2 Sheets--Sheet 1.

E. CHURCH.

Grading-Apparatus.

No. 163,849. Patented June 1, 1875.

Fig. 1.

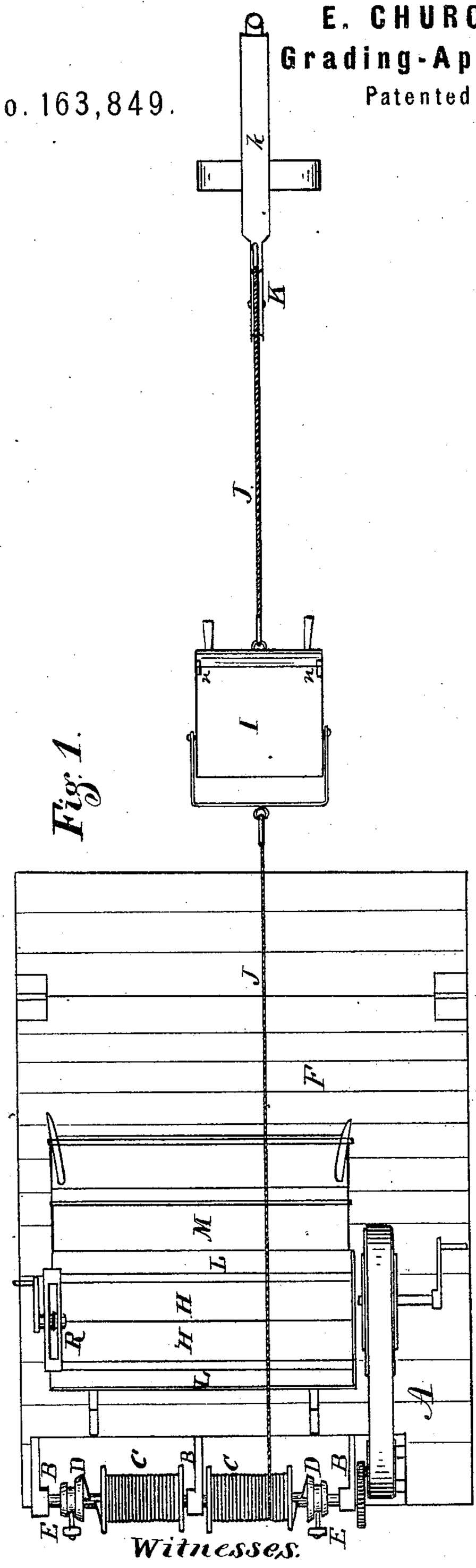
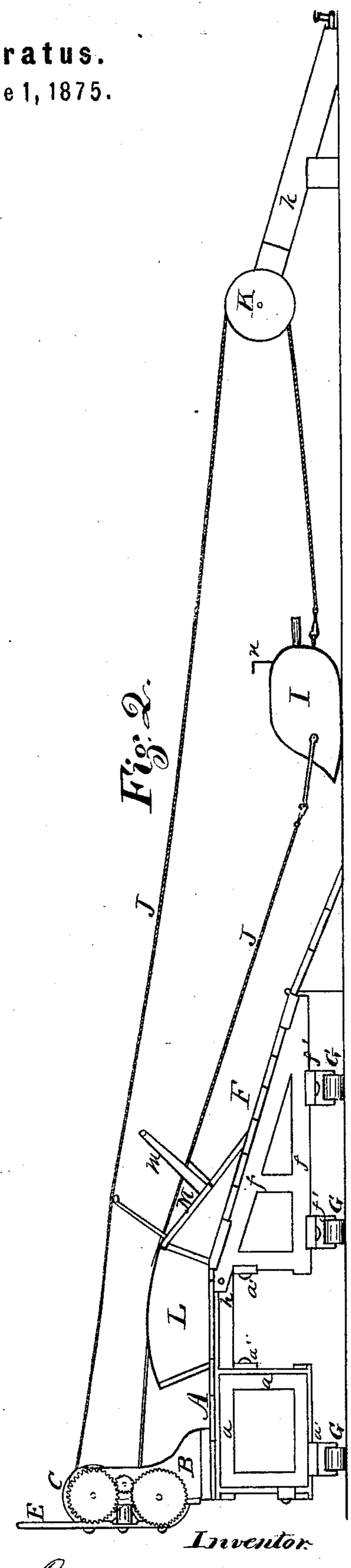


Fig. 2.



