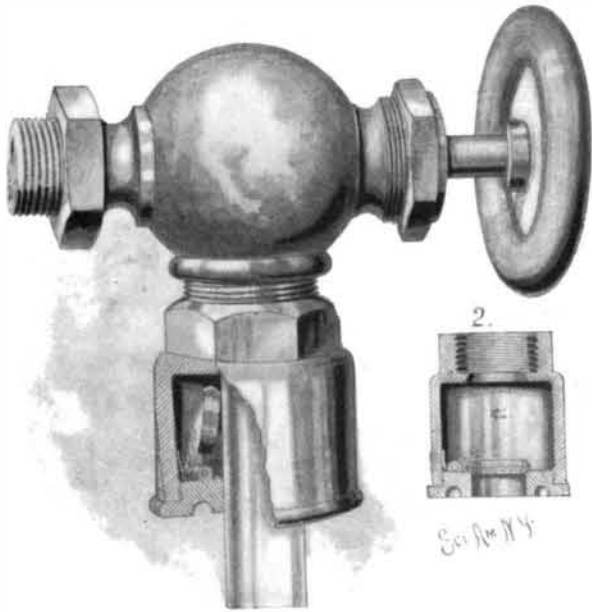


A SAFETY WATER GAGE FOR BOILERS.

The illustration represents a gage for marine or other boilers, so arranged that the gage will immediately close on the breaking of the glass, preventing the escape of steam and water from the boiler. It is designed to be of especial value for ships' boilers inclosed within narrow limits, and in general for high pressure



FROEHLICH'S WATER GAGE FOR BOILERS.

boilers. It has been patented by Henry Froehlich, of Honolulu, Hawaii. Fig. 1 represents in perspective the upper part of the gage, with a portion of its valve section broken out, showing a sectional view with the valve open, it being understood that there is a similar valve at the top and bottom of the gage, communicating with the steam and water spaces respectively, the bottom valve being inverted. Fig. 2 is a sectional view, the glass being removed and the valve seated. The gage is secured to the boiler by the usual heads, connected by the gage glass, and on opposite faces of the heads are the safety devices, taking the place of the usual packing nuts, and through which extend the upper and lower ends of the glass. In the open end of each casing screws a cover having a central valve seat for the passage of the end of the glass and the reception of a pivoted valve, which normally rests against the side of the glass, as shown in Fig. 1. A spring presses on the valve, and, in case of the breaking of the glass, contributes, together with the pressure of the water or steam, to insure its instant closing. The valve has a beveled edge, and its surface is concave, so that the steam or water may most efficiently act to force it instantly to closed position as soon as its normal support, the glass, is removed, and thus prevent the escape of steam or hot water from the boiler, the upper valve swinging downward to its seat and the lower valve swinging upward.

HUMBERT'S NOISELESS GUN.

The suppression of smoke in firearms is considered an advantage, but how would it be if we should succeed also in suppressing the noise and the flash that accompany every discharge of a cannon or musket? We should succeed in carrying on a battle in silence, and somewhat, too, after the manner of blind people, as there would no longer be anything to reveal the position of a battery of artillery, even at night. But we cannot very well conceive of a silent battle, and one

