

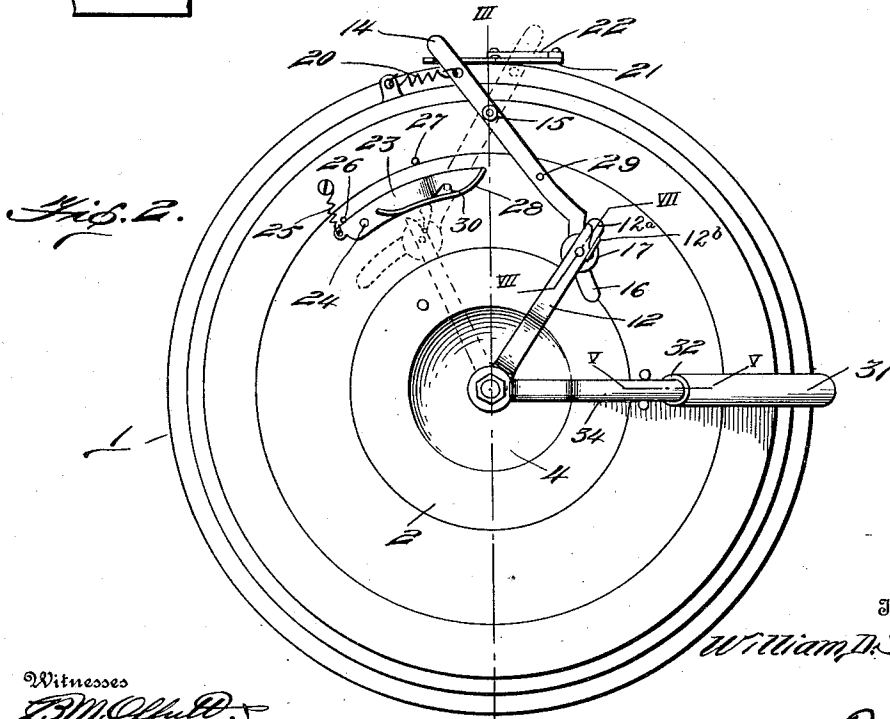
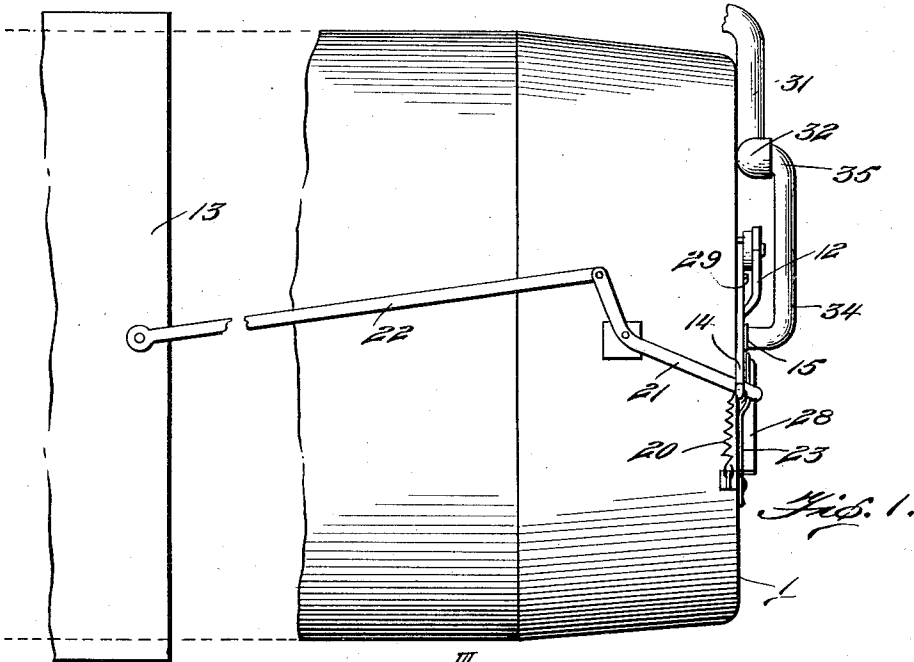
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ORDNANCE.

