

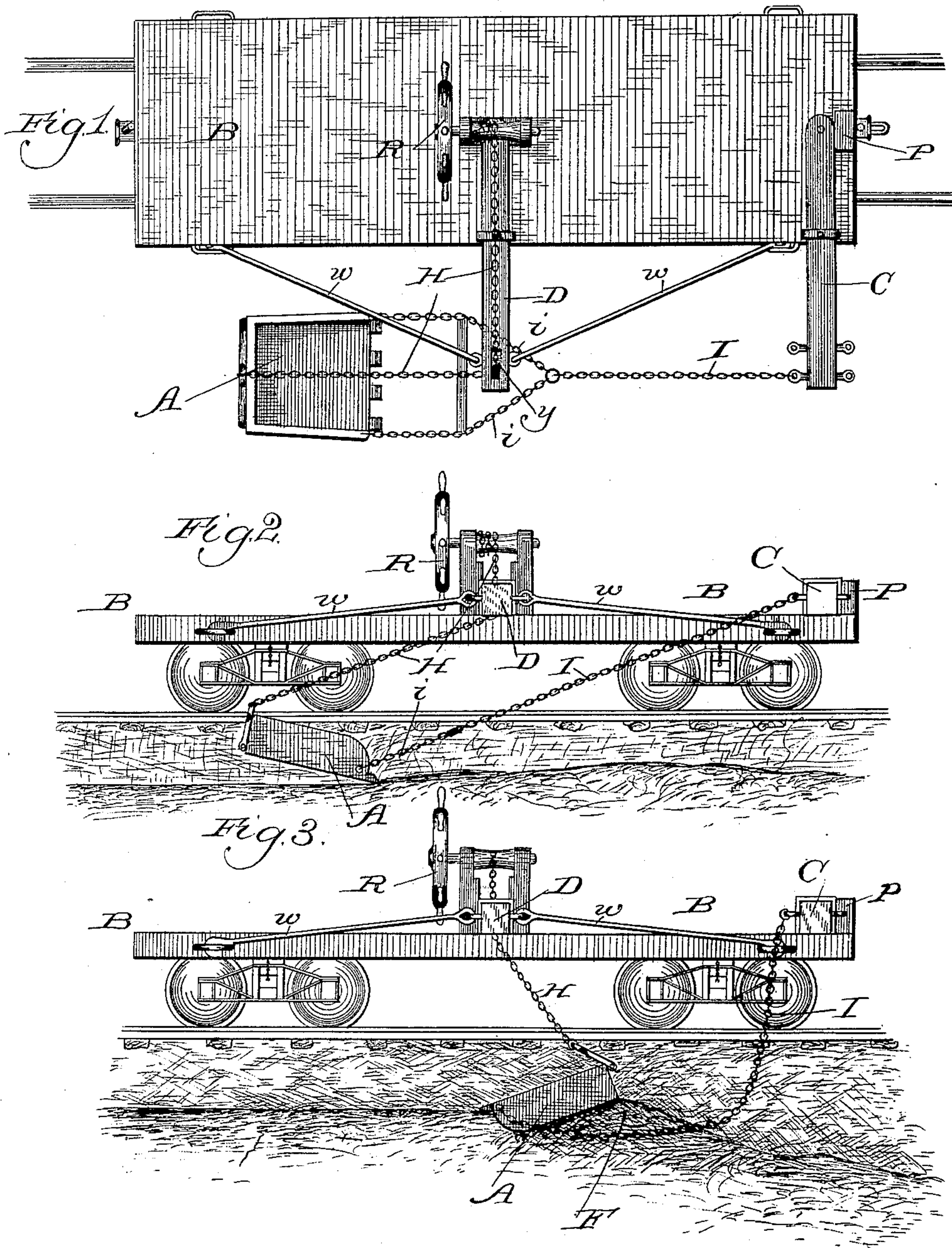
(No Model.)

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G. W. DYE.
RAILROAD DITCHING MACHINE.