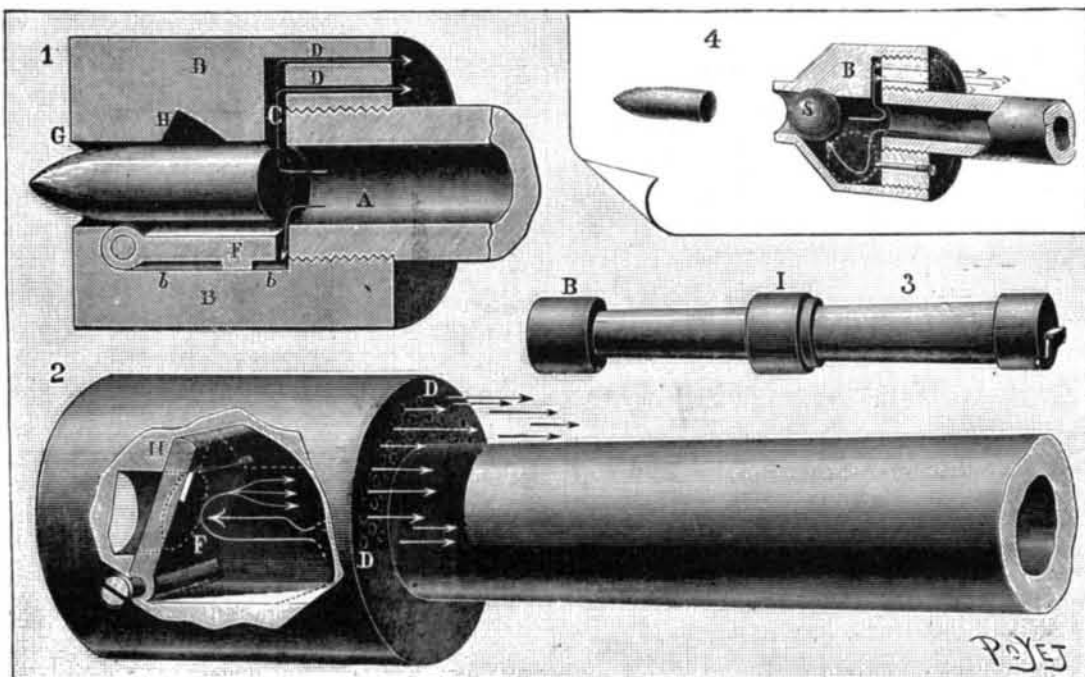
without cannon or musketry. In days of old, when only side arms were known, a hand to hand conflict was inevitable, and the air was filled with the shouts of the combatants. With long range weapons it would be entirely different, and we should all at once see a regiment arrested in its march, decimated by a shower of balls, without any indication to guide the return fire.

The thing appears possible, at least in part, according to the recent experiments of Colonel Humbert, who proposes to close the extremity of the gun, as soon as the projectile has made its exit, so that there shall be no flash, and that the air shall be prevented from abruptly entering the piece—such entrance being one of the causes of the detonation. By the same fact, the recoil is very greatly reduced, if not completely annihilated.

The system devised by Colonel Humbert for attaining such a result consists of a block, B (Fig. 1, Nos. 1 and 2), which is screwed to the extremity, A, of the muzzle, which has been previously threaded to this effect. This block has an aperture of the same diameter as that of the bore of the gun, and toward its center there is a chamber, H, in which there is a shutter, F, that pivots at one of its extremities. This, in its normal position, is horizontal (No. 1), and lies in a recess prepared for its reception. Beneath there is an empty space, b b. When the powder is ignited, the projectile takes on, as usual, its full velocity; but, at the moment at which it is about to make its exit through the extremity, G, of the block, a portion of the gas, still at a very high pressure, flows under the shutter, F, and forces it to rise and assume a vertical position (No. 2). It thus prevents the exit of the flame as well as of the gas, which escapes with a relatively feeble velocity through a number of small apertures, D (Nos. 1 and 2), formed in the rear end of the block. The air cannot enter until the pressure is almost null, and it then produces neither noise nor recoil. In order that the escape of the gas in the rear may not discommode the gunner, there is arranged at a short distance from the block a screen, I, against which the velocity of the gas is checked.

For a musket the apparatus is the same, with the exception that for the shutter there is substituted a ball, S (No. 4), which performs the same role.

When the inventor submitted his idea to the ministers of war and navy, it was not thought that there was any reason for taking it seriously, and he was permitted to patent it and make whatever he thought proper out of it. Left thus to his own initiative, he was obliged to seek in some private manufactory the means of making a practical experiment. The Hotchkiss establishment put itself at his disposal, and experiments were made with a gun of 37 mm. caliber. The experiment gave, in the main, the results that had been anticipated: the flash was scarcely visible and the noise was greatly reduced. The recoil, however, still existed in a large measure; but the value of such a system cannot be judged from a few hasty tests.



THE HUMBERT NOISELESS GUN.

