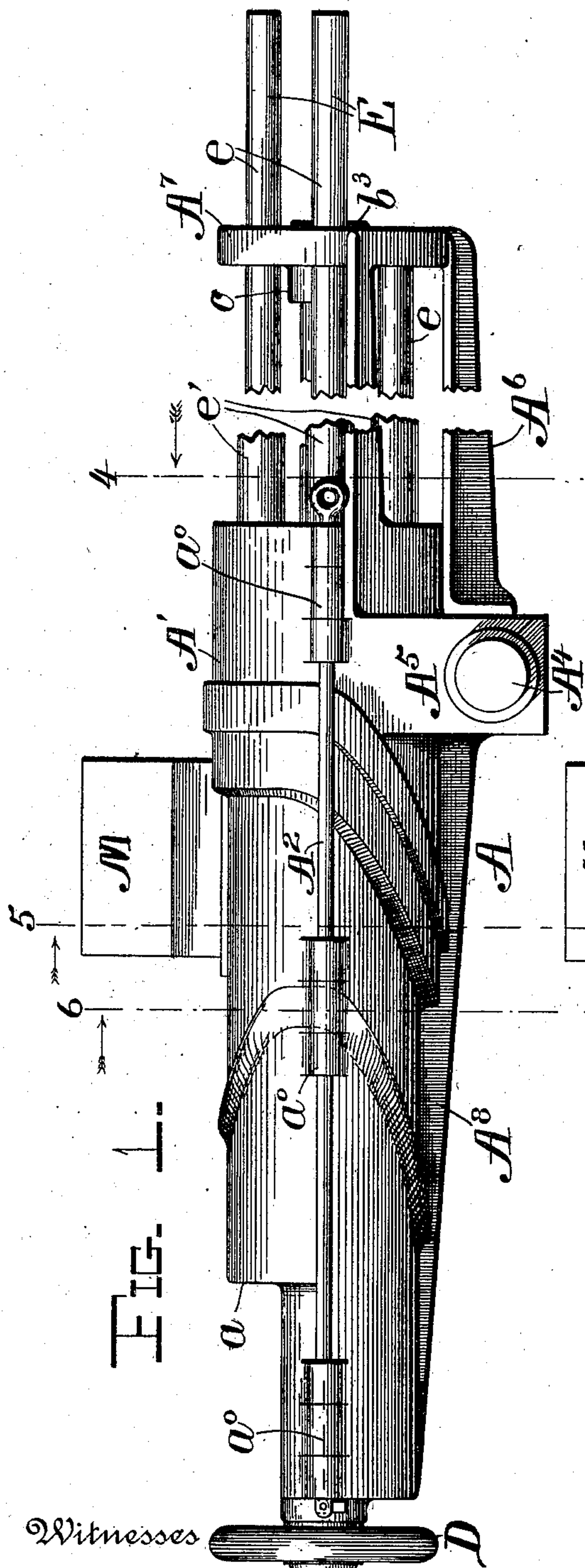
Patented Apr. 29, 1902.

L. L. DRIGGS.
AUTOMATIC GUN.

(Application filed Aug. 24, 1897.)

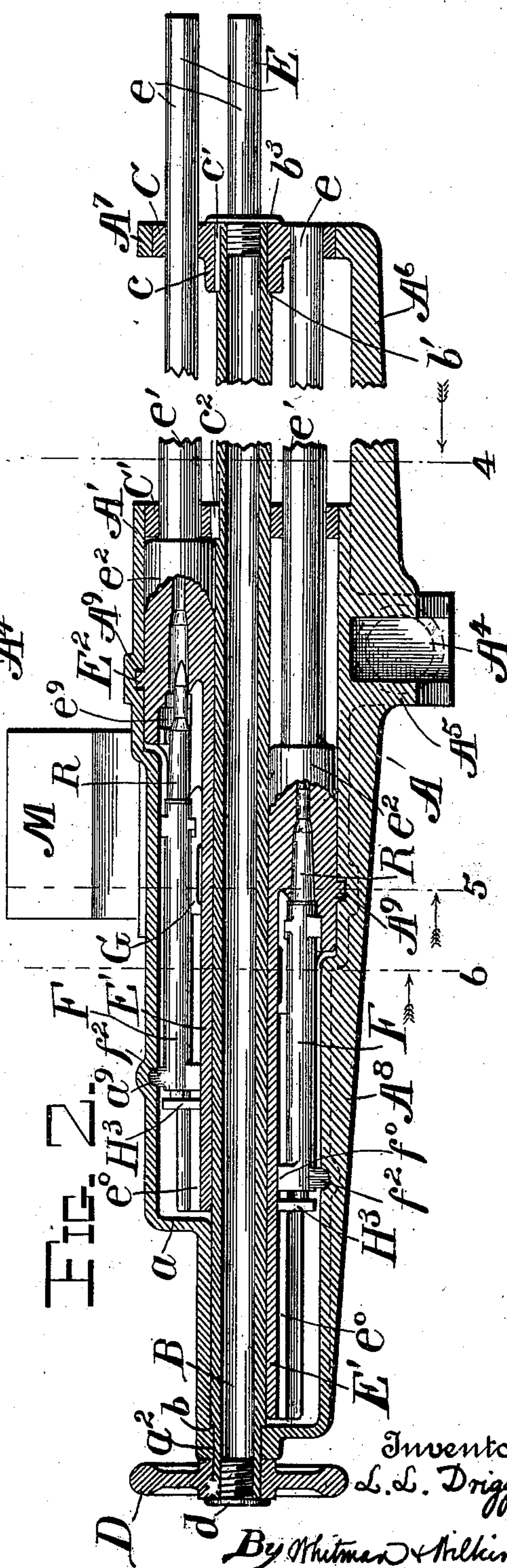
(No Model.)