No. 339,157.

Patented Apr. 6, 1886.



Witnesses
Chas. E. Gaylord.
Edw. L. Evans.

Inventor:
George W. Dye
By E. S. Hart.
Atty.

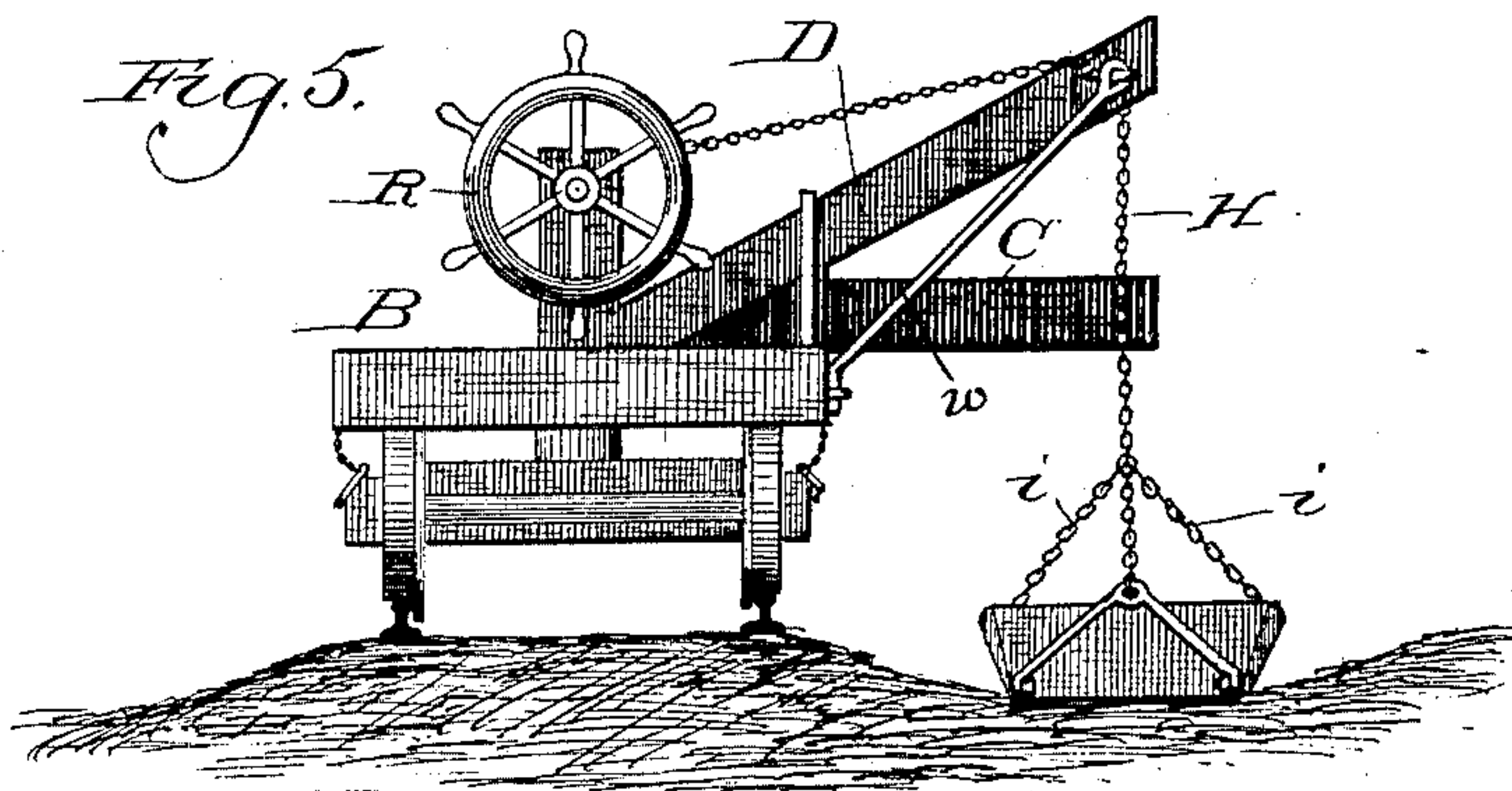
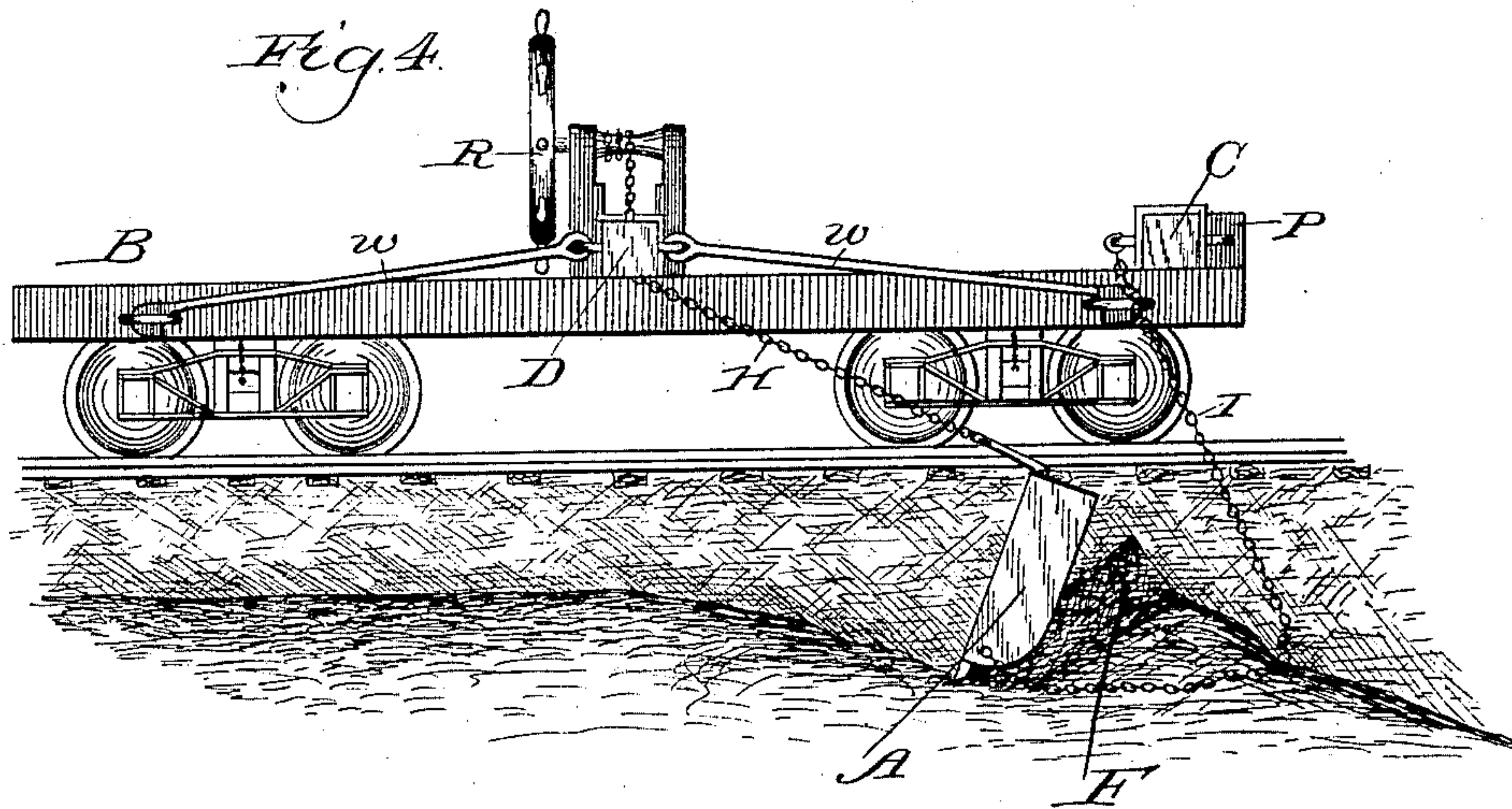
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UNITED STATES PATENT OFFICE.