Witnesses.

Geo. W. Gibbitts

Henry B. Gibbitts

Inventor.

Edwin Church

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

2 Sheets--Sheet 2.

E. CHURCH.

Grading-Apparatus.

No. 163,849. Patented June 1, 1875.

Fig. 3.

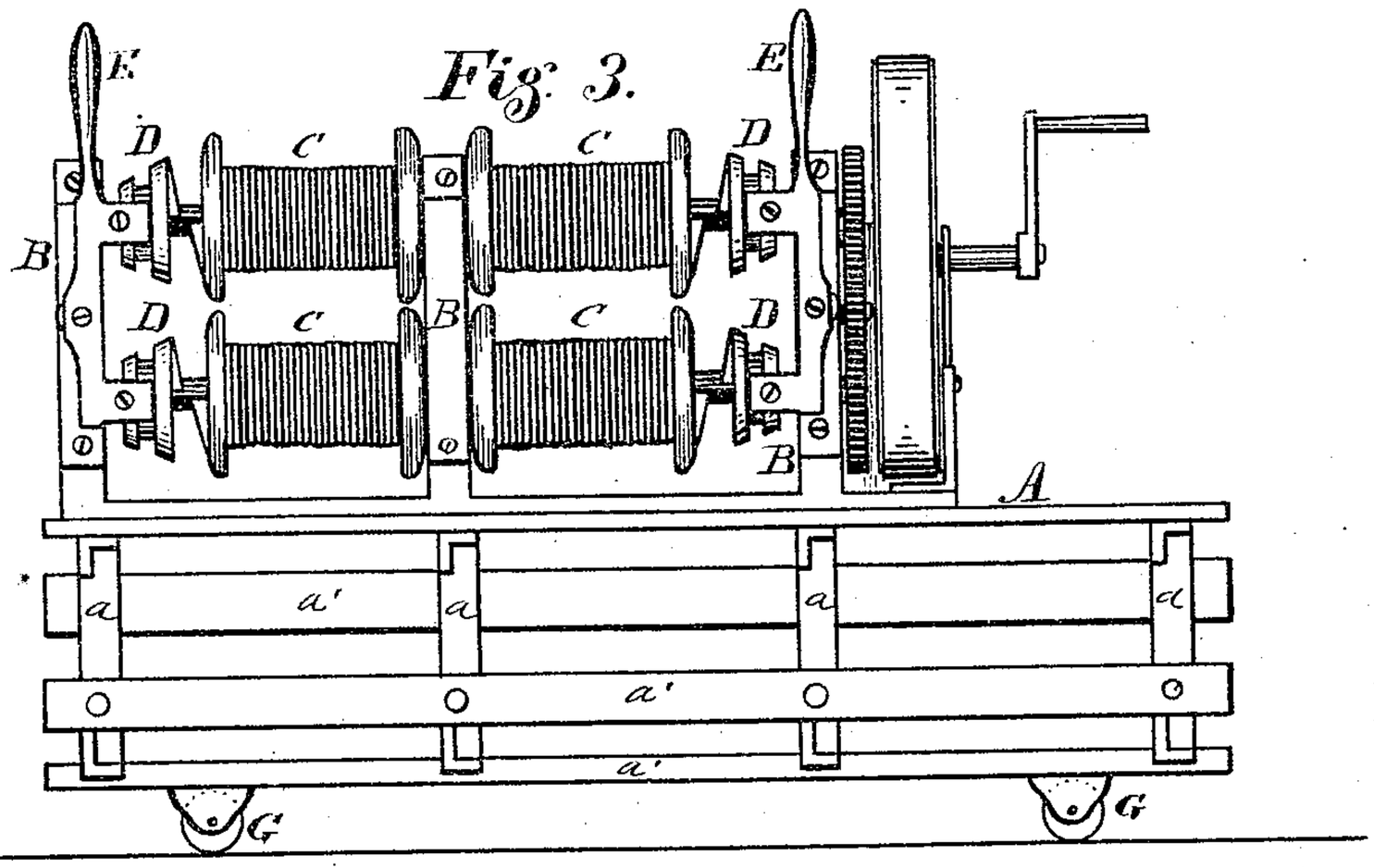
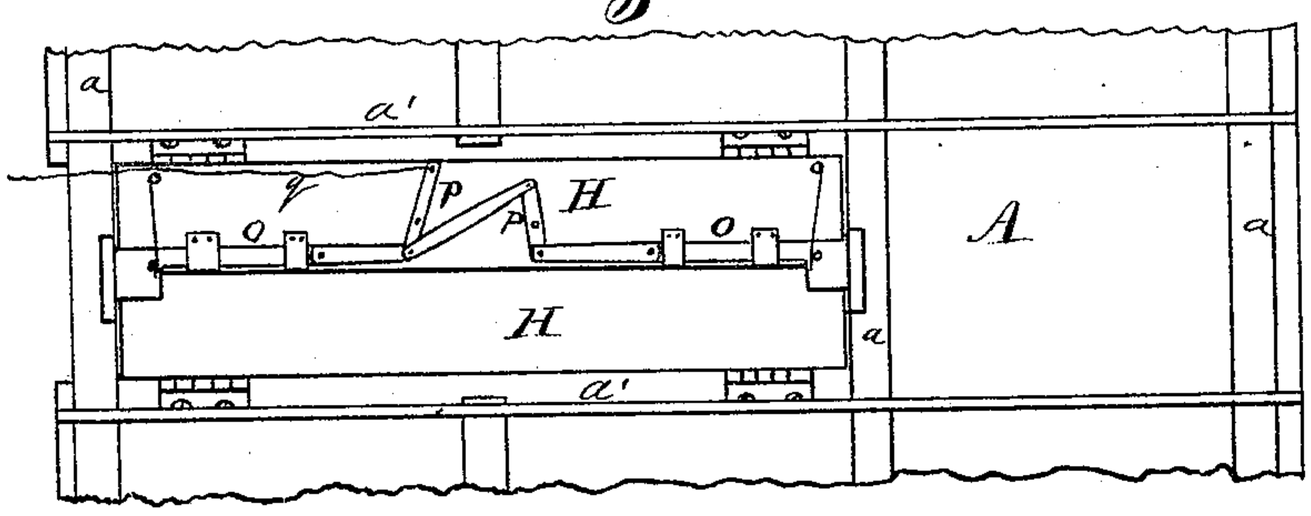


