D. F. ASBURY.

GAS CHECK.

APPLICATION FILED JULY 6, 1916.

1,376,130.

Patented Apr. 26, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

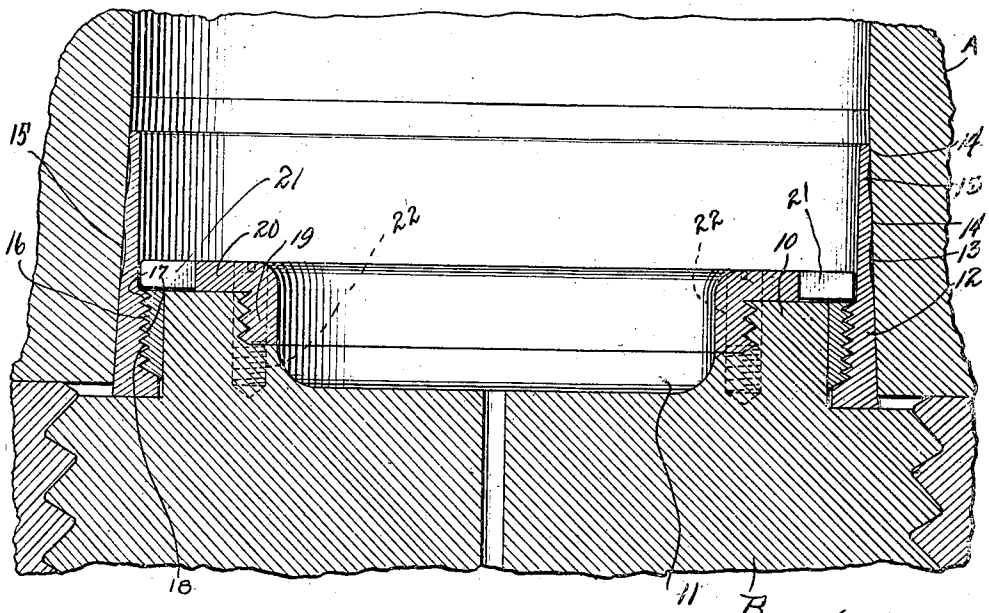


Fig. 3.

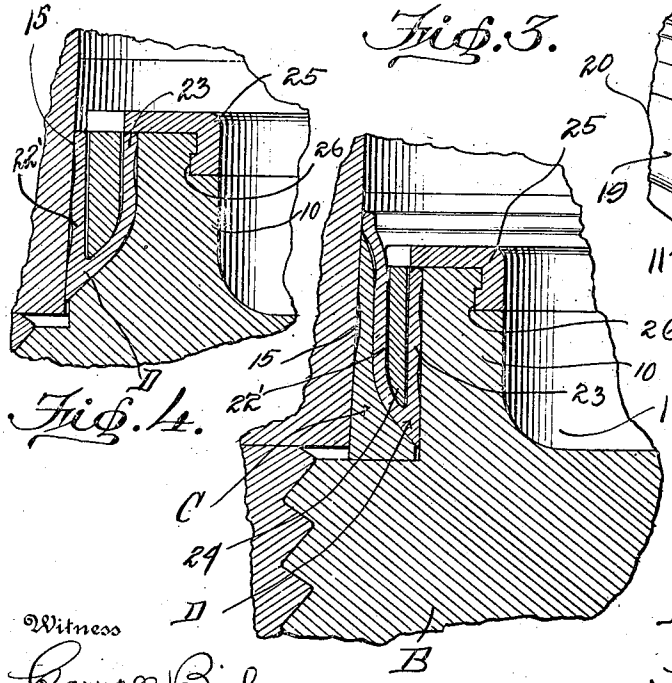
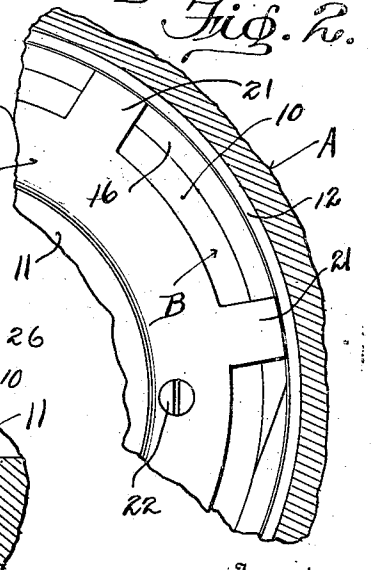


Fig. 4.

Fig. 2.



Witness

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2 SHEETS—SHEET 2.

Fig. 5.