GEORGE W. DYE, OF WASHINGTON, IOWA.

RAILROAD DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 339,157, dated April 6, 1886.

Application filed July 16, 1885. Serial No. 171,810. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. DYE, a citizen of the United States, residing at Washington, in the county of Washington and State of Iowa, have invented certain new and useful Improvements in Railroad Ditching-Machines, of which the following is a description.

My invention relates to machines for removing earth from ditches at the sides of railroad-tracks, and in "cuts," and at places where it cannot readily be thrown out upon the bank, but must be removed outside the cut. Wherever the soil is easily affected by frost or water these ditches are frequently obstructed by earth sliding into them from the banks, which must be removed to allow the water to run off freely, and in places where the material is wet and sticky this removal is expensive and troublesome. It has been attempted heretofore to employ machinery involving the use of shovels and scoops for this purpose; but the difficulty in unloading or dumping this sticky material from the shovels or scoops has been so great that the practical benefits of such machinery have been greatly diminished. In machinery for this purpose heretofore, where shovels or scoops have been used, it has been attempted to unload or dump them by raising them above the ground, with one end downward, so that the weight of the load would cause it to slide out; or they have been constructed to open outward at the bottom to drop the load, while in others tanks of water are carried and the inside of the shovels or scoops thoroughly wet each time before loading to cause the load to slide out more readily. In others spuds or bars are used to loosen the load from the scoop and to cause it to fall out. All of these devices have proved ineffective to a greater or less extent, as in such devices the weight of the load alone is relied upon to overcome its adhesion to the sides and bottom of the scoops or shovels, and oftentimes this is insufficient, and much delay is caused in unloading or dumping them. It is to overcome this difficulty and to provide a machine by which the material can be easily taken up, removed, and readily unloaded that my improvement is intended. I accomplish these results by the peculiar construc-

tion and operation of my improvement, which I will now proceed to describe.

Figure 1 is a top view of my improvement. Fig. 2, a side view while being loaded; Fig. 3, a side view when the scraper has been overturned in the process of dumping; Fig. 4, another side view showing the scraper in the process of dumping, having been "jerked" away from its load, as hereinafter explained; Fig. 5, an end view showing a variation in the construction, giving a different position to the rear draft-arm, which is advantageous where it is desired to dump the scraper on ground nearly level, as it enables the operator to overturn the scraper, when desired, directly underneath the arm without striking it.

The letter B indicates the platform or floor of the car; the letter A the scraper, built of any suitable material, preferably of iron or steel, of convenient size for handling the dirt, and preferable of about the shape of the ditch desired, having bottom, sides, and rear end, the front end being open, the sides and rear end preferably built flaring from the bottom, making the scraper widest at the top, so that when turned bottom upward the earth will more freely discharge from it, and preferably, but not necessarily, fitted at the front end of the bottom with teeth (shown in Fig. 1) rounded or beveled on the top at their points, so as to more readily enter the earth.

Attached to the scraper near the front end, and preferably at its sides, are the spreading chains *i i*, connecting at suitable distances from the scraper with the front draft-chain, I. These chains *i i* are more conveniently used when held apart by a spreader, (shown in Fig. 1,) which should be placed sufficiently near the scraper to prevent its passing over the back of it when the scraper is overturned. These spreading chains *i i* (which are simply a continuation of the front draft-chain, I,) are attached to the scraper in such a position near the front end that when being drawn forward by them (the rear draft-chain, H, being slack) the nose of the scraper will be drawn upward sufficiently so that it will slide freely over the ground without being drawn into it. The front draft-chain, I, is attached to the front draft-arm, C, at or near its outer end at about the center of the desired ditch. This draft-