Fig. 4.



Witnesses.

Geo. W. Tibbitts

Henry B. Tibbitts

Inventor.

Edwin Church

UNITED STATES PATENT OFFICE.

EDWIN CHURCH, OF CLEVELAND, OHIO.

IMPROVEMENT IN GRADING APPARATUS.

Specification forming part of Letters Patent No. **163,849**, dated June 1, 1875; application filed December 19, 1874.

To all whom it may concern:

Be it known that I, EDWIN CHURCH, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new Grading and Excavating Machine, of which the following is a specification:

This invention relates to a machine for grading or excavating earth; and consists of a series of drums mounted in suitable frame-work, and geared to be operated by steam or other power, all situated on a portable platform or bridge, the said drums winding up and hauling a rope, to which is attached an earth scraper or scoop. The said earth-scoop is drawn up an inclined plane at one side of the said platform or bridge, and is made to tilt over and deposit its load onto trap-doors made in said bridge. The said drums are so arranged with clutches that they will draw the scoop toward the bridge, and also away from it, for successive loads, and there may be two or more scoops operated at the same time. The platform or bridge is so arranged that teams with wagons drive under it, where the trap-doors are located, and the earth deposited in said wagons by tripping the said doors, for hauling the earth away.

To enable others to fully understand my invention, I will proceed to describe the same in detail, with the aid of the accompanying drawing, in which—

Figure 1 is a plan or top view. Fig. 2 is a side elevation. Fig. 3 is an end elevation. Fig. 4 is an under-side view of the trap-doors.