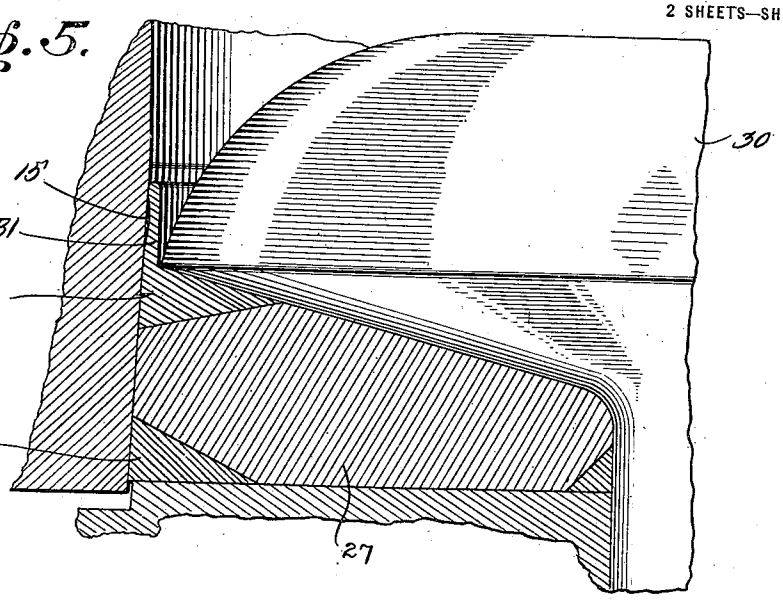
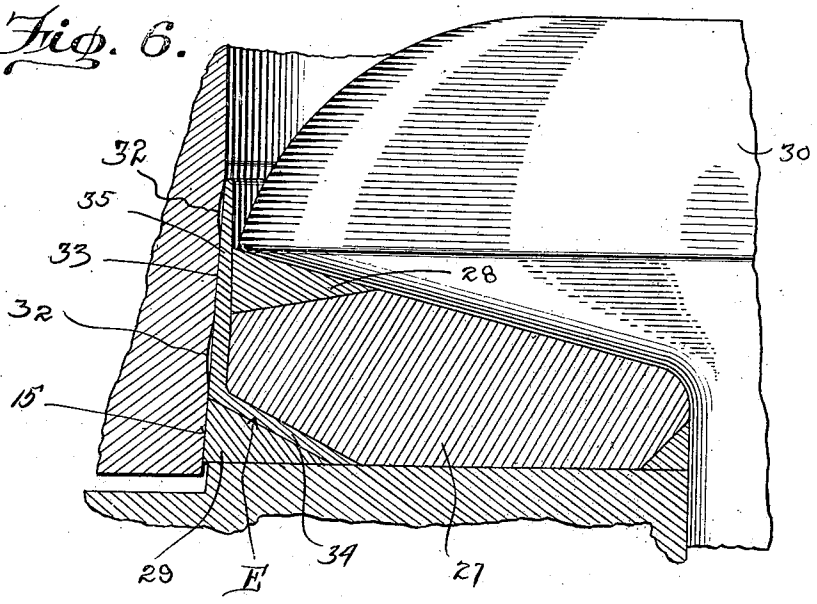


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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GAS-CHECK.

1,376,130. Specification of Letters Patent. Patented Apr. 26, 1921.

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To all whom it may concern:

Be it known that I, DORSEY F. ASBURY, a citizen of the United States, and resident of the city of Washington, in the District of Columbia, have invented certain new and useful Improvements in Gas-Checks, of which the following is a specification.

In breech mechanisms utilizing gas checks of the pad type a longitudinal passage is provided in the breech plug to permit the mushroom stem to project to the rear to the atmosphere. This passage provides the necessary means for obtaining a higher unit pressure in the pad than in the gun chamber. Under such conditions the pressure of the pad against its seat is higher than the pressure in the gun chamber and therefore the gases of discharge cannot pass between the pad and its seat. Thus it will be seen that in the successful operation of a gas check for breech loading guns it is necessary to obtain and maintain a higher pressure between the sealing members of the check than the pressure of the gases of explosion. Pads of gas checks require the use of expensive presses and molds in their manufacture and the pads' coverings frequently burn and tear.