4 Sheets—Sheet 1.



Witnesses

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J. Stephen Ginst.



Inventor

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Attorneys.

No. 698,472.

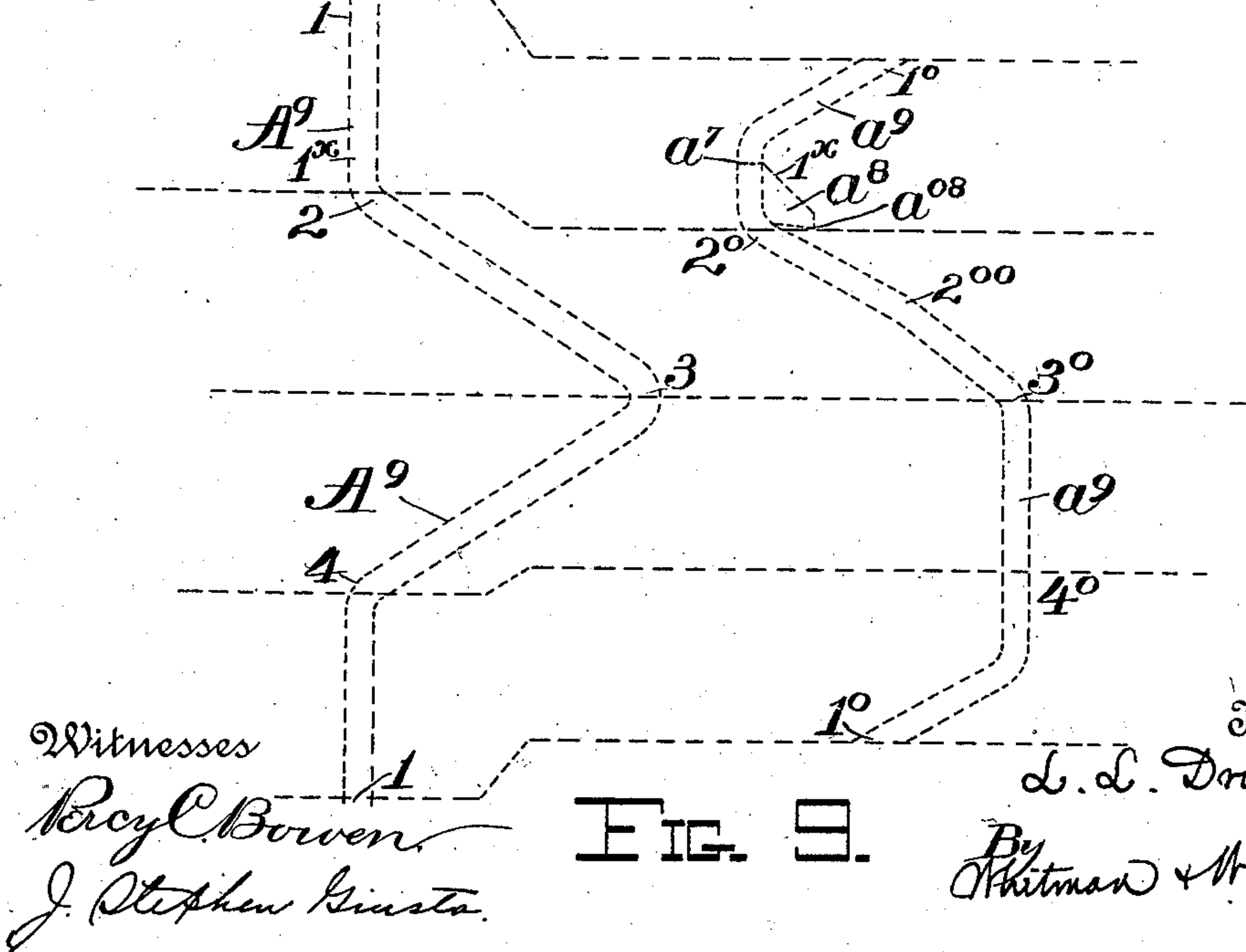
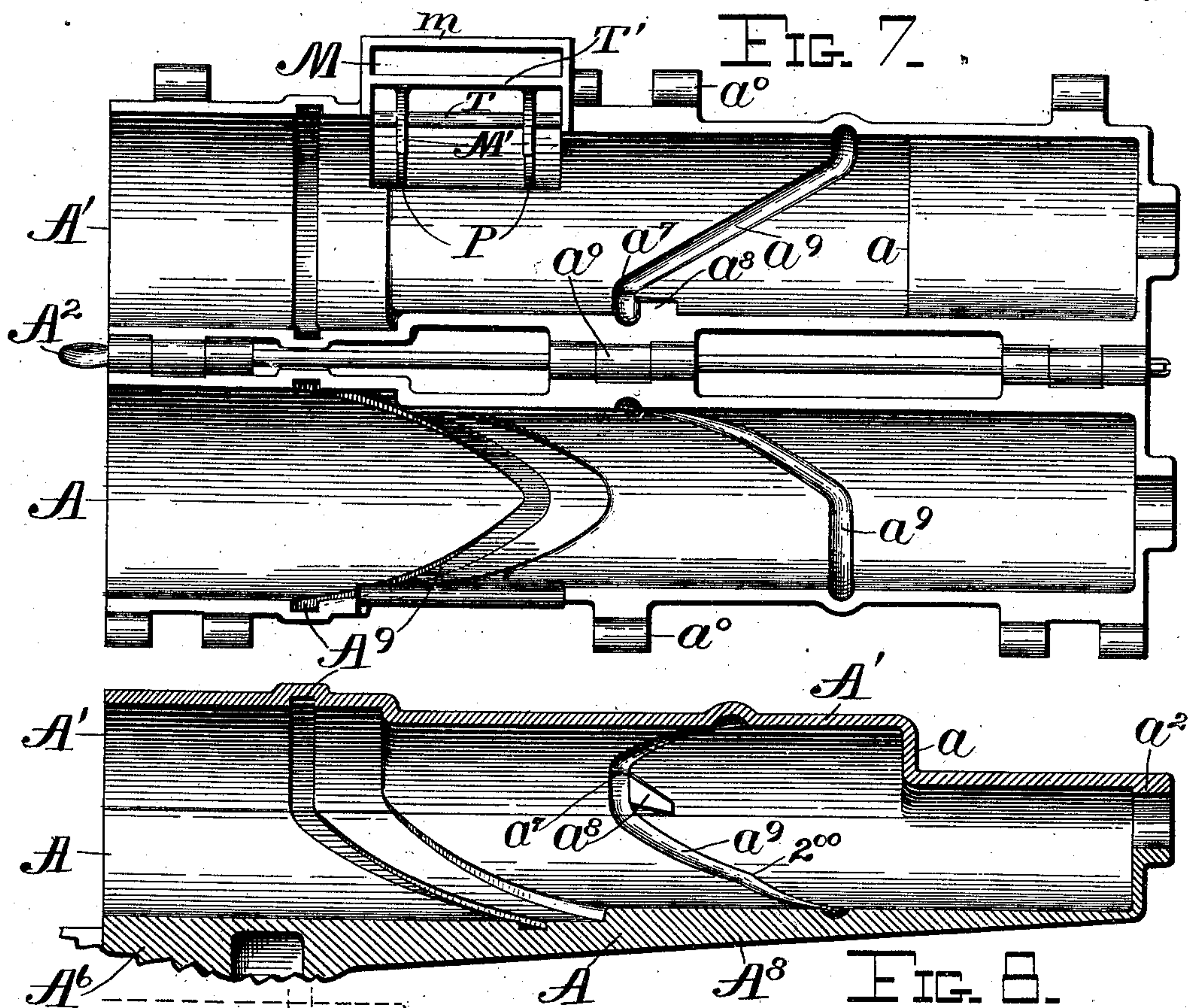
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4 Sheets—Sheet 3.



