(No Model.)

G. A. GUNTHER & H. W. HUBBARD.

SNOW PLOW.

No. 294,382. Patented Mar. 4, 1884.

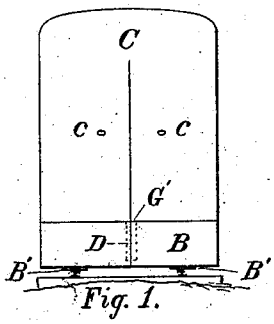


Fig. 1.

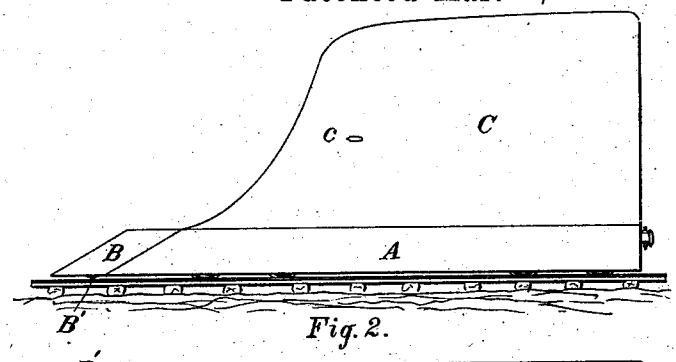


Fig. 2.

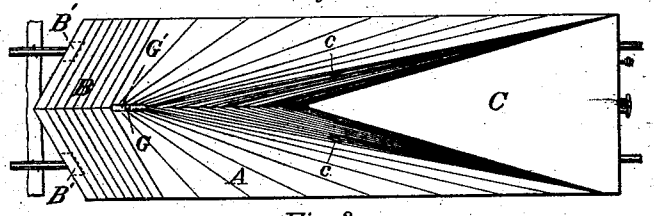


Fig. 3.

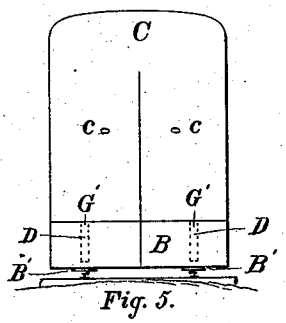


Fig. 5.

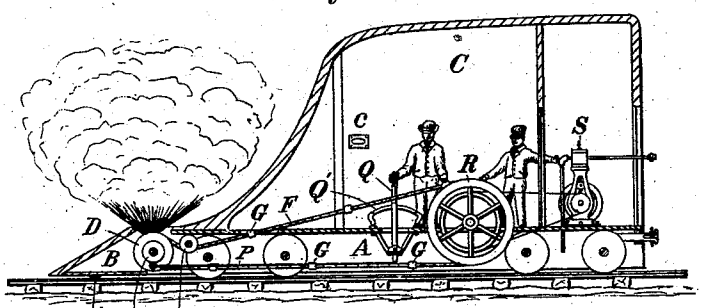


Fig. 4.

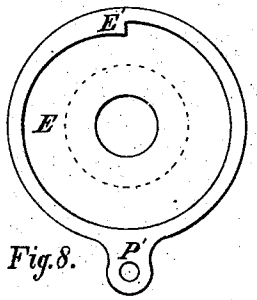


Fig. 8.

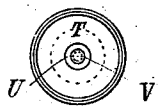


Fig. 10.

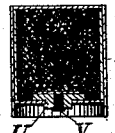


Fig. 11.

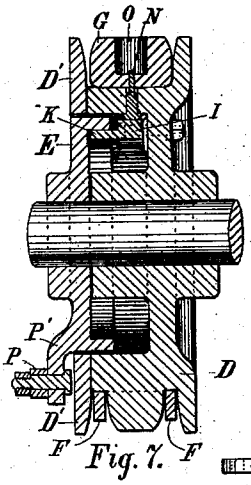


Fig. 7.

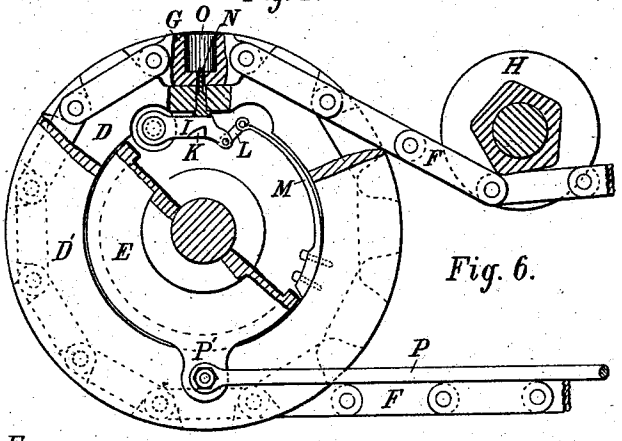


Fig. 6.