It is therefore the object of my invention to provide a gas check embodying means for obtaining and maintaining a higher pressure at annular initial contact checking places than the pressure of the gas in the gun chamber; to provide a checking member having a wave shaped sealing surface, the crest and trough of the wave being annular; to provide a checking member having a waved sealing surface, the crest of the wave being in contact with the gas check seat before gun fire; to provide a checking member having a wave shaped sealing surface, the crest being in contact with the gas check seat before and after gun fire and the trough being forced in contact with said seat by a pressure due to gun fire; to provide a checking member having a wave shaped sealing surface the material of that part of the member forming the wave trough acting as a bridge between the crests so that the uniform unit pressure on the chamber side of the member will produce a higher pressure at the crests on the checking side of the member than that in the gun chamber; to provide a gas check that can be forced into contact with the gas check seat at annular places before the gun is fired; to provide a resilient gas check that will work itself loose or unstick itself from the gas check seat after firing the gun so that the unsticking of the check at such time will not have to be accomplished by an applied operating force; to provide a member in the gas check for occupying such space as in which sparks might accumulate, said member also acting as means to assist in retracting the check when opening the breech mechanism; to provide a gas check which can be readily removed and replaced without disturbing any other parts of the breech mechanism; to provide a gas check that will occupy a relatively small amount of space in the gun chamber and thereby enable the gun to be shortened at the breech where it is so expensive per unit length; and to provide a gas check that is relatively cheap to manufacture.

In the drawings chosen to illustrate my invention the scope whereof is pointed out in the claims,

Figure 1 is a longitudinal section through the breech of a gun having my improved gas check;

Fig. 2, a front view of a fragment of what is shown in Fig. 1;

Fig. 3, a fragment of what is shown in Fig. 1 illustrating another embodiment of my invention;

Fig. 4, a view similar to Fig. 3 illustrating still another embodiment of my invention;

Fig. 5, a partial longitudinal section through a gun showing my invention associated with a pad gas check of the "De Bange" type, and

Fig. 6, a view similar to Fig. 5 showing another embodiment of my invention in connection with a pad gas check of the "De Bange" type.

Referring particularly to Figs. 1 and 2 A indicates the gun and B the breech plug. The forward end of the plug B is provided with an annular extension 10 forming a central recess 11. The improved gas check embodies an annular checking member 12 surrounding the extension 10 and projecting forwardly of the plug B a considerable distance. The sealing surface of the member 12 is wave shaped and this surface is disposed forward of the extension 10. This sealing surface embodies a plurality of annular troughs 13 and a plurality of annular

crests 14 which latter engage the gas check seat 15 of the gun at spaced annular places. Interposed between the extension 10 of the breech plug and the checking member 12 is a split ring 16 provided with a plurality of inclined surfaces 17 which coöperate with a plurality of inclined surfaces 18 formed on the adjacent side of the checking member 12. Threaded in the recess 11 is a tubular member 19 provided at its forward end with a circumscribing flange 20 which overlies the outer end of the extension 10. Formed on this flange 20 is a plurality of arms 21 which overlie the adjacent edge of the ring 16. The member 19 together with the flange 20 and arm 21 constitute a holding device for securing the checking member 12 and the ring 16 in operative position, it being noted that the member 19 is secured against rotation after application by suitable screws 22 engaged through the flange 20 and into the plug B.

In the operation of the gas check illustrated in Figs. 1 and 2 it will be obvious that when the gun is fired the gas pressure will act on the pressure receiving surface of the portion of the checking member 12 forward of the breech plug and as the material of the checking member within the limits of the troughs 13 acts as a bridge the uniform unit pressure on the chamber side of the member 12 will produce a higher pressure at the crests 14 against the gas check seat 15 than the pressure present in the gun chamber. In this operation it will be apparent that as the surface of the troughs 13 is forced into engagement with the gas check seat the effective sealing area of the sealing surface of the checking member progressively increases as the chamber pressure of the gun increases and owing to the resiliency of the material of which the checking member 12 is constructed the effective sealing area of the sealing surface of the checking member decreases as the chamber pressure decreases. In this way the checking member 12 automatically loosens or unsticks itself from the gas check seat 15 so that no great force is necessary to effect the withdrawal of the gas check from its seat. The pressure in the chamber of the gun also acts against the ring 16 and as a result of the coaction between the inclined surfaces 17 and 18 a wedging action is produced whereby the ring serves as a seal between the breech plug and the checking member to prevent the escape of gases at that place.

In the embodiment of the invention shown in Fig. 3 checking members C and D are employed, the checking surface of the former coöperating with the gun seat 15. The member D is substantially U-shaped in cross section and includes flanges 22′ and 23. The sealing surface of the flange 22′ of the member D engages against the chamber side of the member C and also against the extreme forward end of the gas check seat 15. The sealing surface of the flange 23 engages against the outer side of the extension 10 of the breech plug B. The sealing surface of the member C and the member D all include wave shaped portions similar to that described with respect to Figs. 1 and 2 and effecting a similar checking action when the gun is fired to that previously described. Disposed between the flanges 22′ and 23 is a filler ring 24 slightly less in cross section than the space between the flanges 22′ and 23 so as to permit the gases of explosion to reach the chamber side of said flanges at the same time preventing the accumulation of sparks in the space between the flanges 22′ and 23. The members C, D and the ring 24 are held in operative position by a holding member 25 having an interlocking engagement with the plug B at 26, said holding member being split in order that it may be contracted to permit its application to the plug. In opening the breech mechanism the member 25 acts against the ring 24 and the latter in turn acts against the checking member D so as to properly effect the withdrawal of the latter. It will be obvious that in the event any gas should get by the forward end of the flange 22′ between same and the seat 15 such gas will be effectually checked by the member C.