Witnesses
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FIG. 9.

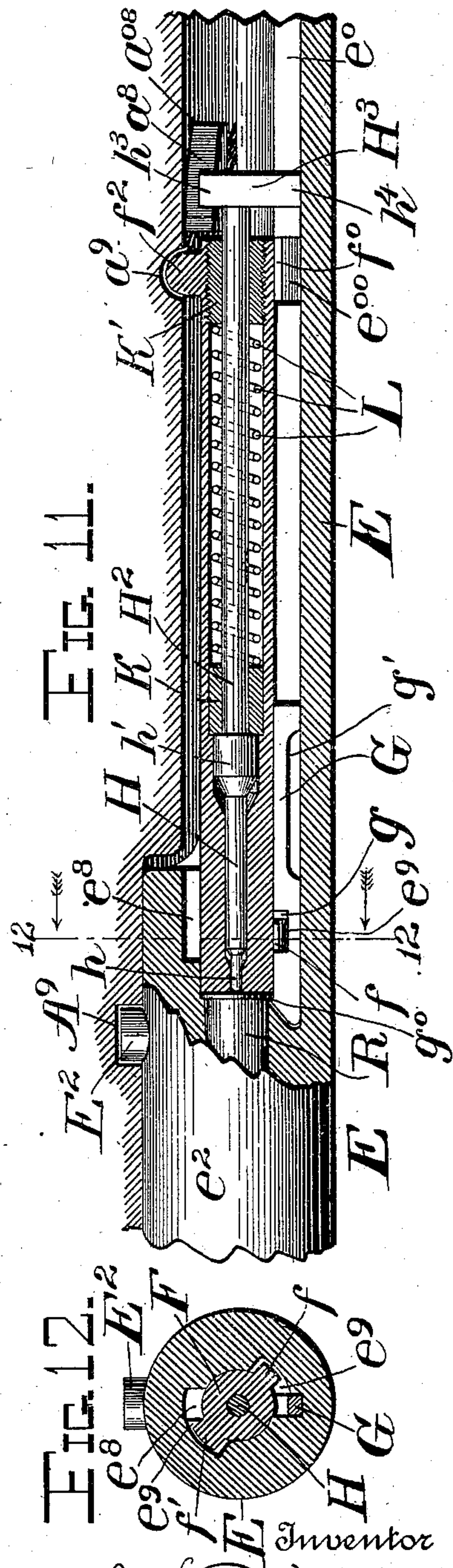
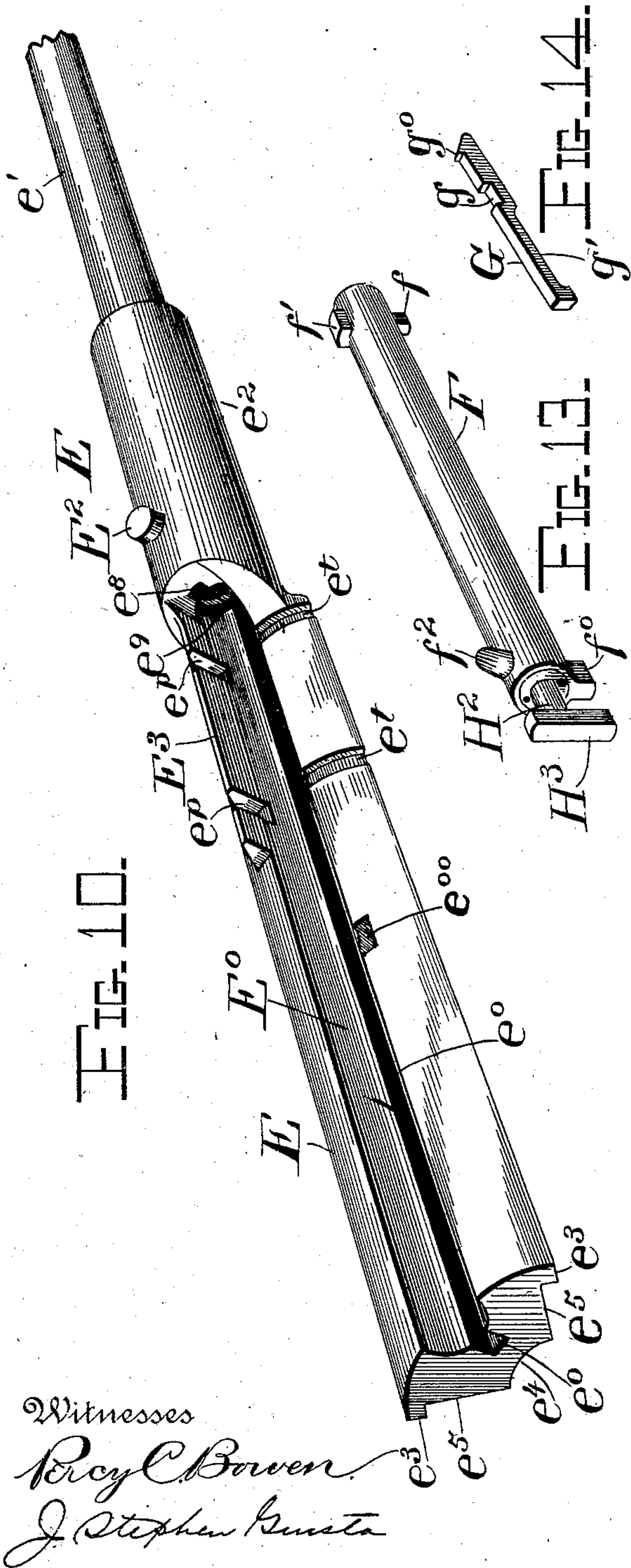
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AUTOMATIC GUN.

(Application filed Aug. 24, 1897.)

(No Model.)

4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

LOUIS LABADIE DRIGGS, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO DRIGGS-SEABURY GUN AND AMMUNITION COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

AUTOMATIC GUN.

SPECIFICATION forming part of Letters Patent No. 698,472, dated April 29, 1902.

Application filed August 24, 1897. Serial No. 649,369. (No model.)

To all whom it may concern:

Be it known that I, LOUIS LABADIE DRIGGS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Automatic Guns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in automatic revolving guns in which there are a plurality of barrels and in which each barrel recoils as it fires and exerts a part of the energy of the recoil in moving the other barrels toward the firing position.

My invention also consists of certain other novel features that will be more fully described and claimed.

Reference is had to the accompanying drawings, in which the same parts are indicated throughout the several views by the same characters.

Figure 1 represents a side elevation of the gun detached from its mount, parts being broken away. Fig. 2 represents a central vertical section through the gun along the line 2 2 of Fig. 5. Fig. 3 represents a view of the gun as seen from the muzzle. Fig. 4 represents a section along the line 4 4 of Figs. 1 and 2 and looking in the direction of the arrows. Fig. 5 represents a section along the line 5 5 of Figs. 1 and 2 and looking in the direction of the arrows. Fig. 6 represents a section along the line 6 6 of Figs. 1 and 2 and looking in the direction of the arrows. Fig. 7 represents an interior view of the two parts which are hinged together to form the casing of the gun. Fig. 8 represents a central vertical section through the gun-casing shown as removed from the gun and represents the cam-grooves therein. Fig. 9 is a diagrammatic view of the cam-grooves as developed. Fig. 10 is a perspective view of one of the barrels detached from the gun, parts being broken away. Fig. 11 is a longitudinal sectional view through one of the barrels near the breech thereof, showing the breech-block and firing-pin. Fig. 12 represents a section

along the line 12 12 of Fig. 11 and looking in the direction of the arrows, and Fig. 13 is a perspective view of one of the sliding breech-blocks, and Fig. 14 is a perspective view of one of the extractors.

