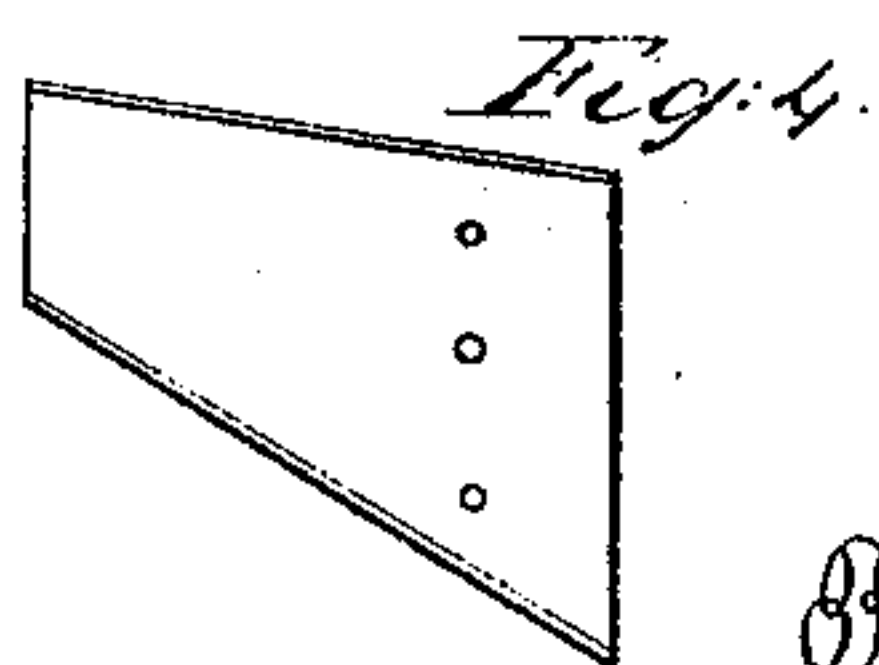
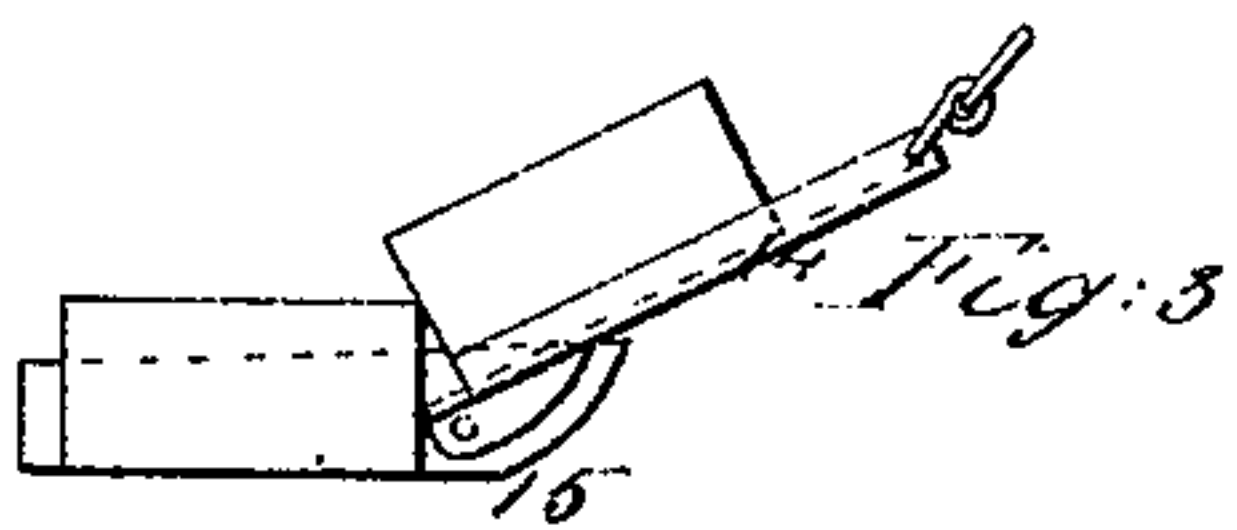