APPLICATION FILED JAN. 4, 1909.

Patented Nov. 7, 1911.

2 SHEETS-SHEET 1.

1,007,808.



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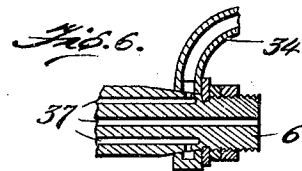
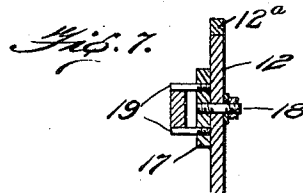
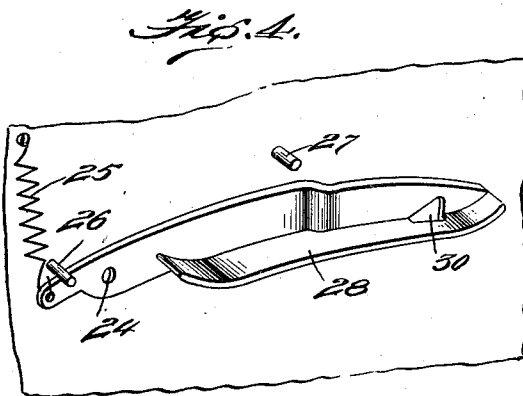
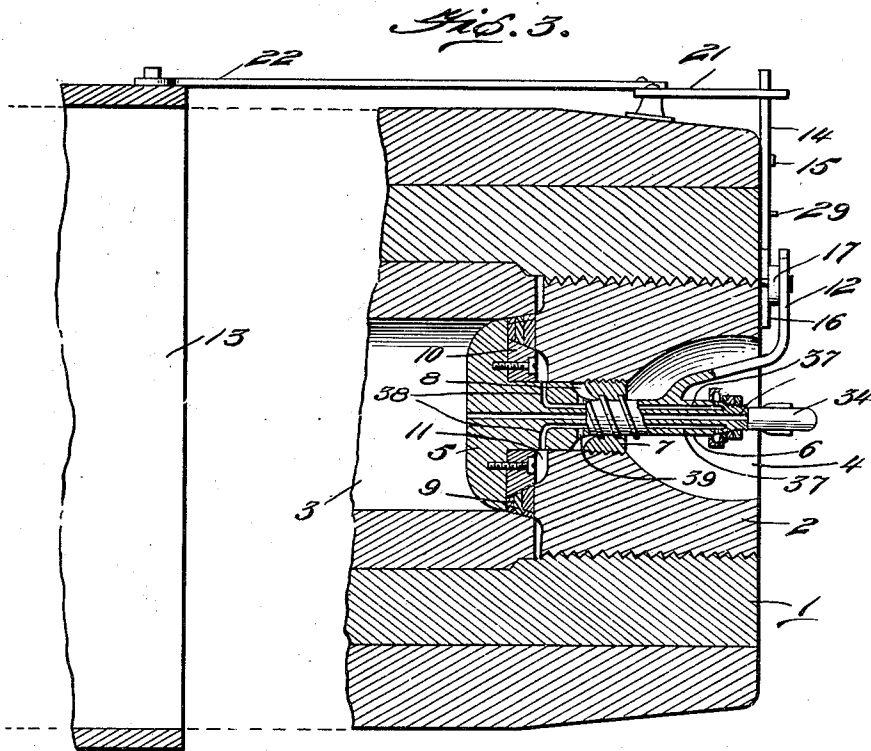
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*Fig. 5.*

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# UNITED STATES PATENT OFFICE.

WILLIAM D. SMITH, OF DENVER, COLORADO, ASSIGNOR TO AUTOMATIC FLAREBACK PREVENTION COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

## ORDNANCE.

1,007,808.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Original application filed May 11, 1906, Serial No. 316,357. Divided and this application filed January 4, 1909. Serial No. 470,672.