In the several views the gun-mount and training and elevating gear are not shown; but any suitable gun-mount may be adopted, and the mount not being a part of my invention I have not considered it necessary to describe the same.

The several operative parts in the breech of the gun are inclosed in a casing which is composed of two parts A and A', hinged together, as at a^0 , and connected together by rods A² and A³. The upper part A' of the gun-casing is preferably reduced in diameter, as at a , to lighten the parts and form a bearing for the rear end of the spindle B. The rod A² preferably extends the full length of the gun-casing on one side of the gun, while the rods A³ are necessarily two or more in number to avoid passing through the hopper M; but the methods of hinging the two parts of the gun-casing together may be varied at will so long as the idea is carried out that the upper part of the gun-casing may be lifted when desired to allow free access to the mechanism inclosed therein.

The lower part of the gun-casing is provided with brackets A⁵, carrying trunnions A⁴, on which the gun is pivoted in the usual way, while rigidity is given to the lower member of the gun-casing by stiffening-ribs A⁶ and A⁸. The front stiffening-rib A⁶ carries the ring A⁷, which may be either cast integrally therewith or rigidly attached thereto, as may be preferred.

A central hollow spindle B is rigidly held in the rings C C', journaled on the ring A⁷ and in the front end of the gun-casing, and the rear end of the spindle B is shouldered, as at b , to fit in the cylindrical openings a^3 in the rear end of the gun-casing. The hand-wheel D is keyed onto this spindle and is held in place by the cap d , as shown most clearly in Fig. 2. The front end of this spindle B is keyed to the hub c of the ring C by means of the key c' and is preferably closed with a cap

b^3 . The ring C' is secured to this spindle B by means of the key c^2 . The barrels E have their cylindrical portions e and e' passed through cylindrical apertures in the rings C and C' , and thus these barrels are allowed to move longitudinally in the said rings. It will thus be obvious that if the hand-wheel D be turned, as when commencing to fire the gun, the barrels will be rotated about the axis of the gun. The portion of the gun-barrel surrounding the powder-chamber is also preferably cylindrical, as at e^2 , in order to obtain uniform strength about the axis of the bore. This portion of the gun-barrel is provided with a lug E^2 , which engages in the cam-groove A^9 in the gun-casing. (See Fig. 11.)

The gun-barrel consists of two principal portions, the barrel proper, comprising the cylindrical portions e^2 , e' , and e , and the rear portion or heel, which carries the breech-block or firing mechanism. This rear portion is provided with a groove E^0 , adapted to receive the cartridge and also to hold and guide the breech-block. The bottom of this semi-circular groove E^0 is scored out longitudinally, as at e^0 , to form a guide for the lug f^0 on the rear end of the breech-block F . The upper face of each barrel is rounded, as shown in Fig. 10, while the lower face is also rounded, as at e^4 , to fit snugly, but move freely on the spindle B . The sides of the heel of the barrel are preferably cut away, as at e^5 , whereby the friction of one barrel on the other is lessened and whereby the weight of the barrels is reduced somewhat. The extractor G also slides in this longitudinal groove e^0 and is provided with a hook g^0 , which is adapted to engage beneath the flange of the cartridge, as shown in Fig. 11. The lug f of the breech-block engages in the slot g of the extractor and draws the same to the rear as the breech-block is drawn to the rear, as will be hereinafter more fully described. The extractor is preferably cut away, as at g' , to give the requisite resiliency, the purpose of which is well known in the art. The breech-block is perforated to receive the firing-pin H , having the point h and the shoulder h' and the rearwardly-extending arm H^2 , around which fit loosely the sleeves K and K' , between which is held the firing-spring L . The sleeve K' is screwed into the rear end of the breech-block, closing the same, as shown in Fig. 11. The breech-block is provided with a lug f^2 , engaging in the cam-groove a^9 , by means of which the block is withdrawn and pushed forward into place as the gun rotates about its axis, and the arm H^2 of the firing-pin H is provided with a transverse cocking-arm H^3 , one of whose ends h^4 engages in the longitudinal groove e^0 in the barrel, while the opposite end h^3 catches onto and is released by the firing-wedge a^8 , as will be hereinafter more fully described. The upper portion of the bore of the barrel in rear of the cartridge-chamber is enlarged to form a longitudinal slot, as at e^3 , and this and

the lower slot or groove e^0 have wing-passages or bayonet-grooves e^9 , whereby the lugs f and f' of the breech-block may be allowed to swing to the left or to the position locking the breech-block in the barrel, as indicated in Fig. 12. A similar groove e^{00} is provided at one side of the groove e^0 to allow the lug f^0 of the breech-block F to pass into it, whereby the said breech-block is firmly held in position at the time of firing the gun.

