

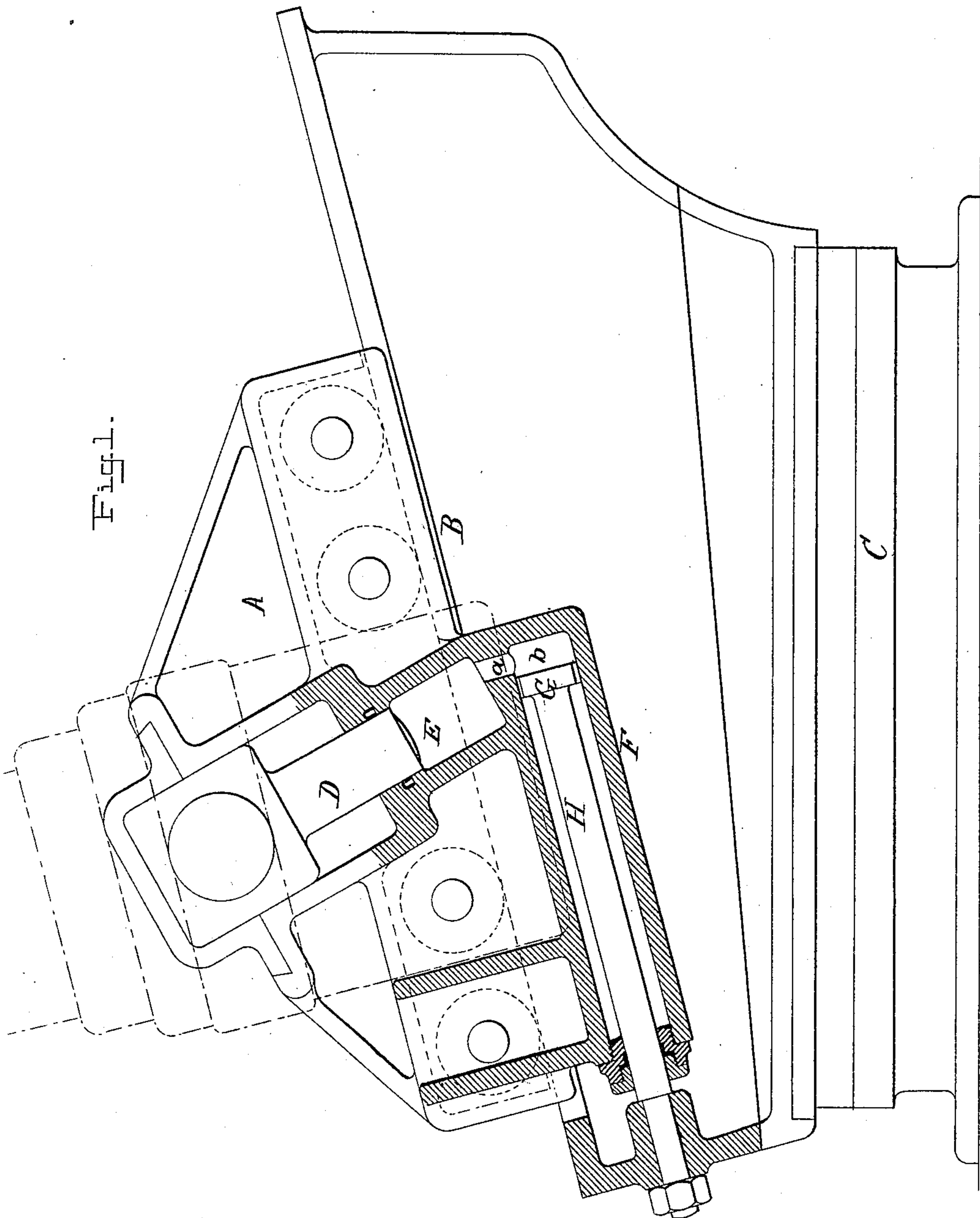
(No Model.)

2 Sheets—Sheet 1.

H. SCHNEIDER.
HYDRAULIC BRAKE FOR ORDNANCE.

No. 428,418.

Patented May 20, 1890.



WITNESSES:

E. J. Griswold
George Baumann

INVENTOR

Henri Schneider

BY

Howson and Howson
his ATTORNEYS

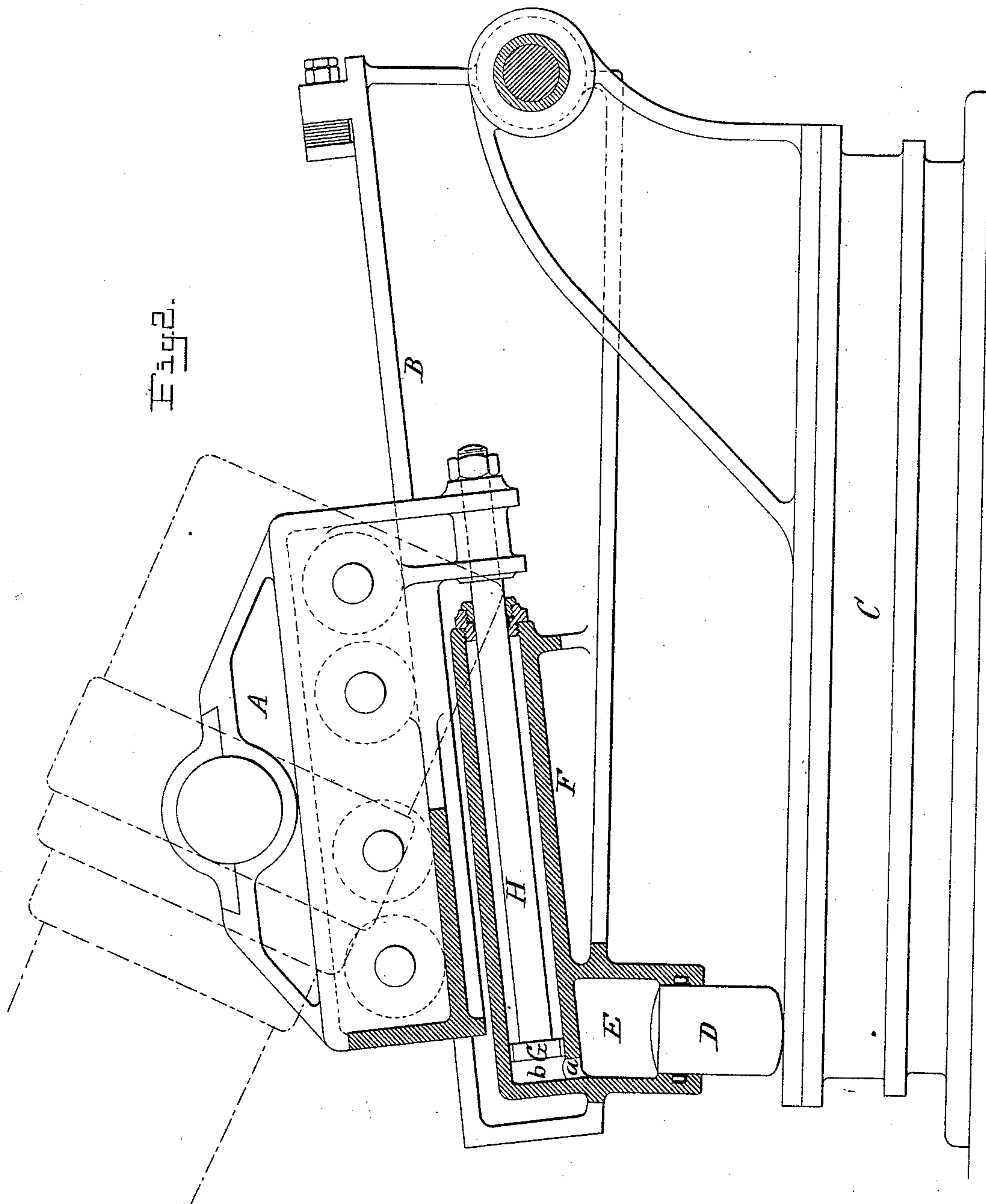
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UNITED STATES PATENT OFFICE.

HENRI SCHNEIDER, OF CREUSOT, FRANCE.

HYDRAULIC BRAKE FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 428,418, dated May 20, 1890.

Application filed January 30, 1890. Serial No. 338,654. (No model.)

To all whom it may concern:

Be it known that I, HENRI SCHNEIDER, a citizen of the Republic of France, and a resident of Creusot, Soane et Loire, France, have
5 invented a System of Conjugated or Combined Hydraulic Brake for Ordnance, of which the following is a specification.

The system of conjugated or combined hydraulic brake for ordnance to which the present invention relates has for its object, first,
10 to limit the recoil of the gun; second, to diminish the effects of concussion or vertical strain, and, third, to store up a part of the force developed in the recoil in order to assist
15 in subsequently bringing the gun back to firing position. When a piece of ordnance is placed on a support, cradle, or carriage capable of sliding or rolling on horizontal or inclined ways, the effects of the discharge are
20 translated into a recoil of the piece and its support and a powerful vertical downward pressure on the platform or way. The force of this pressure or concussion increases in proportion as the angle formed by the barrel
25 with the direction of recoil is increased, so that in the case of guns fired at a considerable elevation, and especially mortars discharged at seventy or even seventy-five degrees, the vertical strain on the platform or
30 mounting is considerable and the recoil very slight, or *nil*. The system of conjugate or combined brake provided according to this invention enables this percussion or vertical strain to be largely diminished and compels
35 the carriage to recoil invariably. As a practical result, the supports or mountings are enabled to be made lighter, generally being exposed to smaller strain, and it is rendered possible to discharge the most powerful guns
40 and mortars at a very great elevation without danger of damaging the platforms and structures on which they are carried.

The accompanying drawings illustrate, by way of example, two arrangements of hydraulic brakes according to this invention, as
45 hereinafter described.

