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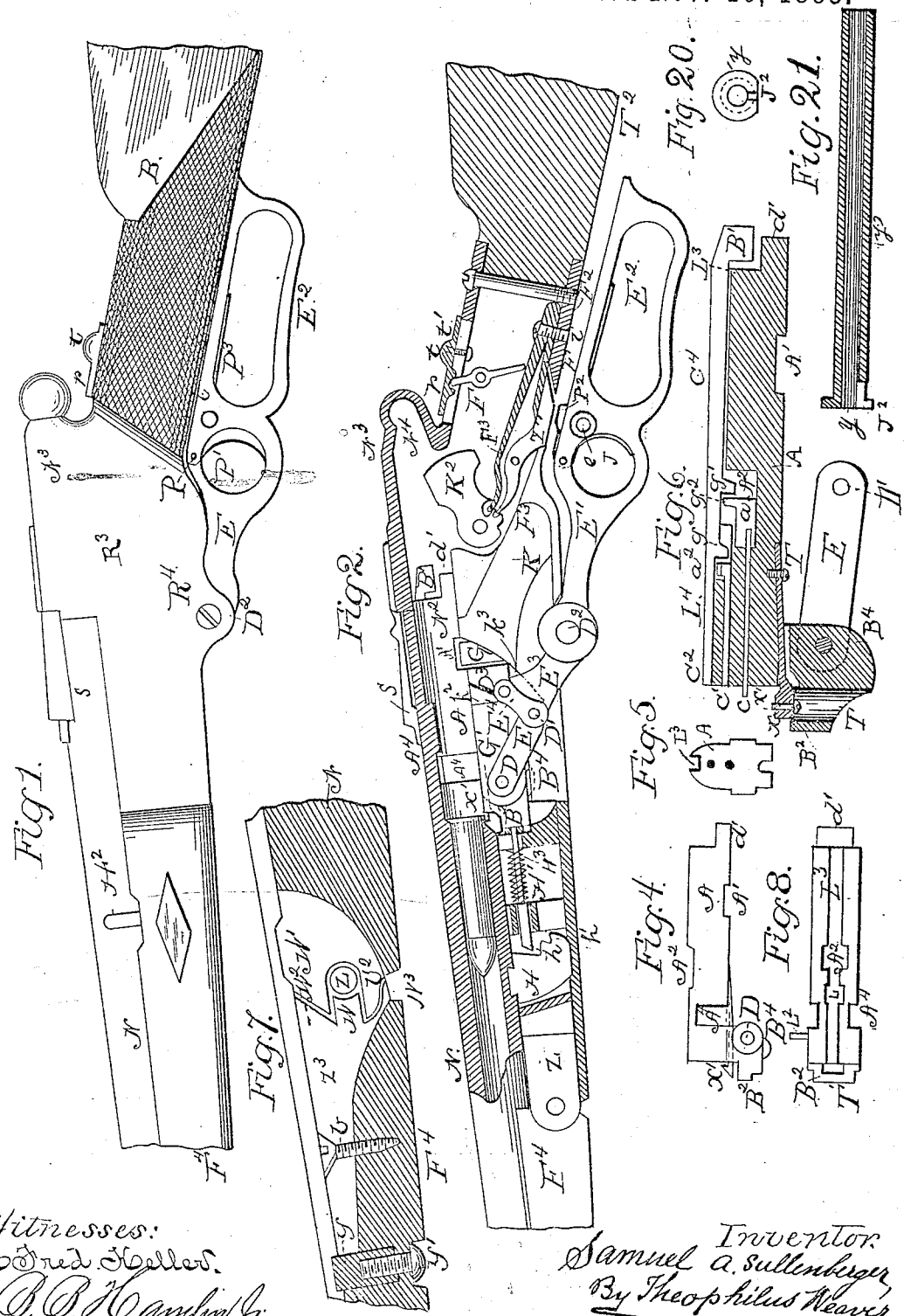
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(Model.) 2 Sheets—Sheet 1.

S. A. SULLENBERGER.

BREECH LOADING FIRE ARM.

No. 330,354. Patented Nov. 10, 1885.



Witnesses:
Fred. Keller.
B. B. Hamlin Jr.

Inventor.
Samuel A. Sullenberger,
By Theophilus Weaver,
His Atty.