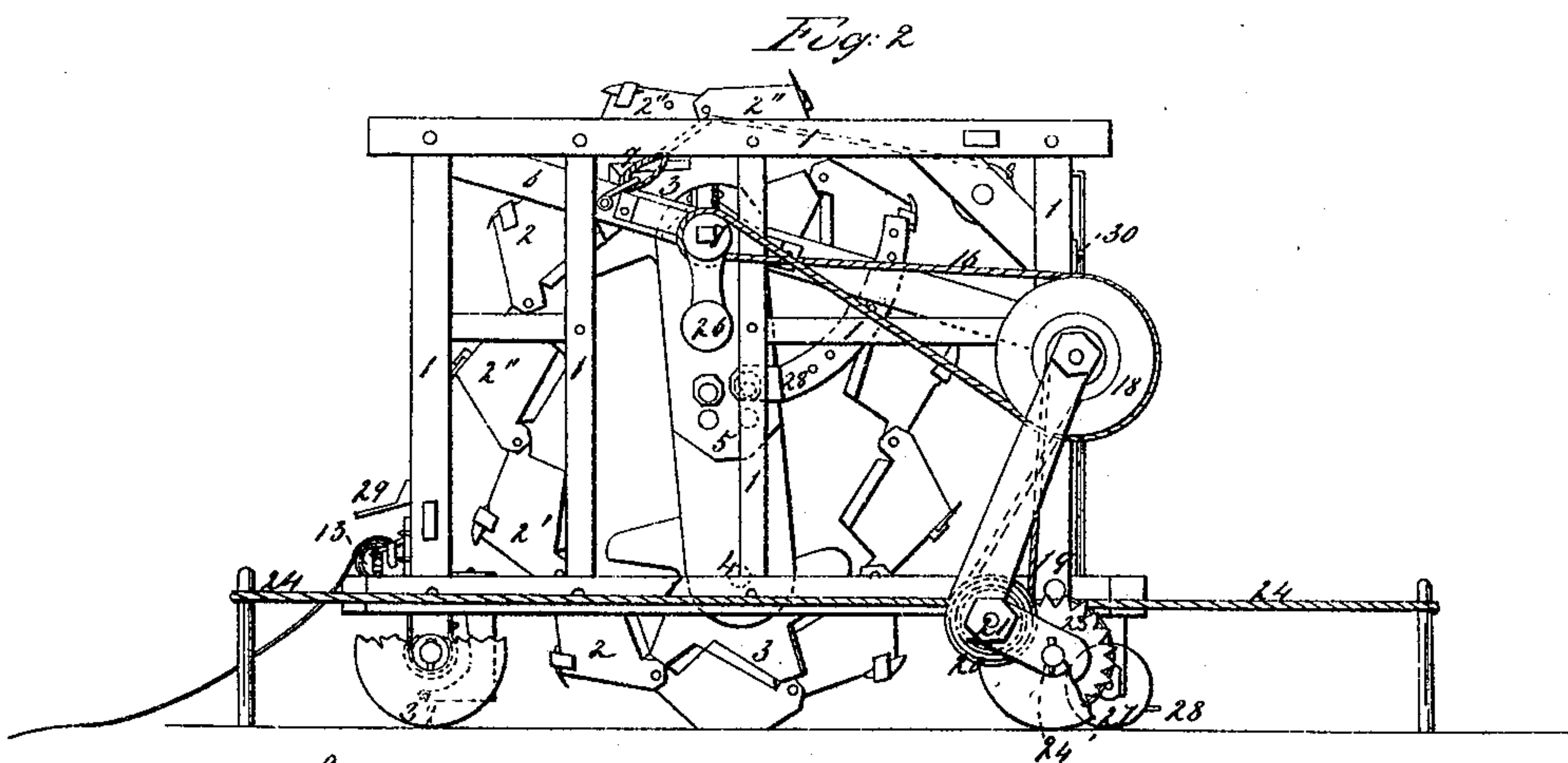
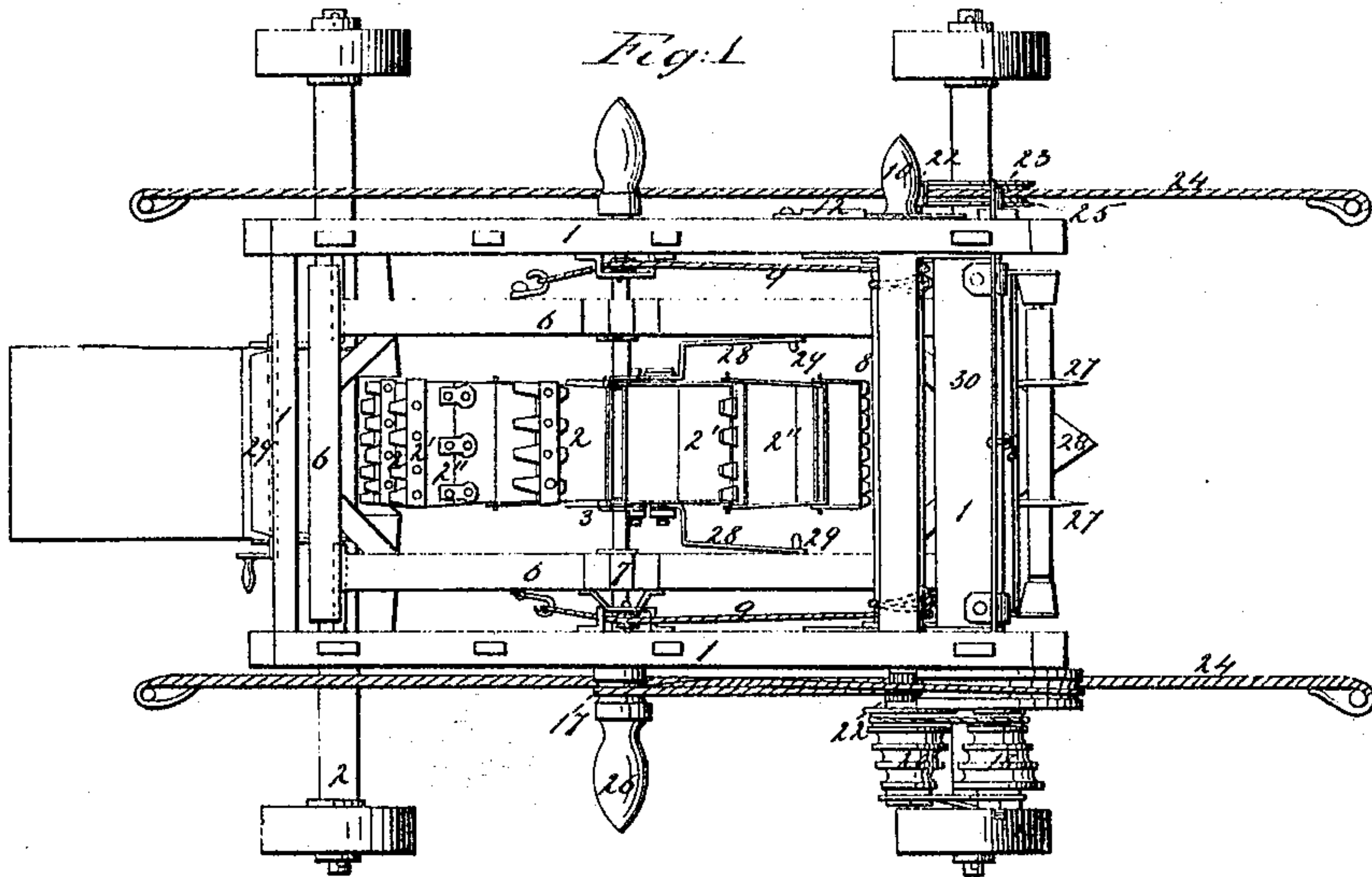