Figure 1 of the said drawings illustrates in vertical section a mortar-mounting, composed, as usual, of a carriage A, an inclined way B,
50 and a base or platform C, on which the upper parts rotate. Fig. 2 is a similar view of a modification.

The gun or mortar illustrated in Fig. 1 is supported on two plungers D, placed under the trunnions and sliding in guides provided
55 in the body or cheeks of the carriage. These plungers enter chambers E and are supported by the liquid contained therein. The chambers E form hydraulic press chambers or cylinders communicating through passages *a* with one
60 or two ordinary hydraulic brake-cylinders F, in which work pistons G, firmly connected to the frame by their rods H. The recoil of the carriage is braked by the passage of the liquid from the front to the rear end *b* of the brake-
65 cylinder, the flow of the liquid being regulated, so as to vary the speed of the recoil according to any desired law, either by drilling suitable holes in the pistons or by providing grooves or ribs of varying profile in the sides of the cylin-
70 ders, or by any other suitable arrangement. When the piece is fired in a direction parallel with the ways, for example, the piece and its carriage recoil and the liquid compressed between the front ends or heads of the brake-
75 cylinders and their pistons retards the recoil by its escape. The rods H being drawn out of the cylinders, a quantity of liquid corresponding to the volume of the said rods passes from the press-chambers E into the brake-
80 cylinders. When the momentum of the recoil has been completely absorbed, the carriage stops and then returns to battery, owing to the incline of the way, and the liquid driven out of the brake-cylinders by the
85 return of the rods H forces up the plungers D in the chambers E, thus returning the piece to the firing position. When firing very high the recoil still takes place; but in this case it is the result of the concussion or
90 vertical shock, which tends to depress the plungers D in the chambers E, expelling the liquid which they contain into the brake-cylinders, where the pressure of the liquid between the piston connected to the fixed ways
95 and the cylinder connected to the movable carriage causes the latter to recoil. The concussion or vertical force in this case is employed to produce work—the elevation of the carriage on the inclined way—and in order to
100 insure the complete and automatic return of the gun to battery it suffices to regulate the inclination, so that the work produced may be equivalent to what is required in order to

force the plungers up again in the press-chambers and bring the piece back to the firing position. The inclination of the way thus depends on the proportion of the weight
 5 of the carriage to the weight of the piece of ordnance which it supports. At whatever angle the piece may be fired it descends or drops in the carriage during the recoil; but the carriage rises relatively to the way or
 10 support, so that the actual displacement of the piece is in a line which is horizontal or slightly inclined upward.

In the arrangement illustrated in Fig. 1 the conjugate or combined brakes being attached
 15 to the carriage move with it in the recoil; but in the arrangement illustrated in Fig. 2 the brakes, being on the ways or support are fixed, although their action is the same as in Fig. 1. In Fig. 2 the carriage A, carrying the piece,
 20 travels on rollers on the inclined way B during the recoil, carrying with it the pistons G, acting as brakes in the cylinders F, placed parallel to the way. The way oscillates on a center T, and is supported on the platform by
 25 the intervention of the plungers D, working in press-chambers E, communicating with the brake-cylinders F through the passages *a*.

In firing in a direction parallel to the way the recoil takes place and is controlled in the
 30 usual manner; but when firing at an angle upward the recoil is accelerated or assisted by the entry of the plungers D into the pressure-chambers and the simultaneous expulsion of the piston-rods H. The return to battery is
 35 likewise effected by the suitable inclination of the way. This system of conjugate combined brake thus compels the carriage to recoil independently of the angle of firing, thus greatly reducing the shock or vertical strain
 40 on the supports, and when combined with a suitably-inclined way enables the gun or

mortar to run out in battery effectually and automatically without the aid of spring or compressed-gas accumulators.

This brake can evidently be applied to any
 45 construction of mounting for service on land or water, and the forms and dimensions of the constituent parts and the nature of the materials can be altered according to circumstances without departing from the principles
 50 of the invention.

I claim—

1. The combination of a gun, its carriage and base, with a hydraulic brake for the recoil, and an upright hydraulic press whose
 55 cylinder communicates with the cylinder of the hydraulic brake to absorb the vertical shock and translate it into a movement of recoil, as and for the purpose set forth.

2. The combination of a gun, its carriage
 60 and base, with a hydraulic brake for the recoil, a hydraulic cylinder communicating with the brake-cylinder, and a plunger in the said hydraulic cylinder forming a support for the gun in a vertical direction, substantially as
 65 described.

3. The combination of a gun, its carriage and base, with hydraulic brake-cylinders on the carriage, fixed pistons therefor, hydraulic
 70 cylinders also on the carriage and communicating with the brake-cylinders, and plungers in the said hydraulic cylinders supporting the trunnions of the gun, all substantially as described.

In testimony whereof I have signed my
 75 name to this specification in the presence of two subscribing witnesses.

HENRI SCHNEIDER.

Witnesses:

CHARLES BRÉNORY,
 LÉON FRANCKEN.