*To all whom it may concern:*

Be it known that I, WILLIAM D. SMITH, of the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Ordnance, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of the breech portion of a gun equipped with the improvements of the present invention. Fig. 2 is a rear elevation thereof. Fig. 3 is a longitudinal sectional view, taken on the line III—III of Fig. 2. Fig. 4 is a detail perspective view on an enlarged scale of the catch member of this invention. Fig. 5 is an enlarged detail sectional view taken on the line V—V of Fig. 2. Fig. 6 is an enlarged detail sectional view taken through the end of the stem of the mushroom head, and Fig. 7 is an enlarged detail sectional view taken on the line VII—VII of Fig. 2.

Like characters of reference indicate corresponding parts in each of the several figures of the drawings.

This invention relates to ordnance of the breech loading type, wherein it is customary to provide the breech-block with a gas check to prevent the escape of gases rearwardly through the breech of the gun.

It is an important object of the present invention to provide a certain new and useful improvement in setting the gas check, and also for effecting the cleansing of the bore of the gun and the expelling of any gases which may be in the gun after the explosion, thereby to effectually avoid "flare backs".

It is a further object of the invention to provide for loosening the gas check through the instrumentality of the recoil of the gun, and also to provide for supplying fluid under pressure to the explosion chamber of the gun for the purpose of expelling the gases therefrom prior to the loosening of the breech block preparatory to opening the same.

With these and other objects in view, the present invention consists in the combina-

tion and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size and minor details may be made, within the scope of the claims, without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, I have illustrated the breech portion 1 of a gun of any common or preferred type, having a breech block 2 threaded therein as usual and provided with a longitudinal bore or opening 3 communicating at its rear end in a socket or recess 4 provided in the rear end of the breech block.

In the bore of the gun and in front of the breech block there is a mushroom head or valve 5 having a shank 6 threaded through a bushing 7 secured in and closing the rear end of the bore or opening in the breech block. It will here be noted that the threaded portion of the shank of the mushroom head is reduced from a point in front of the bushing to its rear end, thereby providing an annular chamber 8, which is employed for taking up the recoil upon the mushroom head, as will be hereafter explained.

Interposed between the mushroom head and the breech block is a gas check 9 formed of a plurality of split rings which decrease in diameter from the rear ring forwardly. A substantially conical expander 10 is suitably secured to the back of the mushroom head in frictional engagement with the inner periphery of the gas check. When the mushroom head is moved rearwardly, it is of course apparent that the expander 10 will expand the gas check and thereby set the same against the walls of the barrel of the gun and thereby form a gas tight joint at this point. The front end of the breech block is provided with a chamber or recess 11 to accommodate the expander, and at the same time form a cushioning chamber for the mushroom head, as will be hereinafter explained.

For rotating the mushroom head so as to move the same back and forth under the

influence of the threaded engagement between the shank of the head and the bushing 7, there is provided a crank handle 12 secured in any manner to the shank and extending rearwardly out of the socket or recess 4 and radially across the breech of the gun. The outer end of the crank handle 12 is provided with a free end 12<sup>a</sup> connected thereto by the leaf spring 12<sup>b</sup>, in such a manner that it is free to swing on the end of the crank handle in one direction, and rigid with and forming a part of the crank handle in the other direction.

To effect automatic swinging of the crank handle by the recoil of the gun, I provide means communicating between the crank handle and the stationary cradle 13 of the gun, whereby the crank handle is actuated by the recoil of the gun. This communication includes a lever 14 fulcrumed upon the breech end of the gun at 15 and projecting beyond the periphery of the gun. The inner end portion of the lever 14 is provided with a bowed or arcuate terminal 16. The inner arcuate or bowed terminal 16 of the lever 14 overlaps the free end of the crank handle 12 and lies between the latter and the gun. A loose joint is provided between the crank handle and the inner terminal of the lever 14, such connection consisting of a pivotal member 17 having its pivot 18 carried by the crank handle. A pair of spaced pins or projections 19 are carried by the pivotal member and loosely embrace the arcuate terminal 16 of the lever 14, so that, when the lever 14 is swung upon its fulcrum 15, the crank handle 12 will be swung with the inner end of the lever, which latter slides between the pins or projections 19 to prevent binding of the joint between the lever and crank handle. Normally, the lever and the crank handle are held in the full line position shown in Fig. 2 of the drawings, by means of a spring, such for instance, as shown at 20 connected to the lever and to the gun. Upon the periphery of the gun there is fulcrumed an angular or bell-crank lever 21, the rear end of which projects beyond the breech of the gun and engages the outer end of the lever 14. A suitable link or connecting rod 22 extends between the cradle 13 and the adjacent end of the bell-crank lever.