N. PETERS. Photo-Lithographer. Washington, D. C.

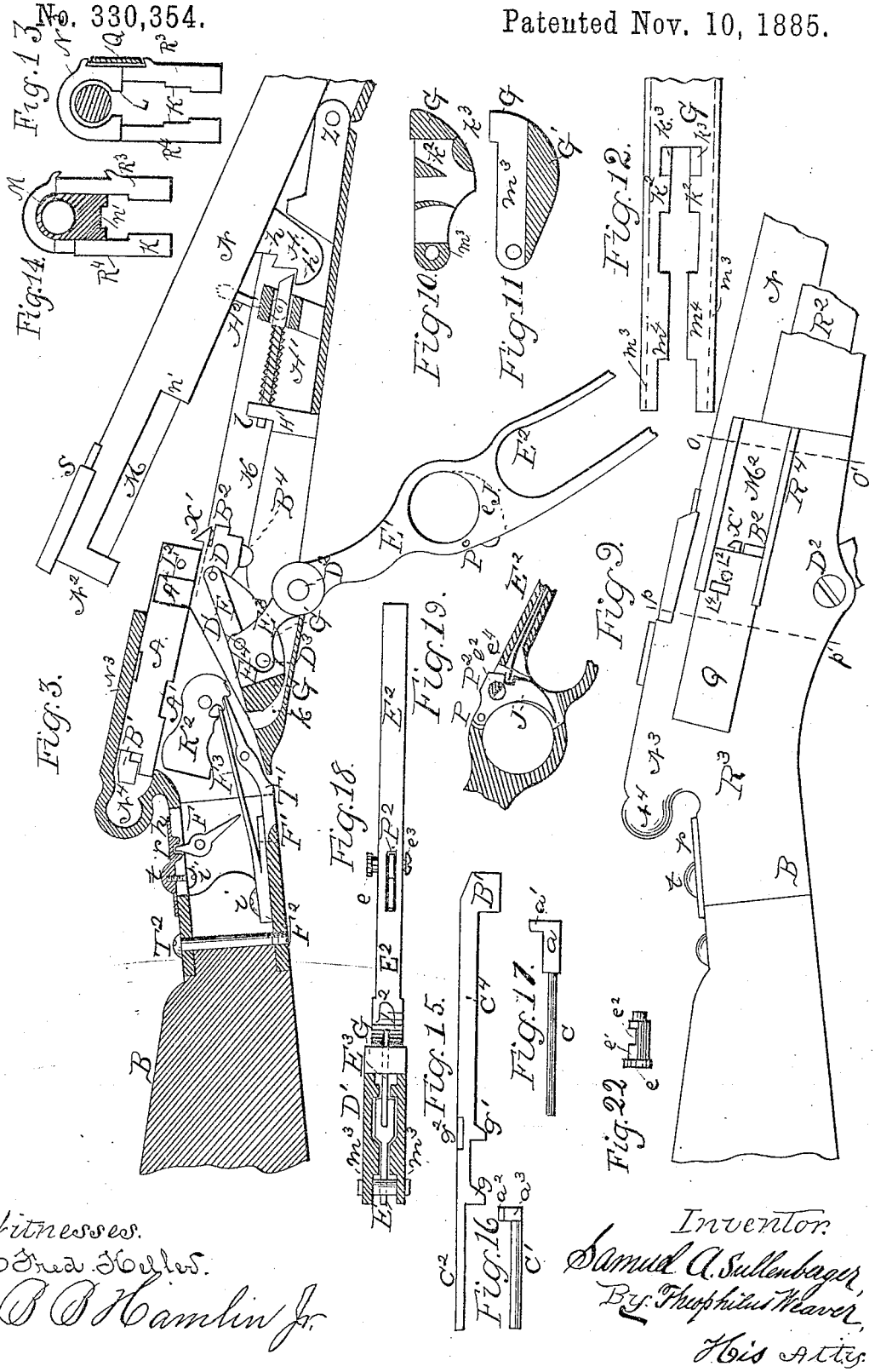
(Model.)

2 Sheets—Sheet 2.

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BREECH LOADING FIRE ARM.

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Fred. Hoyles.
B B Hamlin Jr.

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By Thompson & Weaver,
His Attys.

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UNITED STATES PATENT OFFICE.

SAMUEL A. SULLENBERGER, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO THEOPHILUS WEAVER AND ELIAS Z. WALLOWER, BOTH OF SAME PLACE.

BREECH-LOADING FIRE-ARM.

SPECIFICATION forming part of Letters Patent No. 330,354, dated November 10, 1885.

Application filed May 8, 1884. Serial No. 130,939. (Model.)

To all whom it may concern:

Be it known that I, SAMUEL A. SULLENBERGER, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Breech-Loading Fire-Arms; and I do hereby declare that, in connection with the accompanying drawings, the following is a full, clear, and accurate description of my said invention.