A A represent a raised platform or bridge, constructed of timbers forming the frames *a a a a*, which are united by a sill and stringers, *a'*. On this portion of the platform is placed the working machinery, and which is also provided with trap-doors, for a purpose hereinafter shown. The aforesaid machinery consists of a frame-work, B B, in which are placed two horizontal shafts, carrying drums C C. The drums play loosely on said shafts, and are made to operate by means of clutches D D when required. The clutches are operated by levers E E, so arranged as to throw the upper and lower clutches alternately into gear with the drums, so that they will draw the earth-scoops alternately back and forth. The two shafts are geared together in such a manner that both revolve the same way. The power employed to operate this machinery may be a small portable engine of sufficient capacity for the purpose, or any other suitable power may be employed. Adjoining this bridge is an inclined platform, F, consisting of a frame-work of timbers, *f f*, united by stringers and sills *f'*. This inclined platform, as well as the bridge A, is provided with rollers or large casters G G, for the convenience of shifting them in position. When united, as at *h*, the bridge and inclined platform comprise the foundation upon which all the working parts are placed, except the traversing earth-scoop.

It will be observed that there is a space between the frame-work *a a* of the bridge A and the frames *f f* of the platform F, and underneath the trap-doors H H, which are provided in said bridge A. This space is provided for teams with wagons to drive in under the said trap-doors, for the purpose of loading them for carting away the earth. I is an earth-scoop, of the usual form and construction, to which are attached the ropes J J from the drums C C. At the farther end of the space to be excavated is placed a pulley or block, K, attached to a bar, *k*, securely anchored to the ground, over which pulley the rope for hauling the scoop back passes. This pulley may be located at such distance and position as may be required for operating the scoop. Over the aforesaid trap-doors is made a trough or hopper, L, into which the scoop I is made to deposit its loads by being tilted over when it is drawn up to the top of the platform. This is done by providing a flap, M, hinged to the upper edge of the side of the trough L, the said flap having a bail, *m*, against which hooks *n* on the scoop I engage, thus the forward movement of the scoop causes the said flap M to be turned up on its hinges, tilting the scoop, and depositing its load onto the trap-doors. The trap-doors are hinged so as to drop downward, and are provided with a latch device, as shown in Fig. 4, consisting of slide-bars O O, connected by levers P P, and are operated by a cord, *q*, for unlatching the said doors. To close the doors again a small windlass, R, at one end is employed for that purpose.

The operation of this apparatus is as fol-

lows: The aforesaid bridge and platform being placed in suitable position, and the pulley K fixed, the machinery is set in motion. The drums being loose on the shafts, the engine and machinery may run continuously. An attendant being at the clutch-lever, the lower clutch is thrown into gear with the drum, which immediately draws and winds up the rope, hauling the scoop toward the bridge. The said scoop, having been held and dipped by an operator for that purpose, is filled with earth. When it arrives at the trough L it is tilted, as before described, and deposits its load onto the trap-doors; then the attendant at the clutch-lever immediately throws the lower drum out of gear, releasing it, and at the same time throwing the upper drum into gear. The upper or draw-back rope pulls the scoop back again for repeating the operation.

It will be seen there are two pairs of drums represented in the drawings. This is to show that two or more scoops may be operated at the same time, or alternately. Teams with wagons pass under the bridge, and receive the earth and haul it away as fast as it is brought thereto.

For grading and excavating this apparatus possesses great advantages over any other now in use, is portable, and may be readily transported and set up for use in a very short time.

When used for grading where the earth is hard or packed, a plow may be attached to the ropes in place of the scoop, for breaking up the ground beforehand.

I claim—

1. The bridge A, constructed with a space for teams to pass under, and having combined therewith the frames B B, drums C C, shafts and clutches D D, and the trap-doors H H, provided with the latch and closing device, substantially as and for the purpose set forth.

2. The inclined platform F, provided with the flap M, having a bail, *m*, by means of which the scoop I is made to tilt and deposit its loads onto the trap-doors, substantially as shown and described, and for the purpose set forth.

EDWIN CHURCH.

Witnesses:

GEO. W. TIBBITTS,

HENRY B. TIBBITTS.