As thus far described, when the gun is discharged, the recoil which takes place causes the link or rod 22 to pull upon the bell-crank lever 21 and swing the latter against the lever 14, which carries with it the crank handle 12 from the full line position, shown in Fig. 2 of the drawings, to the dotted line position, whereby the mushroom is automatically rotated by the recoil of the gun and consequently is also moved forwardly in an endwise direction under the influence of the threaded engagement between

the shank of the mushroom and the bushing 7. This endwise movement of the mushroom of course releases the gas check prior to the opening of the breech block and independent of the initial rotary movement of the block preparatory to swinging the same open.

To lock the lever in the position to which it is moved by the recoil of the gun, there is provided a swinging latch 23 pivoted near one end at 24 upon the breech of the gun to one side of the breech block. A spring 25 yieldably holds the pivotal end of the latch against the stop 26 so as to limit the inward swing of the latch, while the outward swing is limited by a stop 27. Across the inner longitudinal edge of the latch is a flange or cam 28 lying in the path of the free end of the crank handle 12. When the crank moves to the left and strikes the cam face 28 the free end 12<sup>a</sup> swings against the action of the spring 12<sup>b</sup>, and does not raise the latch. 29 is a pin on the lever 14 and in line of movement of the cam face 28, and a notch or opening 30 in the latch. When the pin strikes the cam face 28 it raises the free end of the latch and as immediately after the pin enters the notch or opening the spring 25 will swing the latch and retain the lever 14 in the position shown in dotted lines in Fig. 2.

After the discharge of the gun, the breech block may be opened in the usual manner by first turning it to the left to disengage its threads from the threads of the gun, after which it is swung rearwardly in the usual manner. When the breech block is turned to the left, the loose joint between the crank handle 12 and the lever 14 permits of the crank handle turning with the breech block, by reason of the fact that the pivotal joint member 17 merely slides upon the bowed or arcuate terminal 16 of the lever 14, because this arcuate terminal is now disposed in a position where the shank of the mushroom head is also the center of the arc described by the part 16. After the breech block has been rotated, it is then swung rearwardly, the crank handle 12 readily disengaging from the lever 14 by reason of the fact that the pins or projections 19 upon the joint member 17 slide readily from the lever.

In closing the breech, the joint member 17 of the crank handle readily returns to its engagement with the lever 14. When the breech block is turned to the right for engagement with the threads of the gun the free end 12<sup>a</sup> of the crank handle which is held rigid when moved in this direction wipes across the swinging latch 23 and swinging it outwardly thereby releases the projection 29 and permits the lever 14 to swing over to the full line position with the crank handle 13. It will of course be understood that the bell-crank lever 21 and the

link or rod 22 immediately return to their normal positions after the recoil and therefore do not interfere with the return of the lever 14 to its normal position.