In said drawings, Figure 1 represents a side elevation of my fire-arm with parts in position for firing. Fig. 2 represents a longitudinal sectional view of the breech-end plan of works of my gun, taken through its middle, the broad way, and showing parts of stock broken away and parts in perspective view. Fig. 3 represents a side elevation of same (barrel in tilted position,) with mechanism in position for inserting auxiliary barrel, and breech-chamber open vertically below. Fig. 4 represents a side elevation of the breech-bolt. Fig. 5 represents a front view of the same. Fig. 6 represents a longitudinal section of breech-bolt, firing-pins, extractor, and connector. Fig. 7 represents a sectional view of break-down joint at fore end. Fig. 8 represents a top view of breech-bolt. Fig. 9 represents a right-side elevation of my fire-arm, its ends and operating-lever broken away and charge-slide open. Fig. 10 represents a longitudinal section of my breech-brace, taken vertically. Fig. 11 represents a right-side elevation of the same, and Fig. 12 represents a top view of the same. Fig. 13 represents a cross-section of my breech-chamber, taken at the line $p\,p'$, and showing also slotted ring or locking-abutment in section. Fig. 14 represents a cross-section of breech-chamber and receiver, taken at the line O O', as viewed from the rear. Figs. 15, 16, and 17 represent longitudinal elevations of the rim or maximum fire pin, the mid-range, and the center-fire pins, respectively. Fig. 18 represents an edge view from above of operating-lever, connector, and breech-brace connected and in position, as in Fig. 3. Fig. 19 represents plan of trigger and its stop device. Fig. 20 represents a side view of my auxiliary barrel. Fig. 21 represents a rear end view of the same. Fig. 22 represents a vertical section of operating-lever at the portion containing the trigger.

Similar letters denote similar parts and portions in all views.

The object of my invention is to provide a fire-arm adapted to use auxiliary barrels conveniently and all calibers of cartridges from the maximum, or No. 50, to the minimum, or No. 22, inclusive, and that will extract the shells of the same automatically by adjustable means; that is of simple and effective mechanism enabling thirty to forty loads to be fired per minute; that is suitable for remodeling old government muskets, using the lock now on them; and that can for latter purpose be made without the break-down feature, as the breech-loading is effected without exterior unshipping of parts in course of firing, and the arm is a safety device in the trigger and hammer mechanisms.

Some particular, novel, and useful features of my invention are, in brief, first, an extension of butt of tilting-barrel adapted both as section of receiver and lock-down abutment, with breech-bolt inserted in latter and in fixed guide on breech-chamber equipped and operating to perform the functions of locking down the barrel and breeching the same simultaneously; second, the longitudinally-movable breech-bolt peculiarly guided and adapted with breech-brace hinged thereto, in connection with operating mechanism, to stand in firmly interlocked position against the butt of the barrel, and to retreat for release of the barrel, ejection of shells, and charging; third, means for completing interlocked position of breech-brace, breech-bolt, and guides for latter, and for quick release of brace; fourth, sectional receiver with automatic slide for closing and opening entrance thereto; fifth, bottom exit for shells in breech-chamber and works adapted to eject same below; sixth, universally adapted fire-pins; seventh, combinations of coacting mechanisms.

In reference to drawings, letter N denotes the barrel, provided with rearward extension M N^2, integral with its butt-end n', and ar-

ranged as a prolongation of its upper side and having the sight of usual form thereon.

