B. B. HOTCHKISS.

WHEEL-BRAKE.

No. 186,565. Patented Jan. 23, 1877.

Fig:1.

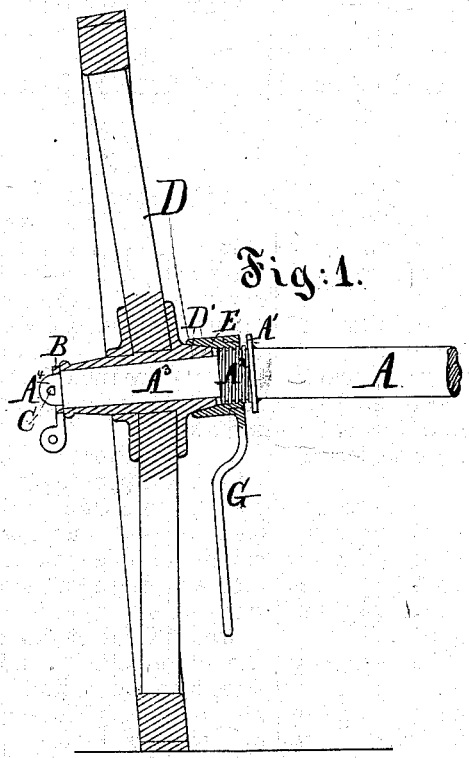
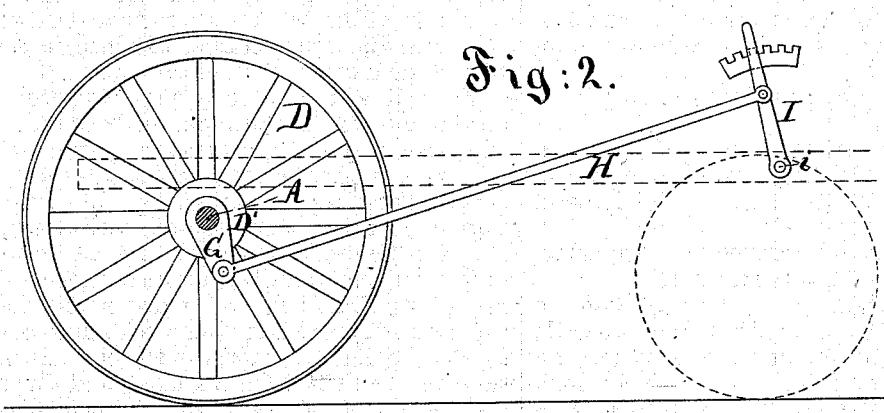



Fig:2.




Witnesses:

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Inventor:

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by his attorney

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# UNITED STATES PATENT OFFICE.

BENJAMIN B. HOTCHKISS, OF NEW YORK, N. Y.

## IMPROVEMENT IN WHEEL-BRAKES.

Specification forming part of Letters Patent No. **186,565**, dated January 23, 1877; application filed September 29, 1876.

*To all whom it may concern:*

Be it known that I, BENJAMIN B. HOTCHKISS, of New York city, in the State of New York, temporarily residing in Paris, France, have invented certain new and useful Improvements relating to Wheel-Brakes, of which the following is a specification:

The invention is more especially applicable to artillery, in which it is desired to hold the wheels and prevent their revolving during the recoil of the piece, and to liberate them for the advance movement.

In working guns it is desirable to reduce the time of replacing the piece in battery after each discharge. For this and other purposes it is desirable to reduce the extent of the recoil by retarding or arresting the revolution of the wheels during the recoil, and allowing them to revolve freely during the replacing movements.

I have invented a brake which, in addition to other advantages, adds but little to the mechanism, and does not interfere with the removal and exchange of wheels whenever necessary from accident or other cause.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a vertical section through an artillery-wheel with my brake. Fig. 2 is a side elevation, representing the application thereof to carriages.

Similar letters of reference indicate corresponding parts in both the figures.

Referring to Fig. 1, A is the main body of the axle. $A^1$ is a collar; $A^2$, a screw-thread; $A^3$, the wheel-bearing; and $A^4$, the projecting end, receiving a washer, B, and linchpin C. The wheel D, constructed in any suitable manner, turns on the part $A^3$ of the axle, and presents a conical hub, D′, towards the collar $A^1$. E is a stout collar or brake-ring, having a conical cavity adapted to match on the wheel-cone D′, and a female screw-thread adapted to match on the screw-thread $A^2$. A lever, G, is forged with or otherwise firmly connected to the brake-collar E.

As the wheel turns it tends with more or less force to turn the brake-collar in the same direction. In one way of turning, the screw-threads $A^2$ move the brake-collar away from the wheel, and soon leave it at liberty. The other way of turning tightens the brake-collar upon the wheel, and tends to soon bind it fast, after which the wheel can no longer turn in that direction, and must stand fixed until some sufficient force is applied in the opposite direction.