A hopper M , having an outer flat side m , is secured to the upper member of the gun-casing, and in this hopper the feed-wheel P , having hooked teeth p , is journaled, as on the pin M' . The cartridges R are fed to the gun on a feed strip or belt Q , having pairs of flexible teeth q , holding the cartridges, as is well known in the art. The cartridges are from there guided into the gun, and the empty shells are guided out by means of curved plates T , connected together by the web T' . These curved plates are provided with guide-arms t to facilitate the passage of the cartridge into the gun and guide-arms t' and t^2 to facilitate the passage of the empty shells out of the gun. The barrel is provided with the lug E^3 , indented by the grooves e^p , in which the teeth p of the feed-wheel P pass. This lug E^3 bears against the cartridges *seriatim* and feeds the cartridges to the cartridge-chamber of the barrel, at the same time turning the feed-wheel P through an angle corresponding to one tooth. Thus each barrel takes a cartridge from the feed-wheel and turns the latter in position to deliver a cartridge to the next barrel. The plates T project into the grooves e^t in the barrel, whereby any possibility of these plates catching in the cartridge-shell either when loaded or empty, and thus jamming in the gun, is obviated.

The grooves A^9 and a^9 are arranged as shown developed in Fig. 9, and the operation of the gun will best be understood by reference to this figure. When the lug E^2 of the barrel is at the position indicated by the numeral 1 in this Fig. 9, the lug f^2 on the breech-block is at the position indicated by the numeral 1⁰, and when in this position the cartridge would be in the groove E^0 and partly entering the cartridge-chamber, while the breech-block would be about half-way home or half-way between the open and the closed position. As the barrel continues to revolve the lug E^2 would reach the position 1^x, while the cocking-arm H^3 would just begin to ride over the cocking-wedge a^8 . The parts would then be in the position shown in Fig. 11. A very slight further movement of the barrel about the axis of the gun will cause the cocking-arm H^3 to ride up over the cocking-wedge a^8 and pass over the releasing edge a^{08} , and the spring L would throw the firing-pin forward, firing the cartridge. It should be mentioned that before the cocking-arm H^3 begins to ride up over the cocking-wedge a^8 the lug f^2 of the breech-block will engage the projection a^7 in

the cam-groove a^9 and will turn the breech-block from the position indicated in dotted lines in Fig. 6 to that shown in full lines in the said figure. In this manner the breech-block will be turned through a sufficient angle to lock the same in the firing position. When the cartridge is fired, the lug E^2 will be in the position indicated by the numeral 2 in Fig. 9, while the lug f^2 will be in the position indicated by the numeral 2⁰. The shock of the discharge will cause the barrel to recoil to the rear from 2 to 3. Since the groove A^9 is in the fixed casing, the barrel will revolve upon the axis of the gun. At the same time the barrel is recoiling from 2 to 3 the breech-block also recoils; but the angle of the groove a^9 from the point 2⁰⁰ to the point 3⁰ being less acute than the angle from 2⁰ to 2⁰⁰ a torsional motion is given to the breech-block relative to the barrel, and this block is turned through a sufficient angle to unlock the same from engagement in the barrel; and when the lug f^2 reaches the position 3⁰ the breech-block is revolved far enough about its axis to be freely slid in the groove e^0 . At the time that this barrel and the corresponding breech-block have arrived at the position 3 and 3⁰ a second barrel has arrived at the position 2 and 2⁰ and operating like the first barrel revolves the first barrel to the position 4 and 4⁰. In revolving from 3 to 4 the first barrel is cammed to the front by the groove A^9 between these numbers 3 and 4; but the breech-block is held to the rear by that part of the groove a^9 between the points 3⁰ and 4⁰, and in this manner provision is made for the insertion of a fresh cartridge between the breech-block and the cartridge-chamber of the barrel. As the gun continues to revolve from 4 to 1 the barrel remains in the front position, while the breech-block is pushed to the front by the action of the cam-groove a^9 , and is finally locked in position by the further action of this groove after it brings up against the base of the cartridge. It will be seen that as the barrel returns to the initial position, as in passing from 3 to 4, the breech-block remains stationary; as in passing from 3⁰ to 4⁰, and the extractor G will extract the empty shell from the cartridge-chamber; and as the gun continues to rotate this empty shell will be expelled beneath the plates T , as shown in Fig. 5. In order to start the gun, it will be necessary to turn the hand-wheel D sufficiently to fire the first cartridge, after which the gun will be automatic in its action, each cartridge bringing the gun into the firing position for the next, and so on, it being only necessary that the gun servants keep the gun pointed on the object and keep it supplied with ammunition. If it be desired to use practice charges only, as with dummies, a hand-crank might be substituted for the wheel D .

It will be seen that in this improved revolving cannon the advantage of a plurality of barrels is obtained, where each barrel does its own share of the work and may be used

in combination with the other barrels or operated entirely alone in case the operating parts of the other barrels or the firing mechanism therefor should become disabled. Another obvious advantage of using a number of barrels, as in this improved automatic gun, over those automatic guns in which a single barrel is used is that the barrel will not heat up so rapidly nor wear out so rapidly, and thus the parts will be less likely to jam from excessive heating, and, moreover, the life of the gun will be increased in a degree corresponding to the increase in the number of barrels. It will also be obvious that while I have shown four barrels that number may be increased or diminished.