M denotes the receiver, open below and forming, in conjunction with the upper edge of wall R^1 of breech-chamber, the opening M^2 on right side of gun for inserting thereat the cartridges manually in charging the fire-arm. Said opening is wholly rearward from barrel, and so situated below said extension that fragments of shells or fire cannot reach the face of the gunner. Rearward from the receiver M is the ring-section N^3, also integral with the butt of the barrel, and having interiorly the same bore as said receiver, and axially in line with the bore of barrel. Said ring-section is vertically slotted below at L in line with axis of said bore, as a means for locking thereby said extension and barrel down axially in line with the cylindrical breech-bolt A by embracing it, as follows: Said breech-bolt has a longitudinal movement in line with the axis of the barrel and is guided, mainly, in the bore of the rear fixed tubular extension, N^3, formed as an integral part of the breech-chamber. Said bolt has near its front end a reduced portion, A^4, between shoulders, adapted to let said ring-section N^2 drop over it, by way of slot L therein, until the axis of said barrel and bolt coincide, the latter being retracted to position, shown in Fig. 3. After said ring-section is down over said notched part of breech-bolt and the latter has been advanced, as in Fig. 2, the barrel is locked down by said ring-section embracing the round or unnotched portion of said bolt. The front edge of said ring-section serves as a rear abutment, against which the foot G of the breech-brace G G′ sets to brace said bolt in position while breeching gun. Said breech-brace is hinged at its front end or tenons, m^3, to the slider B^4, under and a part of the front end of said bolt A. Said brace and bolt are coacting breech-pieces, and have reciprocating movements imparted to them for advancing and retracting them or for breeching and unbreeching the gun by means of the operating-lever $E' E^2 E^3$, connected to said slider by the link or connector E. The travel of said bolt is rectilinear, and that of said brace is curvilinear at its foot end, G, since the latter is caused to sheer off from the path of said bolt into a side rear retreat, *k*, both by the guiding ledges K on the insides of the breech-chamber wall and by the eccentric movement of the studs D^3 on arm E^3 in connection with cams k^2 k^3, on the insides of the recess in said block G G′, which latter action is more particularly to be noted as follows: The principal extent of the reciprocating and sheering movements of said brace is effected by the lever $E' E^2 E^3$ and the link E, connecting said parts together at the pivots D D′. Near the end of the forward movement of both breech-pieces said pivots D D′ and the lever-fulcrum D^2, are nearly in a straight line, constituting a knee-joint of well-known power. When the middle pivot, D′, reaches said line, the bolt has completed its movement, but the front end of said brace has then given it a final upward movement to embrace said bolt, causing the foot G of brace G G′ to step or swing into the notch A′ on under side of bolt A; also to embrace by its front end the ring-section N^2, as shown in Fig. 2. The means for imparting to said block said final upward movement are the studs D^3, arranged oppositely in line on the wrist E^4 of the arm E^3 of said lever, and the eccentric cams k^2, arranged oppositely on the insides of the recess in said block G G′, which studs engage said cams to push the end G upward quickly, as stated, to embrace said bolt and ring-section, thus effecting a powerful interlocked position of said parts the moment said pivot D has crossed said line. In said position of the parts the operating-lever $E' E^2$ E^3 is drawn by tension or stress of parts sprung at said knee-joint over the line joining the pivots thereof to hug the stock B, and the action of explosion of the load keeps the lever pressed thereto. The breech-closers are therefore self-sustained against recoil. By reversing the movement of said lever for unbreeching the gun said studs D^3 on part E^4 act instantly against the oppositely-arranged similar cams, k^3, inside said block G G′, for drawing its end G quickly down away from said notch A′ and ring-section N^2 before the return movement of breech-bolt A has begun. The momentary delay, while pivot D′ is passing beyond the line joining the pivots D D^2, is thus employed for starting and completing the movement of the breech-brace. Said studs may be anti-friction rollers. The said bolt A, having hinged thereto as its support-brace G G′, in advancing to position for breeching is at front guided by the shoulders or slider B^4, riding on the ledges K, which latter abut from the walls inside the breech-chamber. An end portion, B^2, on said slider also then rests on the bench H′. Said slider is recessed vertically and longitudinally at T′, and in the recess the extractor T is attached to the under side of bolt A. The catch X′ of the extractor is provided with a screw, X, arranged vertically in it, having its point beveled to correspond with the strike of that of the extractor. It is thereby adjusted for all sizes of shells, as the screw X can be set to catch the smaller sizes of them. Said breech-brace may be cast as one piece, having on its insides the fillings M^4, and said cams k^2 k^3 of such lateral thickness that when the link E, provided with clevis end, and the arm E^3, pivoted thereto, are in the recess in the said brace, as shown in Fig. 18, the vacant space may be as little as possible for securing adequate strength of the parts within small compass. On the exterior, at upper portions of said brace, are the ledges M^5, adapted to ride on ledges K on the adjacent inner sides of breech-chamber.