In the embodiment of my invention shown in Fig. 4 the checking member C is dispensed with and the flange 22′ of the member D is shortened and positioned to coöperate with the gas check seat on the gun throughout the entire sealing surface of said flange. In this form of the invention the sealing surfaces of the flanges 22′ and 23 are constructed wave shaped in the manner and for the purposes previously described.

In Fig. 5 I have shown my invention utilized in connection with a gas check of the "De Bange" type wherein is employed a pad 27, front and rear checking rings 28 and 29 and a mushroom 30 all as is well known. The front checking ring 28 is provided with a forwardly extending annular flange 31 which is adapted to coöperate with the gas check seat 15. This flange 31 constitutes a checking member and the sealing surface thereof is wave shaped in the manner and for the purposes previously described. In this form of the invention it will be obvious that when the pressure in the gun chamber due to firing makes up, the sealing member which is constituted by the ring 28 and its flange 31 will be forced and held tight to the seat during any longitudinal movement of the member during gun fire. In other words the chamber pressure acts directly on the chamber side of the flange 31 to force and hold the front check-

ing ring right against the seat during any longitudinal movement of the ring during gun fire.

In the embodiment of the invention shown in Fig. 6 I construct the front and rear checking rings as is usual and in this case provide the gas check seat 15 with a wave shaped surface including troughs 32 and crests 33. The checking member in this instance is indicated at E and is formed angular to produce flanges 34 and 35 the former of which is interposed between the pad 27 and the rear checking ring 29 while the latter is interposed between the gas check seat 15 and the front checking ring 28 and pad 27. While the wave shaped sealing surface in this instance is shown embodied in the gas check seat on the gun the sealing action is the same as that previously described.

What is claimed is:—

1. A gas check for breech loading guns coacting with a seat on the gun and having a sealing surface, the effective sealing area thereof, which coacts with the seat on the gun, progressively increasing as the chamber pressure of the gun increases.

2. A gas check for breech loading guns coacting with a set on the gun and having a sealing surface, the effective sealing area thereof, which coacts with the seat of the gun, progressively increasing as the chamber pressure of the gun increases and progressively decreasing as the chamber pressure of the gun decreases.

3. A gas check for breech loading guns coacting with a seat on the gun and having a sealing surface the effective sealing area thereof, which coacts with the seat on the gun, increasing after the initial sealing contact when the gun is fired.

4. A gas check for breech loading guns coacting with a seat on the gun and having its sealing surface wave shaped, the direction of the wave being longitudinal of the gas check and the crest of the wave being normally in contact with the gas check seat, and the trough of said wave being normally out of contact with the gas check seat and forced toward the seat during gun fire by the gun chamber pressure.

5. In a breech loading gun, a resilient gas check coacting with a seat on the gun and having its sealing surface wave shaped before and after gun fire and forced to the shape of the gas check seat during gun fire.

6. The combination with a gun having a gas check seat, of a breech plug also having a gas check seat, and a gas check having an annular wave shaped sealing surface normally bearing against the seat on the gun and the seat on the plug at the crest of the wave and forced toward said seats at the trough of the wave by chamber pressure.

7. The combination with a gun having a gas check seat, of a breech plug also having a gas check seat, and a gas check formed of mutually connected portions, the exterior surface of the outer portion and the interior of the inner portion being wave shaped and in annular contact with the gas check seats on the gun and plug respectively at the crests of the waves.

8. In a breech loading gun, an annular gas check having a U-shaped cross section and its sealing surfaces wave shaped.

9. In a breech loading gun, an annular gas check having a U-shaped cross section and its sealing surfaces wave shaped, and an annular member disposed in the resulting cavity of the gas check which serves to partially fill said cavity and act to pull the gas check rearward when opening the breech.

10. A gas check for breech loading guns the cross section of the normal shape of which embodies a continuous succession of reverse curves.

11. The combination with a breech loading gun, of a gas check seat on the gun, a gas check including a sealing surface coacting with the seat, said seat and sealing surface normally having spaced surface portions in engagement and operable to an increased surface engagement by chamber pressure.

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

DORSEY F. ASBURY.

Witnesses:
C. G. Evans,
E. Stowell.