It will be obvious that the hand-wheel D serves also as a fly-wheel, and if a sufficient rotary velocity be imparted to the spindle B this fly-wheel will serve to assist in carrying the moving parts over a dead-center, such as might occur should one of the cartridges prove defective or should one or more of them be omitted from the feed-belt. By making this hand-wheel of sufficient size a considerable rotary effect may be obtained thereby. This effect, it will be obvious, is accumulated with that of the other parts rotating about the axis of the gun.

It will be noted that each barrel is locked against rearward motion in the gun-casing a large portion of the revolution of the spindle B and that this especially takes place immediately preceding the time when the barrel reaches the firing position. Furthermore, it will be obvious that the breech-block is firmly locked in the barrel for an appreciable interval before the firing-pin is cocked and also for a considerable period after the firing-pin has plunged forward, striking the base of the cartridge. In this way danger to the moving parts from hanging fire is avoided.

It will be noted as among the special features of this improved gun that the lugs f' and f near the front end of the breech-block are securely locked in the banded grooves e^9 immediately before and for an appreciable interval after the discharge of the cartridge. The fact that this breech-block is supported at its forward end in immediate proximity to the cartridge is of especial advantage, as in guns of similar type hitherto manufactured the principal support for the breech-block has been at or near the rear end thereof, causing a yielding effect, due to the resiliency of the breech-block, and tending to injure the parts or to jam the cartridge or cause the same to jam in the gun or affect the proper action of the extractor.

If at any time it be desired to obtain access to the moving parts, as for inspection or repair, it will be a simple matter to withdraw the rod A^2 and swing the upper portion A' of the gun-casing about its hinges on the other side.

It will be obvious that a great many other modifications might be made in the herein-

described apparatus which could be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an automatic gun, the combination with a gun-casing, a spindle journaled concentric with said casing, a plurality of barrels having rearwardly-extending heels grouped around said spindle and rotating therewith, guides mounted on said spindle and allowing said barrels to move longitudinally relative to said spindle, and interacting cam-surfaces between said barrels and said gun-casing, whereby as each barrel is fired, the said barrel recoils and rotates said spindle, substantially as described.

2. In an automatic gun, the combination with a gun-casing, a spindle journaled concentric with said casing, a plurality of barrels having rearwardly-extending heels grouped around said spindle and rotating therewith, guides mounted on said spindle and allowing said barrels to move longitudinally relative to said spindle, and interacting cam-surfaces between the exterior of said barrels and the interior of said casing, whereby said barrels cause said spindle to rotate about its axis as each barrel recoils, and means for loading cartridges into said barrels for firing the same, substantially as described.

3. In an automatic gun, the combination with a gun-casing, a spindle journaled concentric with said casing, a plurality of barrels having rearwardly-extending heels grouped around said spindle and rotating therewith, guides mounted on said spindle and allowing said barrels to move longitudinally relative to said spindle, and interacting cam-surfaces between the exterior of said barrels and the interior of said casing, whereby said barrels are caused to rotate said spindle about its axis as the barrel recoils, and means operated by the rotation of the said barrels about said spindle for feeding the cartridges to and for ejecting the same from the said barrels, and automatically-operated means for firing said cartridges, substantially as described.

4. In an automatic gun, the combination with a group of barrels adapted to rotate about a common axis, and each provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel and lugs or projections engaging in said slots, means operated by the shock of discharge for rotating said group of barrels about said common axis, and for moving said breech-block in said slots from the open to the closed position and vice versa, means for loading said barrels, a spring-operated firing-pin mounted in each of said breech-blocks, and means for automatically cocking and releasing the same substantially as described.

5. In an automatic gun, the combination with a group of barrels adapted to rotate about a common axis, and each provided with a rear-

wardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, means operated by the shock of discharge for rotating said group of barrels about said common axis and for moving said breech-block in said slots from the open to the closed position and vice versa, means also operated by the shock of discharge for loading said barrels *seriatim*, a spring-operated firing-pin mounted in each of said breech-blocks, and means for automatically cocking and releasing the same, substantially as described.

6. In an automatic gun, the combination with a group of barrels adapted to rotate about a common axis but to recoil parallel to said axis, and each provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, means operated by the recoil of each barrel for rotating the said group of barrels through a given angle about said common axis, and for moving said breech-block in said slots from the open to the closed position and vice versa, means for loading said barrels, a spring-operated firing-pin mounted in each of said breech-blocks, and means for automatically cocking and releasing the same, substantially as described.

7. In an automatic gun, the combination with a group of barrels adapted to rotate about a common axis but to recoil parallel to said axis, and each provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, means operated by the recoil of each barrel for rotating the said group of barrels through a given angle about said common axis, and for moving said breech-block in said slots from the open to the closed position and vice versa, means operated by the recoil for loading said barrels, a spring-operated firing-pin mounted in each of said breech-blocks and means for automatically cocking and releasing the same, substantially as described.

8. In an automatic revolving cannon the combination with a gun-casing, a spindle journaled concentric with said casing, a plurality of barrels grouped around said spindle and adapted to rotate therewith and also to move longitudinally relative to said spindle, each barrel being provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, a spring-operated firing-pin mounted in each of said breech-blocks, interacting cam-surfaces provided between said barrels, said breech-block, said firing-pin and said gun-casing, whereby as each barrel is fired, the said barrel recoils and rotates said spindle, and the breech-block is brought from the closed to the open position and the firing-pin is operated, and means for loading cartridges into said barrels, substantially as described.