My breech-bolt A has in its upper portion a longitudinal groove, L^3, from end to end thereof, for guiding therein the top-fire pin

C^2, and has in it bores for guiding therein the center-fire pin C and the mid-range fire-pin C'. Said bolt has in it, along said groove L^3, wider rectangular recesses A^2 L, communicating with each other by said groove. The rear ends of said recesses serve as stops for extensions a^2 g^2 on the tops of the fire-pins C' and C^2, respectively, to permit their throw rearward. The rear end or head, *a*, of pin C is stopped by the rear end of the recess A^2 when pin is not used; or said head is stopped by the detent *g'* when said pin C is used. On the under side of the bar of pin C^2 are the catches *g g'*, adapted to couple said pin with either or both the other pins, C C', as shown in Fig. 6. The pin C^2 lifts off said bolt A when the latter is advanced and the gun is broken down. After said pin is lifted off, and before replacing it, the other pins, C C', may be set as desired, that any one of them may be projected to cause the explosion when the hammer K^2 strikes the head B' of pin C^2, and the other pins shall be stopped from coming forward at the same instant more than flush with the face of the front end of said bolt. The bar C^4 of pin C^2 is kept down in said groove by the receiver when the barrel is in normal position for firing. When said pins are adjusted to be in positions as shown in Fig. 6, by pushing back the point of pin C, as the cartridge will do when the bolt A is brought forward against it in breeching the gun, the head B' of pin C^2 will then be in position to receive an effectual blow from the hammer K^2, and pin C^2, by its contact with pin C, is in position to deliver the blow to the latter, and thereby to produce a center-fire blow on cartridge. When either of the other pins, C' C^2, are set to project at the point beyond said bolt, the blow of the hammer K^2 may produce a side or a rim fire of cartridge. The pin C' is made to be a little thicker than the other pins, or it may be radially oval that its front end may strike the rims of all sizes of cartridges in common use, which the pin C^2 may not strike, so that said two pins will answer for rim-firing of all cartridges in common use. The fire-arm is therefore adapted to cartridges of all sizes to either way of firing them, and to shells of all lengths, as the extractor has sufficient longitudinal movement to extract shells of maximum length, and the extractor's catch X' may be adjusted or changed by screw X to seize all calibers from the maximum to the minimum inclusive.

Breech-bolt A is provided with rear projection, *d'*, of nearly equal rearward extension as that of the pin-head B', which projection is a shield or relief for the extractor T as follows: The hammer K^2 is turned back to cocked position by contact with the rear end of said part B' and part *d'* when the bolt A is being retracted by action of operating-lever E' E^2 E^3. The pressure of said hammer against part B' operates to project the point of the pin which for the time is used, and thereby acts to push against the shell and to disengage it from the catch of the extractor before it is fully extracted. To obviate said interference with its function, the guard *d'* is made to receive on it the pressure of said hammer after the rearward movement of bolt A has begun, thus mediately protecting the extractor. Said hammer K^2 is actuated to strike by a spring, F^3, and it is held set by the sear T' in positions, as shown. The spring F', actuating said sear, is united to spring F^3 at the screw *i* at their butt-ends F^2. A pivoted lever, F, is operated by contact with teeth on a sliding plate, *r*, to set its limb in position on spring F^3, as shown in Fig. 3, to suspend the action thereof when desired, and serves as a safety-stop for the hammer. Said plate *r* is retained on tang or grip of the gun by the head of screw *t'*. Said head bears against the under side of said tang, while the stem of said screw works in a longitudinal slot in said tang, and the screw sets in a knob or thick part of said plate.

The operating-lever E' E^2 E^3 has pivoted to it a trigger, J, whose nose P^2, by contact with sear T', trips it in firing. Through said lever and through said trigger pivoted in slot therein is transversely inserted the rotary stop-piece *e*, for regulating the set of said trigger. The shank *e'* of said piece is cylindrical, having about half its thickness cut away by the notch e^2 therein, which is so adapted that when the stop is turned, as shown in Fig. 19, the trigger is stopped thereby, that it shall not swing about its pivot P, and that when said shank *e'* is turned a half-revolution from said position then said trigger shall be free to swing about said pivot, it being retracted by the flat spring e^4 engaging it, as shown. Said stop-piece is secured in said lever by screw e^3, or by simply riveting its end. When said nose P^2 is kept projected fixedly or set, the said lever itself may be handled or gripped as the trigger. When the said grip device is not preferred, as in target practice, said stop-piece *e* is adjusted to free the trigger J, and then it may be operated distinctly from said lever or after the latter has been gripped against the stock B. For rapid firing, as in army use, the set trigger may be preferred, as more rapid, the same lever thus serving to cock, breech, and trig the arm.