5 To supply fluid under pressure to the gun, for flushing the bore thereof and expelling gases therefrom, as well as to cushion the mushroom head against the action of the explosion, there is provided a supply pipe 31  
10 in communication with a source of fluid under pressure not shown, the free end of the tube or pipe terminating in an elbow 32 containing a spring-pressed valve 33 tending to close the outlet pipe. Swiveled upon  
15 the rear end portion of the shank of the mushroom head is a tube or pipe 34 terminating at its free end in an elbow 35 which automatically enters the valved elbow 32 of the supply pipe when the breech block is  
20 swung into its closed position. The elbow 35 has a cross bar or trip 36 disposed to strike the front end of the stem of the valve 33 and automatically open the same when the two elbows come together. The pipe or arm 34  
25 has its inner end swiveled in any suitable manner around the rear end portion of the shank of the mushroom head and in communication with one or more longitudinal passages 37 in the shank of the mushroom  
30 head, each of said passages having a branch 38 communicating with the annular chamber 11 between the breech block and the mushroom head and another branch 39 communicating with the chamber 8 between the  
35 bushing 7 and the forward end portion of the shank 6. It will now be understood that when the breech block is closed, communication is automatically established between the source of fluid under pressure and the chambers 8 and 11, whereby the mushroom head  
40 will be effectually cushioned against the effects of the explosion so as to permit a slight rearward movement of the mushroom to further set the gas check without damaging the threaded engagement between the  
45 shank and the breech block. When the mushroom head is automatically loosened or moved forwardly by the recoil of the gun as hereinbefore described, the fluid under  
50 pressure in the chamber 8 will escape forwardly about the periphery of the mushroom head in a cylindrical stream, thereby to expel all gases from the bore of the gun  
55 through the muzzle thereof before the breech block is rotated preparatory to swinging the same open. The passage of this air around the gas checks and mushroom head will tend to cool the various parts as well as the bore of the gun.

60 This is a divisional application from my application Serial No. 316,357, "Guns", filed May 11, 1906.

What I claim is:—

65 1. In a gun, a gas check, means for setting the gas check prior to the discharge, and

means operated by the recoil of the gun for loosening the gas check, substantially as described.

2. In a gun, a breech block, a mushroom head, a gas check, means for operating the mushroom head to tighten the gas check, and means operated by the recoil of the gun for loosening the gas check, substantially as described. 70

3. In a gun, a breech block, a mushroom head, a fluid inlet controlled by the mushroom head, means to supply fluid under pressure to said inlet, and means to advance the mushroom head by the recoil of the gun to open the inlet to flush the gun; substantially as described. 80

4. In a gun the combination of a breech block and a gas check, means for initially expanding the gas check before the explosion and permitting further expansion of the gas check under the action of the explosion, and connections operated by the recoil of the gun for loosening the gas check, substantially as described. 85

5. In a gun the combination of a breech block and a gas check, means for initially expanding the gas check before the explosion and permitting further expansion of the gas check under the action of the explosion, a fluid pressure chamber, and connections operated by the recoil of the gun for loosening the gas check and injecting fluid into the gun from said chamber; substantially as described. 90 95

6. In a gun, a breech block, a mushroom head, a gas check, a crank for operating the mushroom head to tighten and loosen the gas check, a lever connected to the crank, and means operated by the recoil of the gun to operate the lever to loosen the gas check; substantially as described. 100 105

7. In a gun, a breech block, a mushroom head, a gas check, a crank for operating the mushroom head to tighten and loosen the gas check, a lever connected to the crank, a swinging latch, a pin on the lever to be engaged by the latch when the gas check is loosened, and means operated by the recoil of the gun to operate the lever to loosen the gas check; substantially as described. 110 115

8. In a gun, a breech block, a mushroom head, a gas check, a crank for operating the mushroom to tighten or loosen the gas check, said crank having a member capable of movement in one direction on the end thereof, but locked from movement in the other direction, a swinging latch in line of movement of the said member to be moved by the movement of the crank in one direction, a lever connected to the crank, a pin on the lever to be engaged by the latch when the gas check is loosened, and means operated by the recoil of the gun to loosen the gas check, substantially as described. 120 125

9. In a gun, a breech block, a mushroom 130

head, a gas check, a crank for operating the mushroom head to tighten and loosen the gas check, a lever connected to the crank, latching means to latch the lever when the gas check is loosened, and means operated by the recoil of the gun to operate the lever to loosen the gas check; substantially as described.

10. In a gun, a breech block, a mushroom head, a fluid inlet normally closed by the mushroom head, means to supply fluid under pressure to said inlet, and means to advance the mushroom head before the breech block is rotated to open the inlet to flush the gun; substantially as described.

11. In a gun, a breech block, a mushroom head, a fluid inlet port controlled by the mushroom head, means to supply fluid under pressure to said port, and means controlled by the recoil of the gun to advance the mushroom head to open the port and allow fluid pressure to pass into the bore of the gun to cool and flush the same; substantially as described.