With artillery, a right-hand screw-thread and correspondingly-threaded collar is applied on one side of the gun, and a left-hand screw-thread and correspondingly-threaded collar is applied on the other side. The example represented is on the left side of the gun, where a left-handed thread, $A^2$, is required. The fact that one is right-handed and the other is left-handed causes both to be tightened by a similar motion of the piece, and both to be loosened by a motion in the opposite direction.

My brakes can be thrown out of use, when desired, by simply turning the levers G, and consequently the brake-rings E, sufficiently back away from the hub D′, so that the latter shall exert no considerable influence on it to turn it during the recoil of the gun.

When it is desired to put my invention in use the gun is first brought in battery, and while one man is laying the gun, another or others turn the levers G on the respective sides of the piece, and bring the brake-ring E into more or less tight contact with the hub D′. On the discharge of the piece the wheel in commencing to turn exerts its friction on the brake-ring E, and in the endeavor to turn it therewith tightens it further. This automatic tightening insures that the wheel shall not turn far before it becomes fixed, and during the remainder of the recoil movement the wheels drag forcibly on the ground, and soon bring the gun to rest.

In returning the gun to position, a sufficient force being applied, the wheels will turn of themselves in the right direction, and, by so turning, will turn the screw-rings E and soon set the wheels entirely at liberty. The labor may be reduced by turning the brake-ring E to a proper extent in the loosening direction,

by means of the lever G, before or simultaneously with the application of the necessary force to move the gun forward.

It will be seen that my brake-ring may be put on and taken off, either automatically by the motion of the wheel itself, or by hand, by the motion of the lever G, or by a combination of both modes of working.

Referring to Fig. 2, all the parts immediately adjacent to the brake may be the same as before. But instead of applying the hand directly to the lever G, a rod, H, is pivoted thereto and connects it to a hand-lever, I, turning on a fixed center, *i*, and adapted, by an ordinary locking-catch, (not represented,) to be set in various positions. By changing the position of the lever I, the brake may be held on or off or in an intermediate position.

The cone D′ and the corresponding hollow interior of the adjacent portion of the brake-ring E may be made with wide variations in the degree of inclination. I esteem it essental, however, to success in working automatically that the inclination be very gradual, so that the friction between the wheel-hub and the check-ring shall be much greater than that between the check-ring and the screw-threads. But when the brake is to be worked largely or entirely by hand, and especially its position is to be controlled by a lever, I, so that it cannot move automatically, it may be expedient to greatly change the inclination of the cone.

The device may be worked with some success by simply matching plane surfaces together, without any attempt at inserting one within the other.

The lever G on one side of the gun or carriage may be connected, by a cross-bar or otherwise, with the corresponding lever on the opposite side, so as to compel both to move together, if preferred, in any case. For artillery purposes, however, it is preferable to have them separate and allow one to turn to a greater extent than the other, if necessary.

So far I have said little of the collar $A^1$. The device may be successfully used without such collar. But I deem this collar $A^1$ important. It prevents the brake-ring E from ever being screwed back unnecessarily far. And if it is desired at any time to keep the brake-ring E entirely and positively out of contact with the wheel the brake-ring may be simply screwed up tight against this collar $A^1$. This will prevent any accidental application of the brake. As preferably adjusted, a half turn or about that motion of the brake-ring serves to carry the brake back or inward from the wheel and to bring it over hard against the collar $A^1$. Such adjustment can be easily obtained by a little care in fitting all the parts, and it allows the lever G to be of any length desired. It is important to so apply the parts that the inertia of the lever G shall tighten rather than slacken the screw by the recoil of the gun.

The invention may be used with advantage not only on guns which recoil at each discharge, but also on machine-guns of the character known as Gatling and others, where the discharges are rapid and are individually of too little force to cause a recoil. In the latter, the machine being placed in position and carefully laid, the tightening of my brakes performs an important function in bracing and stiffening the support, so that there is no looseness or shackling due to the play of the axle within the wheels.

I claim as my invention—

1. The brake-ring E and screw-thread $A^2$, in combination with a carriage axle and wheel, as herein specified.

2. The conical boss D′ on the wheel, in combination with the brake-ring E, having an interior corresponding surface, E′, and with the screw-thread $A^2$ on the axle, as herein specified.

3. The brake-lever G, in combination with the threaded brake-ring E, and with the threaded axle, and with a wheel mounted as herein specified.

4. The collar $A^1$, in combination with the screw-thread $A^2$ on the axle, and with a brake-ring mounted thereon, so as to limit the motion of the brake-ring and to hold it firmly in the "off" condition when required, as herein specified.

In testimony whereof I have hereunto set my hand this 26th day of September, 1876, in the presence of two subscribing witnesses.

B. B. HOTCHKISS.

Witnesses:

THOMAS D. STETSON,

A. HENRY GENTNER.