9. In an automatic revolving cannon the combination with a gun-casing, a spindle journaled concentric with said casing, a plurality of barrels grouped around said spindle and adapted to rotate therewith, and also to move longitudinally relative to said spindle, each barrel being provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, a spring-operated firing-pin mounted in each of said breech-blocks, interacting cam-surfaces provided between said barrels, said breech-block, said firing-pin and said gun-casing, whereby as each barrel is fired, the said barrel recoils and rotates said spindle, the breech-block is brought from the closed to the open position and the firing-pin is operated, and means operated by the rotation of the said barrels about said spindle for feeding the cartridges to and for ejecting the same from the said barrels, substantially as described.

10. In an automatic revolving cannon the combination with a gun-casing, a spindle journaled concentric with said casing, a plurality of barrels grouped around said spindle and adapted to rotate therewith, and also to move longitudinally relative to said spindle, each barrel being provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, a spring-operated firing-pin mounted in said breech-block, interacting cam-surfaces provided between said barrels, said breech-block, said firing-pin and said gun-casing, whereby as each barrel is fired, the said barrel recoils and rotates said spindle, the breech-block is brought from the closed to the open position, and the firing-pin is operated, and means operated by the rotation of the said barrels about said spindle for feeding the cartridges to and for ejecting the same from the said barrels, substantially as described.

11. In an automatic revolving cannon, the combination with a gun-casing provided with cam-grooves therein, a spindle journaled concentric with said casing a plurality of barrels grouped around said spindle and adapted to rotate therewith and also to move longitudinally relative to said spindle, each barrel being provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, a spring-operated firing-pin mounted in said breech-block, lugs on said barrels, on said breech-blocks and on said firing-pins engaging in said cam-grooves in said gun-casing, whereby as each barrel is fired, the said barrel recoils and rotates said spindle and operates said breech-block and said firing-pin, substantially as described.

12. In an automatic revolving cannon, the combination with a gun-casing provided with cam-grooves on the interior thereof, and a spindle journaled in said casing, of a plurality of barrels grouped about said spindle,

and adapted to move longitudinally relative thereto, each barrel being provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, a spring-operated firing-pin mounted in said breech-block, lugs on the exterior of said barrels, on said breech-blocks and on said firing-pins engaging the cam-grooves in said casing, whereby said barrels cause said spindle to rotate about its axis as the barrel recoils and said breech-blocks and firing-pins are operated, and means operated by the recoil for loading cartridges into said barrels, substantially as described.

13. In an automatic revolving cannon the combination with a gun-casing provided with journal-bearings and cam-grooves, of a spindle journaled in said bearings, a plurality of barrels grouped around said spindle and adapted to rotate therewith and also to move longitudinally relative to said spindle, each barrel being provided with a rearwardly-projecting heel with slots therein, of a breech-block mounted in said heel with lugs or projections engaging in said slots, a spring-operated firing-pin mounted in said breech-block, lugs on the exterior of said barrels, on said breech-block and on said firing-pin, engaging said cam-grooves in said gun-casing, whereby as each barrel is fired, the said barrel recoils and rotates said spindle and operates said breech-block and said firing-pin, substantially as described.

14. In an automatic revolving cannon, the combination with a substantially cylindrical shell or casing provided on the inner surface thereof with two cam-grooves of varying pitch, the front cam-groove being essentially V-shaped when developed, and the rear cam-groove having a small part of its length parallel to one of the sides of the V of the front groove and then approaching said side at a slight inclination, with a slight elevation in one portion of the said rear groove, of a spindle journaled in the center of the cylindrical shell, longitudinally-movable barrels grouped about said spindle and each having a rearwardly-extending heel with a longitudinal slot therein and slots transverse to said longitudinal slot, a lug or projection on each of said barrels engaging in the front cam-groove, and a breech-block mounted in rear of the cartridge-chamber, and having lugs adapted to engage in said slots, and also a lug adapted to engage in said rear cam-groove, substantially as described.

15. In an automatic revolving cannon, the combination with a substantially cylindrical shell or casing provided on the inner surface thereof with two cam-grooves of varying pitch, the front cam-groove being essentially V-shaped when developed, and the rear cam-groove having a small part of its length parallel to one of the sides of the V of the front groove and then approaching said side at a slight inclination, with a slight elevation in

one portion of the said rear groove, and a
cocking-wedge also provided on the interior
of the casing, of a spindle journaled in the
center of the cylindrical shell, longitudinally-
5 movable barrels grouped about said spindle
and each having a rearwardly-extending heel
with a longitudinal slot therein and slots
transverse to said longitudinal slot, a lug or
projection on each of said barrels engaging
10 in the front cam-groove, and a breech-block
mounted in rear of the cartridge-chamber,
and having lugs adapted to engage in said

slots, and also a lug adapted to engage in
said rear cam-groove, and a spring-operated
firing-pin having a cocking-arm adapted to 15
engage said cocking-wedge, substantially as
described.

In testimony whereof I affix my signature
in presence of two witnesses.

LOUIS LABADIE DRIGGS.

Witnesses:

A. Y. LEECH, Jr.,
V. C. TASKER.