arm C projects from the front end of the car, and is held in its place, when in use, by any convenient means, which should for convenience be readily detachable. The rear draft-arm, D, is located on the car back of the front draft-arm, and preferably at or about the center of the car, and it extends beyond the side of the car to about the center of the desired ditch. A preferable construction for both of these arms is pivoting them at one of their ends at or about the longitudinal center of the car, (shown in Fig. 1,) as this construction admits of their being changed and used upon either side of the car. The rear draft-chain, H, connected with the rear end of the scraper by spreading chains or a bail, as shown in Fig. 5, passes through or over the outer end of the rear draft-arm, D, over a pulley, *y*, and to the car, and is there operated by the windlass R, or any convenient device whereby it can be lengthened or shortened at pleasure. The windlass R is preferably attached to the rear draft-arm, D, as it thus turns with the arm, and is always in proper position to operate the chain H upon either side of the car.

The rear draft-arm, D, which becomes an important factor in accomplishing the purpose of my improvement, as will hereinafter appear, and upon which great strain is thrown in dumping the loaded scraper, is firmly held in its projected position, when operating, by any convenient device either at the edge of the car or by the strong stay-rods *w w*, extending from the arm toward the ends of the car, and so constructed and attached as to be readily detachable when it is desired to change the position of the arm.

Short stay-chains (shown in each figure except Fig. 1) should connect the body of the car at each end with the trucks. These are not essential to the operation of my device, but are preferable, as the strain upon the rear draft-arm, D, when dumping very sticky material, is sometimes sufficient to tip the body of the car unless these chains are used, and to inconvenience the operators standing upon the car.

My improvement, being constructed substantially as above described, is operated in the following manner: Any power, but preferably a locomotive, is used in connection with the car, and the scraper H is placed upon the ground where the ditch is to be made in the horizontal position shown in Figs. 1 and 5, the front draft-chain, I, being preferably adjusted at such length as to allow the scraper to extend back of the rear draft-arm, D, (see Figs. 1 and 2,) and being so attached that when drawn forward by the front draft-chain only the scraper will slide over the ground without being drawn into it and filled. The rear draft-chain, H, is now shortened by the windlass R, so that the rear end of the scraper is raised slightly, (the distance depending upon the character of the earth to be taken out, but usually a few inches,) and the scraper is thrown somewhat upon its nose.

(See Fig. 2.) The car is now moved slowly forward. The front of the scraper being inclined downward, it is drawn into the earth until it is sufficiently loaded. The windlass is now loosened and the rear draft-chain, H, is lengthened, so that the rear end of the scraper is lowered, throwing the nose out of the earth, and the scraper is drawn forward, sliding upon its bottom, with its load over the ground at the side of the track to the place on the "fill" or embankment where the load is to be deposited. The car is here stopped and run backward until the rear draft-arm, D, is nearly or directly over the rear end of the scraper. Meantime the draft-chain H is shortened, so that when the arm D is over the rear of the scraper the chain H is taut, and the front draft-arm, C, having moved backward with the car several feet the front draft-chain, I, has become slack and no longer acts upon the scraper. The car is now again moved forward slowly. By this movement the rear end of the scraper is raised by the rear draft-arm, D, its nose resting on the bank, and it is turned forward over its nose and turned bottom upward (the load F underneath it) upon the bank. As the scraper is overturned the rear draft-chain, H, is allowed to run out several feet and to become slack, when the scraper is overturned. The position of the car, chains, the scraper, and its load F at this time is shown in Fig. 3, and it is at this point that the rear draft-arm, D, becomes the principal element in the dumping of the scraper. The load consists usually of from one to two cubic yards of sticky material, which adheres to the bottom and sides of the scraper so firmly that if the scraper were suspended with its mouth downward only a portion of it at best would be discharged, leaving usually from one-third to one-half of it adhering to the body of the scraper, and requiring the use of spuds or bars to loosen it and cause it to fall out. With my improvement the load is turned upon the bank, and being usually of a sticky nature it adheres with considerable force to it. When turned over, the area of the surface in contact with the bank is oftentimes equal to the area in contact with the body of the scraper. The weight of the load and the scraper pressing down upon it causes it to adhere often quite firmly to the bank. The weight of the load (always many times greater than the weight of the scraper) at rest upon the bank (or its inertia) and the force of this adhesion of the load to the bank where it exists I utilize by the peculiar operation of my improvement to overcome the adhesion of the load to the scraper and to readily unload or dump it. The car is now moved forward a few feet until quite an amount of slack is obtained in the rear draft-chain, H. The locomotive is then reversed and the car run back quickly, so that when the slack in the chain H is taken up (the rear draft-arm, D, being rigid) a jerk or blow is given backward (through the rear draft arm and chain, H) upon the scraper, and