The fore end, F^1, is attached to barrel N by means of brace Z^3 affixed to it by screw V. The front end of said brace abuts against a part, *y*, in which is inserted the screw *y'*, for securing the said fore end to barrel. The opposite end of said brace is provided with tenon W, adapted to brace against the pintle Z of the hinge connecting the barrel. On either side of said tenon are the projections W^2 and W^3, for embracing, respectively, a scarfed part of knuckle, W', and the tang V^2 thereon, so as to lap beyond the former and to re-enforce the latter by embracing it in front and laterally. Rearward from said hinge is a limiting-stop therefor, consisting of lug H, provided with catches *h h'* on its edge farthest

from the pintle Z, and of plunger H′. The catch *h′* being farther from the hinge center than the catch *h*, when said plunger is disengaged from the latter and barrel N drops down, the catch *h′* will catch on the plunger and arrest the break-down or fall of barrel. By special effort the plunger can also be freed from the catch *h′* and barrel be let drop fully, as follows: Said plunger H′ is pivoted to lever H^2, by which it may be retracted to free its jaw from said catches *h h′*. The spiral spring H^3, inserted around the plunger-stem *l*, between its head and abutment H′, holds the plunger pressed to its place of duty. Its action is automatic at raising barrels. The rear end of said stem *l* serves as a detent in part B^2 on breech-bolt A, to keep down its front end when barrel is tilted, thus avoiding displacement of parts should the gun be inverted in adjusting the fire-pins. The head of the breech-bolt A is of a little greater caliber than the rim of the maximum cartridge, that it may prevent rim-explosions in firing. Near the front end of the breech-bolt A, on its right side, is a projection, L^2, adapted to come against the lug L^1 on the inner side, and near the front end of the slide Q Q′, to push the latter back automatically when said breech-piece is retracted in the operation of extracting shell. Said slide-stays open after being pushed back, leaving the receiver accessible for reloading. Said slide can be removed from its guiding ledges by simply pushing it forward after barrel is tilted. In replacing it, said lug thereon must come rearward from said projection on the breech-bolt. Said lug serves as a stop to limit the rearward movement of said slide.

The operating-lever E′ E^2 E^3 swings about the screw D^2, as its fulcrum and sole retainer, by removing which said lever, breech-bolt A, and breech-brace G G′, all pivoted together, may be connectedly removed from the breech-chamber in the upward direction, the barrel being tilted.

My auxiliary barrel is made with uniform smooth tube y^2, having caliber to fit snugly in the bore of gun-barrel, and having its rear end provided with collar *y* of a diameter to fit the receiver M, and to pass freely through the bore of the ring-section N^2. Said collar and the end of the tube thereat have in them the radial slot J^2, adapted to allow the smaller extractor catch or screw X to reach through it and catch smaller shells in the auxiliary barrel, but not to allow the larger or main extractor-catch X′ to pass through said slot. The exterior parts of said collar at said slot are planed away to a chord line a little outside of the barrel's circumference, thus forming shoulders, whereat said larger catch X′ may seize the auxiliary barrel to withdraw it partially when there is no shell in it on which the smaller catch X may act. When the smaller catch is regularly at work in extracting shell, the larger catch X′ is thereby not permitted to catch on said shoulders. When, however, the auxiliary barrel is empty, or the catch X is adjusted back that its point shall coincide with the incline of catch X′, the latter will come up and seize said shoulders. When, now, the lever E′ E^2 E^3 is operated, as for extracting the shell, said catch X′ will move the auxiliary barrel back sufficiently to enable the gunner to seize it by hand and remove it entirely after the gun is broken down.

For remodeling the old army needle-gun, the barrel is inverted and the breech-pieces are made to conform to the butt extension thereon. In remodeling muskets having the old fire-lock, the same lock can be used with the hammer arranged interiorly.

I do not claim the use of ratchet-formed lug and a plunger or stop, broadly, for regulating the drop of the barrel in breaking the gun, as other analogous devices are shown in English patent to Redman and Kirkwood, No. 1,888, of 1864, and in patent of J. Tonks, March 7, 1882, No. 254,728; but

I claim—

1. In a breech-loading fire-arm, the combination of barrel normally untilted provided with tubular extension normally closed on top and open below and on right side, constituting with cut-away portion of breech-chamber wall the receiver, with the ring-section on rear end of said extension of the same bore as said receiver, a tubular fixed guide on breech-chamber having corresponding bore and arranged axially in line with said receiver and ring-section, and the longitudinally-movable breech-bolt sleeved in said tubular parts and adapted by its rear end in said ring-section and guide to lock down gun-barrel, while by its front end it is held abutted to breech said barrel by means co-operating therewith, substantially as set forth.