*Chaffee & Foster.*

*Excavator.*

*N<sup>o</sup> 2,502.  
33,506.*

*Patented Oct. 15, 1861.*



*Witnesses.*  
*L. A. Roberts*  
*H. James Weston*

*Inventor*  
*Bradford S. Foster*  
*Wm. H. Schaffer*  
*By Thos. D. Brown,*  
*Atty*



# UNITED STATES PATENT OFFICE.

B. P. FOSTER AND W. H. CHAFFEE, OF FLINT, MICHIGAN, ASSIGNORS  
TO WM. H. CHAFFEE, OF SAME PLACE.

## IMPROVEMENT IN DITCHING AND TILE-LAYING MACHINES.

Specification forming part of Letters Patent No. 33,506, dated October 15, 1861.

*To all whom it may concern:*

Be it known that we, B. P. FOSTER and WM. H. CHAFFEE, of Flint, in the county of Genesee and State of Michigan, have invented an Improved Ditching and Tile-Laying Machine, the construction and operation of which we have described in the following specification and illustrated in its accompanying drawings with sufficient clearness to enable competent and skillful workmen in the arts to which it pertains or is most nearly allied to make and use our invention.

Our said invention consists in, first, the arrangement of the teeth and scrapers on the buckets of an endless chain or belt, hereinafter described, so that the teeth of one bucket shall come in line with the interstices between the teeth of the preceding bucket in such a manner as to give alternate lines of deeper penetration into the soil, these two buckets being followed by one having a scraper extending the full width of the belt, as hereinafter more fully set forth; second, the combination of a slide or guide for guiding the tiles into position at the bottom of the ditch, with a spout for conveying the dirt from the buckets to cover the tiles, and a reel for holding a roll of cloth, which is allowed to unwind as the machine advances, in order to cover the tiles and prevent the loose dirt from entering at their joints, as hereinafter described, the said parts being arranged to work in connection with an excavating apparatus, as set forth.