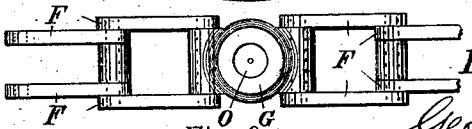


Fig. 9.

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H. Wilbur Hubbard.

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UNITED STATES PATENT OFFICE.

GEORGE A. GUNTHER, OF NEW UTRECHT, AND H. WILBER HUBBARD, OF BROOKLYN, NEW YORK.

SNOW-PLOW.

SPECIFICATION forming part of Letters Patent No. 294,382, dated March 4, 1884.

Application filed October 9, 1883. (No model.)

To all whom it may concern:

Be it known that we, GEORGE A. GUNTHER, of New Utrecht, Kings county, New York, and H. WILBER HUBBARD, of Brooklyn, Kings county, New York, citizens of the United States, and residents of New Utrecht, Kings county, New York, and Brooklyn, Kings county, New York, respectively, have invented certain new and useful Improvements in Snow-Plows, of which the following is a specification.

The object of our invention is to provide a new and improved snow-plow, provided with means for rapidly loosening and scattering the snow in front of the plow by means of explosives, to facilitate the advancing of the plow.

The invention consists in a snow-plow provided with a chain having receptacles for torpedoes or cartridges, which are fired by an automatically-operating hammer.

The invention also consists in a cam-disk for operating the hammer, in means for adjusting the hammer to fire the cartridges or torpedoes at or in different positions, in the construction of the plow, and in numerous other parts and details, as will be fully described and claimed hereinafter.

In the accompanying drawings, in which like letters of reference indicate like parts, Figure 1 is a front view of our improved snow-plow. Fig. 2 is a side view of the same; Fig. 3, a plan view. Fig. 4 is a longitudinal sectional view. Fig. 5 is a front view of a modification. Fig. 6 is an enlarged side view of the wheel over which the chain carrying the torpedoes passes, and of the chain, parts being shown in section. Fig. 7 is a cross-sectional view of the pulley. Fig. 8 is a side view of the eccentric or cam disk for operating the firing mechanism. Fig. 9 is a plan view of the mortar and part of the torpedo-carrying chain. Fig. 10 is a plan view of the cartridge. Fig. 11 is a cross-sectional view of the same.

A is a flat car, low and strongly built, and on the front end of it a pilot-plow, B, is fastened, which is provided on its bottom with a chilled plate, B′, above each rail, so that in case the snow is packed and forces the pilot-plow downward the chilled plates B′ will be forced on the rails until the load on the pilot-plow is removed. The chilled plates slide on the track when the pilot-plow is weighted, and do not wear off as rapidly as if made of ordinary iron.

On the car A the snow-plow proper is built, very heavily and strongly, of iron plates, and is provided near its front end with a longitudinal slot, G′, below which the firing-wheel D is journaled, which firing-wheel is provided with teeth, like a cog-wheel or a sprocket-wheel, for receiving the links of the chain F, and with a single recess for receiving the mortars G, which are members of an endless link-chain, F, the mortars being arranged the length of the periphery of the wheel D apart, so that for every revolution of the wheel D one mortar will enter the recess formed for receiving them in the rim of the wheel. The endless chain F also passes over a sprocket-wheel, R, located farther back in the plow C, and mounted on the same shaft with a pulley over which a belt passes, which also passes over a driving-pulley of a steam-engine, S, in the rear part of the plow, whereby the wheels R and D can be revolved by the engine.

The mortars G are each provided with a cavity, O, adapted to receive cartridges or torpedoes T, and in the bottom each mortar is provided with an aperture for receiving a firing-pin, N, projecting loosely through the bottom of a recess in the wheel D, the lower end of the pin resting on a lever or hammer, I, pivoted at one end to the wheel D, and having its other end coupled by a link, L, with the free end of a spring, M, having its opposite end also fixed to wheel D, whereby the firing-pin N will be pressed in the direction toward the periphery of the wheel D.

The hammer I is provided with a laterally-projecting finger, K, which projects under the laterally-projecting cam-rim of a cam-disk, E, loosely mounted on the shaft of the wheel D, adjoining to the said wheel. The cam rim or track of the disk E is provided with an eccentric inner surface having a shoulder or projection, E′. Diametrically opposite the projection E′ the disk E is provided with an arm, P′, which is pivoted to one end of a rod, P, the opposite end of which is pivoted to a downwardly-projecting lever, Q, provided with a locking-lever for locking it in the desired position on a notched quadrant, Q′.

The endless chain passes under a depressing-wheel, H, a short distance from the inner end of the slot G, to admit of firing at an angle to the rear. If desired, two firing-wheels D can be provided, and in that case the plow must be provided with two slots G′, as shown in Fig. 5.

The snow-plow C is provided with small bull's-eye windows *c*, to admit of the operator seeing ahead.