2. In a breech-loading fire-arm, the combination, with the longitudinally-movable breech-bolt adapted both for breeching arm and for securing barrel locked down at the instant of breeching arm, of tubular rear extension massed on open butt of tilting barrel, of ring-section integral with said extension, of rear fixed guide on breech-chamber, said extension, ring-section, and guide all having corresponding bore and said bolt being snugly sleeved therein, of notched portion of said bolt adapted when the same is retracted fully to pass freely through vertical slot in said ring-section below, but when said bolt is not fully retracted to be embraced by said ring-section and thereby lock barrel down, the rear end of bolt being held in said guide, and of the breech-brace hinged to said bolt and operated by lever mechanism to sustain it in position for breeching by purchase against said ring-section, substantially as set forth.

3. In a breech-loading fire-arm adapted for charging the same without tilting barrel, the combination, with tubular extension in rear of and in line with top of barrel N, of sectional receiver M, covered above by the body of said extension and accessible through opening on

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right side of gun, of longitudinally-movable breech-bolt A, guided in ring-section N^2 as the rear portion of said extension of butt, and in the permanent tubular guide N^3 as rear portion of the breech-chamber wall, of the slide Q Q′, provided near its front end inside, with lug L^4, arranged to abut against the projection L^2 on said bolt for automatically pushing the slide back when the said bolt is retracted for extracting shell and charging, and of mechanism adapted, substantially as described, for producing the reciprocatory movements of said bolt, as set forth.

4. In a breech-loading fire-arm, the combination of tilting barrel N, tubular receiver M, cut away below and on right side, and ring-section N^2, having longitudinal slot L in its lower portion, both said parts constructed as integral with butt-end of said barrel, with cylindrical breech-bolt A, guided in fixed tubular extension N^3 on breech-chamber to keep axially in line with bore of barrel, and with mechanism adapted to move said bolt up to butt of barrel and back therefrom sufficiently to clear the space for dropping out the shells vertically beneath the receiver, substantially as set forth.

5. In a breech-loading fire-arm, the combination of the tilting barrel N, provided with tubular rear extension M N^2, having bore axially in line with that of barrel and adapted with ring-section N^2 to be normally locked down during service, the breech-chamber constructed with permanent tubular guide N^3, set aligned with said bore interiorly, with vertical walls of chamber constantly open below, reciprocatory breech-bolt A, traversing said guide, breech-brace G G′, hinged to said bolt and adapted to embrace it and said ring-section for stopping retreat of bolt in breeching gun, breech-chamber having receptacle *k* for admitting said brace into it, and of mechanism adapted for swinging said brace from its embrace with said bolt and retiring both completely behind the receiver-space, substantially as and for the purposes set forth.

6. In a breech-loading fire-arm, the combination of tilting barrel N, having top extension M N^2 integral therewith, breech-bolt A, having longitudinal movement in fixed guide N^3 axially in line with barrel, slider-abutment B^4 on front end of said bolt adapted to ride on guiding ledges K K′ on inner sides of breech-chamber, and the stem *l* of plunger H′, adapted to bear in portion B^2 of said bolt and thereby keep it on said ledges when barrel is tilted and arm inverted, substantially as and for the purposes set forth.

7. In a breech-loading fire-arm, the combination of reciprocatory breech-bolt A, provided with abutment B^1 thereon arranged beneath its front end, with swinging breech-brace G G′, hinged to said abutment and provided with tenon or foot G, adapted to engage said bolt in a notch, A′, thereon and at the same time to set against the abutment N^2 by said foot, substantially as and for the purposes set forth.

8. In a breech-loading fire-arm, the combination, with tilting barrel having on its butt extension terminated in rear by ring-section, and with breech-bolt having rectilinear movement axially in line with barrel to and from its rear end through said ring-section and into a fixed tubular guide on breech-chamber, whereby barrel is secured down by said bolt at firing, of breech-brace hinged to under side of said bolt at its front end and adapted with foot thereon to clutch in a notch in rear portion of said bolt and abut at the same time by said foot against said ring-section, thereby interlocking said barrel, bolt, brace, and guide, and of an operating-lever fulcrumed in breech-chamber linked to hinge of said pieces and connected by studs on lever-arm with cams within said brace, adapted to control its initial and final movements, substantially as and for the purposes set forth.

9. In a breech-loading fire-arm, the combination of the reciprocatory breech-bolt A and the breech-brace G G′, hinged thereto, both being adapted to engage each other, as set forth, with link or connector E, pivoted to abutment B^4 and to arm E^3 of the operating-lever E′ E^2 E^3, and the studs D^3 on said arm arranged to come in contact with the cams k^2 and k^3, arranged upon the insides of said breech-brace and adapted to be in communication with said studs alternately, substantially as and for the purposes set forth.