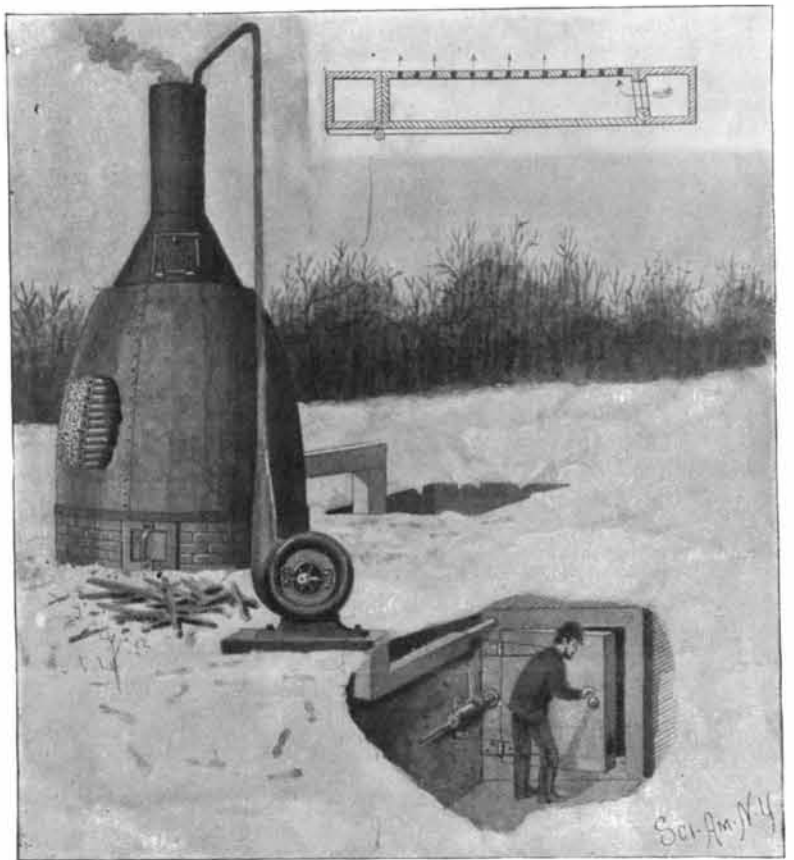
1 and 2. Block, B, screwed to the muzzle, A, of a gun; G, projectile; F, shutter; D D, apertures for the escape of the gas. 3. The entire barrel: B, the block; I, the screen. 4. The device applied to a musket: B, the block; S, ball valve.

The inventor, guided by the remarks made at the experiments, has worked further upon the problem, and expects to reach a complete solution of it. The artillery committee has, on its side, recognized the fact that there is reason for not remaining indifferent, and it is with its aid that some new experiments are to be made.

One great advantage of this invention is that it does not essentially modify the present material. It will suffice to add thereto the block that we have described, and the expense of this will be slight as compared with that which any important modification of our armament usually involves.—La Nature.

AN APPARATUS FOR THAWING FROZEN GROUND.

To thaw frozen ground and facilitate the working of shafts and tunnels therein, an apparatus to direct and retain the heat of a furnace upon the face of an excavation, while also rendering access practicable to such face, is shown in the accompanying illustration, and has been patented by William E. Harris, of No. 207 Twenty-eighth Street, Chicago, Ill. The cone-shaped firebox of the furnace is formed by a coil of pipe



HARRIS' THAWING APPARATUS.

covered by a layer of clay inside the shell, there being a suitable outlet at the top for the escape of the smoke and gases, and through which the upper end of the coil extends, to connect with a blower, by which air is forced through the pipe to be heated by the burning fuel. The lower end of the coil is extended through a box or conduit, where it is surrounded by sand or other non-conducting material, to the ground to be thawed, where it connects with a sleeve held on a shield set against the ground at the end of the tunnel. The shield consists of a hollow frame with central hollow door, there being apertures in the walls of the frame and door, allowing the heated air to pass directly in contact with the frozen ground against which the shield is placed. A jack holds the shield in position as the thawing proceeds, the door being opened from time to time to remove the ground, and the shield being moved forward accordingly, the pipe connecting with the coil being lengthened as the work progresses.

Cheese as a Food.

The London Family Doctor says: "Cheese is a very rich and valuable food, likely to form a very large constituent in the future, and, especially for the working-man, to be very extensively used. There is a difference in stomachs in their ability to digest this article. The writer is able to make an entire meal of cheese with very little bread, and digest it more easily than rice or oatmeal; but in most stomachs it is less digestible, in some, extremely so. Each person must learn for himself. It is a convenient form of animal food, and, when good, particularly agreeable.

"There is a great difference in the composition of cheese both in its water, fat and nitrogenous matter. In general, however, it may be remarked that every variety contains a large amount of nitrogenous matter, and it is for this that it is especially useful as a food. Skim milk cheese is especially rich in this constituent, but less rich in fat. Those who abstain from flesh food will find in cheese abundance of nitrogenous matter to take the place of that found in flesh."