The cartridge T is constructed with a shell of paper or metal, and provided at one end with a flanged head, on the under side of which a cast-iron plate, U, is held, which is provided with a vertically-apertured boss or hub. The boss projects through a hole in the head, but is not flush with the end of the cartridge. A piece of paper, &c., is pasted on the inner surface of the plate U, to prevent the powder from passing out of the shell through the aperture in the boss. The fulminate or cap V is placed into the hole in the boss before the cartridge is inserted within the mortar. The cartridge can be capped at the time of manufacture, thus making it fixed ammunition.

The operation is as follows: The cartridges T are placed into the mortars G, with the cap V at the bottom of the mortars, while the mortars are passing the top of the wheel R, and when the cartridges are to be fired the wheel R is revolved by the engine. The wheel D revolves, but the disk E does not, and as the finger K of the hammer I rests on the cam-track of the disk E the hammer will gradually be pressed downward—that is, toward the shaft—until its finger K arrives at the shoulder or projection E, and when the finger passes the said shoulder or projection E the spring M, which has been brought in tension, suddenly snaps or forces the hammer I upward, thereby driving the firing-pin N upward and causing it to strike the cap or fulminate V, thereby igniting the explosive material in the cartridge and exploding the cartridge or torpedo. The force of the explosion exerts itself upward and through the slot G′, thereby loosening and scattering the snow in front of the plow, thus enabling the plow to be pushed forward.

As shown in the drawings, the disk E is so adjusted that the cartridges will be exploded when directly above the shaft. By means of the rod P and the lever Q the disk E can be adjusted so that the cartridges will be exploded near one end or the other of the slot G′—that is, the transverse axis passing through the middle of the hammer and the arm P of the disk E can be inclined more or less either toward the front or rear, and this causes the hammer to be in advance of or beyond the vertical line through the shaft, and thus the cartridge will be expoded before or after it is vertically above the shaft. The direction of the force of the explosion can thus be adjusted as may be desired.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A snow-plow combined with a chain provided with pockets or mortars for receiving cartridges or torpedoes, substantially as specified.

2. A snow-plow combined with a chain provided with mortars for receiving cartridges or torpedoes, and a firing-wheel over which the said chain passes, substantially as specified.

3. The combination, with a snow-plow, of a chain provided with mortars for receiving torpedoes or cartridges, and a toothed wheel over which the chain passes, the wheel being provided in its periphery with a recess for receiving the mortars successively, substantially as specified.

4. The combination, with a snow-plow, of a chain provided with mortars for receiving cartridges or torpedoes, a firing-wheel over which the said chain passes, and a firing mechanism, substantially as specified.

5. The combination, with a snow-plow having a slot in its top, of a wheel journaled below the slot, a chain passing over the wheel and provided with mortars for receiving cartridges or torpedoes, and a mechanism for firing the cartridges or torpedoes, substantially as specified.

6. The combination, with a snow-plow, of a wheel, a chain passing over the said wheel and provided with mortars for receiving cartridges or torpedoes, a firing-pin held loosely in the rim of the wheel, and a mechanism for forcing the pin against the cap or fulminate of cartridges held in the mortars in the chain, substantially as specified.

7. The combination, with a snow-plow, of a wheel, a chain passing over it and provided with mortars for receiving cartridges or torpedoes, a firing-pin passing loosely through the rim of the wheel, a spring-hammer adapted to strike the pin, and a cam-disk for operating the hammer, substantially as specified.

8. The combination, with a snow-plow, of a wheel, D, the chain F, provided with mortars G, the firing-pin N, held loosely in the rim of the wheel D, the hammer I, pivoted to the wheel, the spring M, connected with the free end of the hammer and fastened to the wheel, the finger K on the hammer, and the cam-disk E, mounted loosely on the shaft of the wheel D, and provided with a shoulder, E′, in its track, substantially as specified.

9. The combination, with a snow-plow, of the wheel D, the chain F, provided with mortars G, the firing-pin N, held loosely in the rim of the wheel D, the hammer I, pivoted to the wheel, the spring M, acting on the hammer, the disk E, having a cam-track provided with a shoulder, E′, the finger K on the hammer I, the connecting-rod P, and the lever Q, substantially as specified.

10. The combination, with a snow-plow, of a wheel, a chain passing over the same and provided with mortars for receiving cartridges or

torpedoes, a firing mechanism for firing the torpedoes, a cam-disk for operating the firing mechanism, and means for adjusting the cam-disk according to the desired direction of the force of the explosion of the cartridges or torpedoes, substantially as specified.

11. The combination, with a snow-plow, of a wheel, a chain passing over the wheel and provided with mortars for receiving cartridges or torpedoes, a firing mechanism, and a steam-engine for operating or driving the chain, substantially as herein shown and described.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two witnesses.

GEO. A. GUNTHER.
H. WILBER HUBBARD.

Witnesses:
FRANCIS C. BOWEN,
ROBT. W. MATTHEWS.