10. In a breech-loading fire-arm, the combination, with the pivoted operating-lever E′ E^2 E^3, connected with the breech-bolt A and with the breech-brace G G′, substantially as set forth, and adapted to fold against the stock B and the sear T′, pivoted therein, of the trigger J, pivoted in recess in said lever and having the nose P^2 adapted to bear against said sear when trigger is set advanced or is operated distinctly from lever when not set advanced, of spring e^4, adapted to retract said trigger when not set advanced, and of rotary stop-piece *e*, having its shank *e′* provided with notch e^2 and applied to set the trigger or release the same, substantially as and for the purposes set forth.

11. In a breech-loading fire-arm, the combination of the reciprocatory bolt or part having attached thereto the extractor with set-screw made with point beveled or cut off obliquely to correspond with the strike of said extractor's catch and inserted through it for supplementing said catch to adapt it to seize shells of less caliber than that the regular catch takes, substantially as set forth.

12. In a breech-loading fire-arm, the combination, with breech-piece A, provided with receptacles A^2 L in path of groove L^3, of top rim-fire pin, C^2, provided with catches *g g′*, and guided in said groove, of mid-range rim-fire pin C′, having head a^3, arranged to couple with catch *g′* by position directly in front of it or to be idle in position behind said catch, and of center-fire pin C, for all ranges or calibers, provided with head *a*, arranged to

couple with catch g' by position in front of it or to be idle in position with its head behind said catch, all adapted to be arranged for use substantially as set forth.

13. In a breech-loading fire-arm, the combination, with breech-bolt A, having rectilinear movement in line with bore of barrel N, of main rim-fire pin C^2, loosely inserted in longitudinal groove L^3 in top of said bolt that it may be lifted off when barrel is tilted and said bolt is fully advanced, of other fire-pins C C', inserted in receptacles in said bolt and having their heads arranged that either may be adjusted to be in coupled position before a detent on under side of said main fire-pin C^2, and be struck thereby, and of hammer K^2, adapted to strike head on main fire-pin and thereby either of said other fire-pins, substantially as and for the purposes set forth.

14. In a breech-loading fire-arm having tilting barrel and breech-chamber vertically open throughout when barrel is tilted, in combination with longitudinally-movable breech-bolt, of swinging breech-brace pivoted to said bolt, of link pivoted in the hinge joining said bolt and brace, and of operating-lever pivoted to said link, whereby its arm, by stud on wrist thereof, works against cams in said brace, the lever being fulcrumed in said open space between the breech-chamber walls by a bolt or screw as the only retainer of said pivoted works that they, as a whole, may be removed by a vertical lift when said bolt or screw is removed, substantially as and for the purposes set forth.

15. In a breech-loading fire-arm, substantially as described, in combination, the essentially united works, consisting of operating-lever $E' E^2 E^3$, link E, pivoted thereto, breech-bolt A, provided with a slider abutment, B^4, pivoted to said link, fire-pins C C' C^2, inserted in breech-bolt, breech-brace G G', hinged to said abutment by same pintle joining said link thereto, studs D^3 on wrist of said lever's arm, the same being adapted to engage the eccentric cams k^2 k^3 in said breech-brace, and screw or bolt D^2, by removing which said works may be removed intact, substantially as set forth.

16. In a breech-loading fire-arm, substantially as described, the combination of the longitudinally-moving breech-bolt guided axially in line with the barrel in normally locked-down position, the breech-chamber wall on right side constructed with aperture or cut-away part opposite to and the whole length of the receiver directly in rear of barrel, the butt of the latter extended rearward over and composing part of said receiver, closed above and on left side thereof, the said bolt provided with pin or lug near its front end and projecting into said opening on right side of receiver, the longitudinally-moving slide adapted and guided to close said opening and having on its inner side a lug or pin arranged to come against the rear side of said projection on said bolt and be thereby moved automatically when bolt is retracted and stopped by its pin or lug when at opposite end of said opening against displacement from its guiding-ledges, and mechanism, substantially as described, for actuating said bolt, the co-operating breech-brace, and the firing-pins, substantially as set forth.

17. In a breech-loading fire-arm in which the breech-piece and its brace are conjointly moved to and sustained in position for breeching the gun by the operating-lever fulcrumed in the breech-chamber, the combination, with said lever, of an adjustable trigger having when adjusted part thereof projecting from the edge of said lever and in communication with the arm of the sear, and of a stop or means for securing said trigger in adjusted position, substantially as and for the purposes set forth.

SAMUEL A. SULLENBERGER.

In presence of—

THOMAS H. SULLENBERGER,

EUGENE SNYDER.