In the accompanying drawings, Figure 1 is a plan of our machine. Fig. 2 is a side elevation. Fig. 3 is a side elevation of the guide for the tiles. Fig. 4 is a plan of a spout or conveyer, which throws the dirt from the buckets to one side, so as not to fill the ditch.

1 1 is the frame of the machine. 2 2' 2'' are the buckets composing an endless chain. The first of these buckets 2 is armed with teeth at the edge, which comes in contact with the ground. The next succeeding bucket 2' has its teeth so placed as to follow the interstices between the teeth of the bucket 2, which precedes it. These two buckets having passed over the ground, and having with their teeth thoroughly broken it up, the scraper on bucket 2'' follows them and takes whatever of the loose dirt the others have left. This chain of buck-

ets is hung on two sprocket-wheels, 3 3, the lower one being hung on a shaft, 4, which has its supports in the lower end of the hanger 5, the upper shaft, 7, being hung in the adjustable frame 6. This frame is made adjustable, for the purpose of regulating the depth to which the ditch shall be dug. As the endless chain is supported by it the depth to which the said chain digs is determined by the height at which the frame 6 is secured. This adjustment is also used when the machine first begins to dig the ditch, the buckets being allowed to descend gradually till they have reached the required depth. This adjustment is accomplished by means of the windlass 8 and the ropes or chains 9, which wind on it, the said windlass being turned by means of the crank 10 and prevented from running back by the ratchet-wheel 11 and pawl 12.

The swinging frame 5 is secured in adjustment and supported in the desired angular position by means of the brace 28, attached at one end to said swinging frame or hanger 5, and at the other secured by the pin 29 to the frame 6, in such a position as to secure the proper action of the parts under the circumstances of the particular case in which it may be used for the time being, said brace 28 being provided with several holes at intervals, as shown, to allow the proper or desired adjustment.

In the rear end of the machine is a reel, 13, on which a roll of cloth is wound. This cloth is allowed to unwind as the machine advances, covering the tiles and protecting the joints from the entrance of the loose dirt. By the time the cloth will have rotted the dirt will have become so compact as to leave no danger of inconvenience from that source. The tiles are laid on a slide or guide, 14, represented in detail in Fig. 3, on which they slide down and take their position in the ditch. The lower part, 15, of the guide being just large enough for the tile to slip over it easily, will hold them in their places laterally, while the pressure exerted by those above will force them together longitudinally. This guide is fastened to the brackets on the under side of the machine, which are shown at 31.

The machine is driven ahead by means of a feeding apparatus connecting with the main



driving-shaft 7, and acting on ropes secured to the ground at each end by means of stakes, and passing once around a windlass attached to the machine. 16 is the band or cord leading from the pulley 17 on the main shaft 7, and drives the intermediate pulley, 18, which, by means of the belt or cord 19, drives the pulley 20 on the shaft 21. On the said shaft 21 are two gear wheels or pinions, 22 22, which mesh into the wheels 23 23. These two wheels 23 23 are upon the shaft 24', which serves as the forward axle of the machine, and around which the ropes 24 24 are passed in a groove on pulleys 25, provided for that purpose.

At the forward end of the machine are two vertical circular knives or cutters, 27 27, which cut the sod on each side, of the proper width for the ditch, so that the horizontal cutter 28 may remove the strip and throw it to one side, leaving the earth bare, ready for the operation of the digger. This apparatus may be raised or lowered by means of the lever 30 and its connections, so as to cut more or less deeply, as may be desired. Should it be desirable to make a ditch simply, the spout or conveyer

shown in Fig. 4 is put on in the place of the spout 29, which is otherwise used, and which is shown attached to the machine.

Having thus fully described our invention, we claim—

1. The arrangement of teeth on the buckets of an endless chain, so that those on one bucket will follow the interstices between the teeth of the one which precedes it, in such a manner as to give alternately different depths of penetration, and these two be followed by a third bucket having a scraper instead of teeth, which cleans up the loose dirt which the others have left, as hereinbefore described.

2. The combination of the guide 14 and 15, reel 13, and spout 29, by which the tiles are laid and covered, (arranged to work in connection with an excavating apparatus,) substantially as described.

BRADFORD P. FOSTER.  
WM. H. CHAFFEE.

Witnesses:

PORTER HAZELTON,  
WM. PATERSON.