it being much lighter than the load adhering to it, and the jar being communicated directly on the sides and bottom of the scraper simultaneously with the force that is applied to draw the scraper back, the adhesion between the sides and bottom of the scraper and the load is overcome by the concussion, and the scraper is jerked away and instantly released from its load clean and ready to be refilled. (See Fig. 4.) The force of the blow or jerk given by the rear draft arm and chain is sometimes very great, being measured by the weight of the engine and car and their velocity, (or their momentum,) and is sufficient to at once dislodge any load, no matter how sticky the material may be. The scraper being thus instantaneously dumped or cleared of its load, the car is continued on its backward course into the cut, and upon reaching the point of loading is in proper position to be at once drawn into the earth and reloaded. In sand or dry earth, which does not adhere to the scraper, the load usually falls out upon the bank as the scraper is turned over, and it is then only necessary to reverse the engine, turn the scraper back upon its bottom without slackening the rear draft-chain, and giving the blow or jerk, as above described, and to return the scraper to be loaded again. It will be seen from the above that the rear draft-arm, D, is an important factor in the operation of my improvement. The load F is composed of wet sticky earth or clay, pliable, and comparatively easily-moving among its parts, and elastic. The scraper, made of iron or steel, is solid and rigid. The backward force is applied by the instantaneous blow or jerk from the rear draft-arm, D. The concussion upon the solid body of the scraper causes the particles of clay next to it to become loosened, (the elasticity and pliability of the clay preventing this jar from being communicated throughout its mass, so as to disintegrate it,) the adhesion between the clay and the body of the scraper is at once overcome, and the load jarred loose, the scraper being readily drawn away, leaving the load adher-

ing together and unbroken. By attaching a front draft-arm, C, to each end of the car it can be used in ditching in either direction, and on either side, without turning the car around.

I am aware that scoops or shovels have been used in railroad ditching-machines, and I do not broadly claim their use. I am aware of Patent No. 272,412, and I do not claim the construction shown in said patent.

A leading feature of my machine, which distinguishes it from these and other previous machines, is that I do not attempt to lift the scraper when it is loaded, either for the purpose of unloading or carrying it, except in so far as the rear end is raised in overturning it; but even this is not done by the windlass, but by movement of the car imparted to the scraper by the rear draft-chain.

What I claim as new is—

1. In a ditching-machine, the combination, with the car, of a scraper provided with a rear draft-chain attachment to the car, said chain being readily regulable as to its length to adapt it to assist in operating the scraper, substantially as specified.

2. In a railroad ditching-machine, the car, in combination with the scraper, front and rear draft-chains, and a windlass for regulating the rear chain, substantially as specified.

3. The ditching-machine consisting of the car, the rigidly secured draft-arms C and D, the draft-chains H and I, the windlass, and the scraper, all combined and operating substantially as specified.

4. In a ditching-machine, the combination, with the car, of the rigid draft-arms C and D, pivoted at their ends to the longitudinal center of the car, and detachably secured at the edge of the car, substantially as specified, whereby said arms are adapted to be used at either side of the car.

GEORGE W. DYE.

Witnesses:

JAS. L. CROSS,
JOE. N. SHAW.