12. In a gun, a breech block, a mushroom head having a stem extending through the breech block, a fluid inlet controlled by the mushroom head and arranged to be opened to flush the gun when the mushroom head is advanced, means to supply fluid pressure to said inlet, a lever connected to the stem of the mushroom head, means to actuate said lever by the recoil of the gun to advance the mushroom head, and a spring latch arranged to engage the lever and retain the mushroom head in its advanced position; substantially as described.

13. In a gun, a breech block, a bore in said breech block having a thread therein, a mushroom head having a threaded stem extending through the bore of the breech block, a fluid inlet controlled by the mushroom head and arranged to be opened when the mushroom head is advanced to flush the gun, a lever connected to the stem of the mushroom head, means to actuate said lever by the recoil of the gun to rotate and advance the mushroom head, and a spring latch arranged to engage and secure the lever and retain the mushroom head in its advanced position; substantially as described.

14. In a gun, a fluid pressure pipe leading into the breech thereof, means to supply fluid pressure to said pipe, a valve controlling the flow of fluid pressure from the pipe to the breech of the gun, and lever mechanism connected to said valve and the gun arranged to be actuated by the recoil movement of the gun to open the valve; substantially as described.

15. In a gun, a fluid pressure pipe leading into the breech thereof, means to supply fluid pressure to said pipe, a valve located in the breech of the gun controlling the flow of fluid pressure from the pipe to

the breech thereof, and lever mechanism connected to said valve and the gun arranged to be actuated by the rearward movement of the gun for opening the valve; substantially as described.

16. In a gun, a fluid pressure pipe leading into the breech thereof, means to supply fluid pressure to said pipe, a valve controlling the flow of fluid pressure from the pipe to the breech of the gun, valve actuating means connected to said valve arranged to be shifted to open the valve by the recoil movement of the gun, and a latching device for securing the valve actuating means in its shifted position; substantially as described.

17. In a gun, a breech block, a mushroom head, a fluid inlet port controlled by the movement of the mushroom head, means to supply fluid pressure to said port, actuating connections connected to the mushroom head arranged to be shifted by the recoil movement of the gun to shift the mushroom head to admit pressure into the bore of the gun, and latching means arranged to latch the mushroom head actuating connections in their shifted positions; substantially as described.

18. In a gun, a breech block, a mushroom head, a fluid inlet port controlled by the movement of the mushroom head, means to supply fluid pressure to said port, actuating connections connected to the mushroom head arranged to be shifted by the recoil movement of the gun to shift the mushroom head to admit pressure into the bore of the gun, latching means arranged to latch the mushroom head actuating connections in their shifted positions, and means for returning the mushroom head during the locking movement of the breech block; substantially as described.

19. A gun having a removable breech block, means for admitting flushing fluid to the gun, a valve for controlling such admission, means actuated by the closing movement of the breech block for opening the valve when the breech block is seated, and means for automatically closing the valve when the breech block is unseated; substantially as described.

20. In a gun, a breech block, a mushroom head having a spindle extending through the bore of the breech block, a gas check between the mushroom head and the breech block, a fluid inlet port normally closed when the mushroom head is in its rearward position, means to supply fluid pressure to said port, a lever connected to the spindle of the mushroom head, means to move said lever to advance the mushroom head into the bore of the gun to open the port, a spring catch to lock the lever when the mushroom head is in its advanced position, and means to return the mushroom head to its normal

position when the lever is released from the latch; substantially as described.

21. In a gun, a breech block, a mushroom head having a spindle extending through the bore of the breech block, a gas check between the mushroom head and the breech block, a fluid inlet port normally closed when the mushroom head is in its rearward position, means to supply fluid pressure to said port, a lever connected to the spindle of the mushroom head, means to move said lever to advance the mushroom head into the bore of the gun to open the port, a

spring catch to lock the lever when the mushroom head is in its advanced position, 15 and a spring to return the mushroom head to its normal position when the lever is released from the latch; substantially as described.

In testimony whereof, I have hereunto 20 set my hand.

WILLIAM D. SMITH.

Witnesses:

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W. J. McPHERSON,  
J. M. GODDARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."