

M. H. BLANCHARD.  
DITCH MAKING MACHINE.  
APPLICATION FILED JAN. 24, 1910.

1,012,189.

Patented Dec. 19, 1911.

2 SHEETS—SHEET 1.

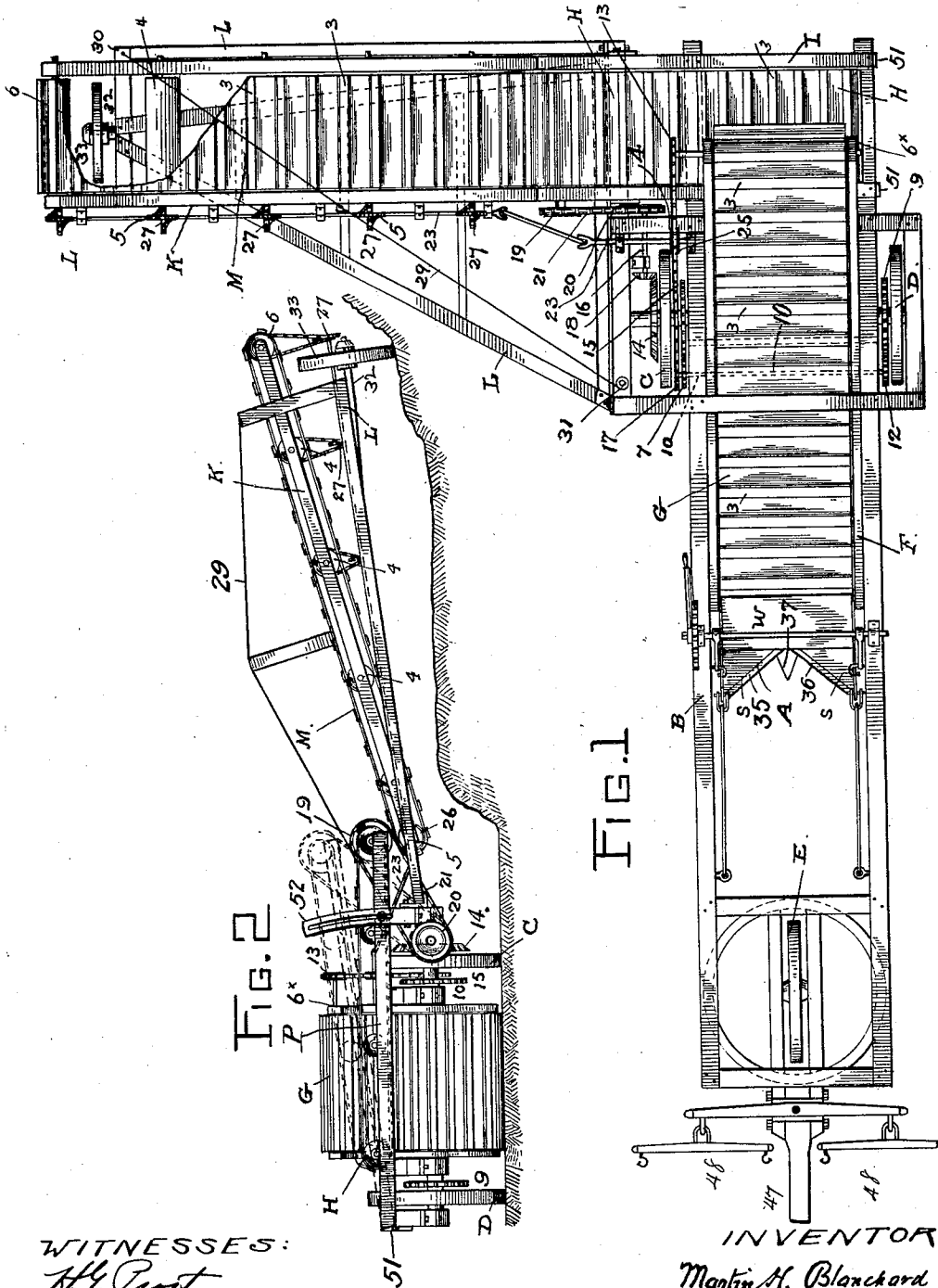


FIG. 1

FIG. 2

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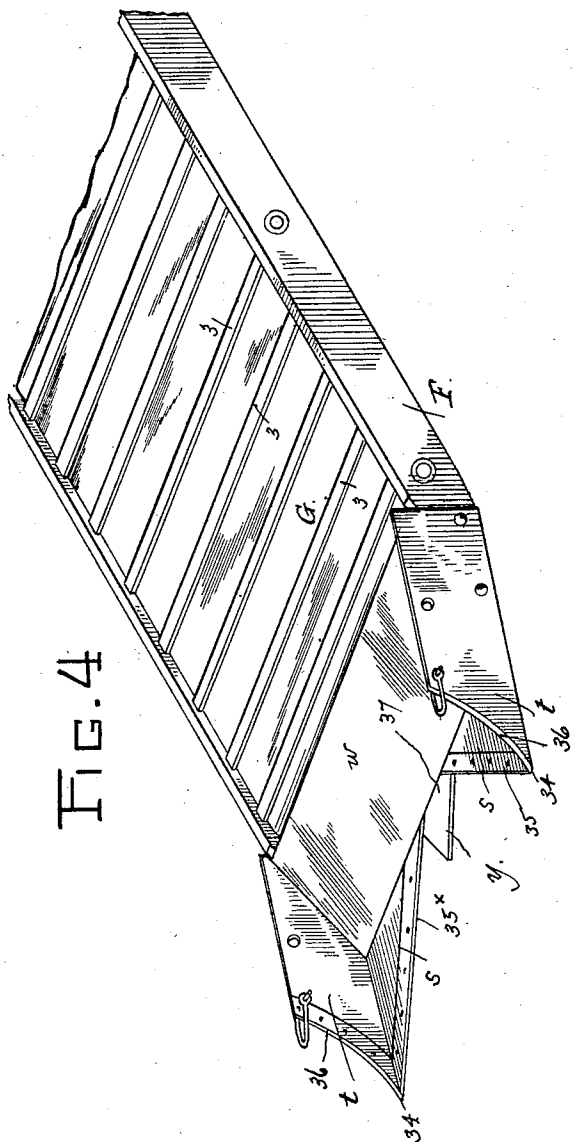


FIG. 4

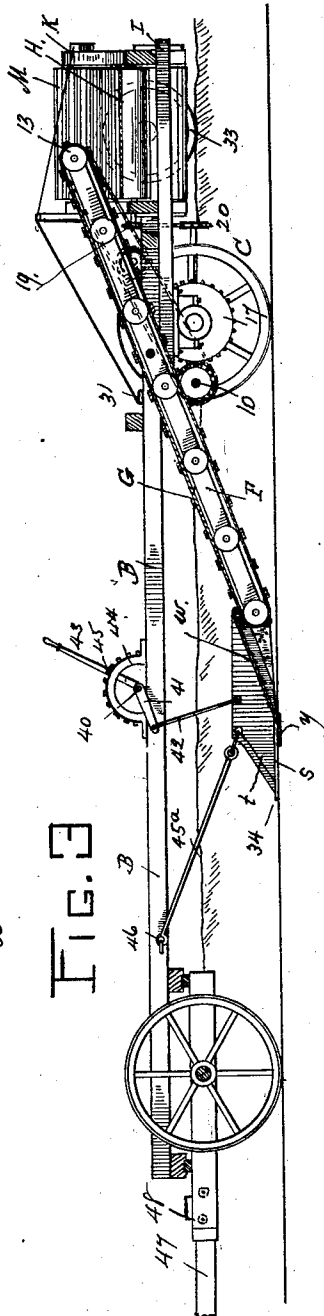


FIG. 5

WITNESSES:  
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# UNITED STATES PATENT OFFICE.

MARTIN H. BLANCHARD, OF DAVISVILLE, CALIFORNIA.

DITCH-MAKING MACHINE.

1,012,189.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed January 24, 1910. Serial No. 539,824.

To all whom it may concern:

Be it known that I, MARTIN H. BLANCHARD, a citizen of the United States, and a resident of Davisville, in the county of Yolo and State of California, have invented new and useful Improvements in Ditch-Making Machines, of which the following is a specification.

This invention relates to an improved ditch making or levee-building machine of that class in which the earth is excavated by means of a scoop arranged on a vehicle and from which scoop the excavated material is conveyed by belt conveyers.

The improvements comprise the arrangement of the conveyer belts, by means of which the material is conveyed from the excavator and discharged from the machine.

Heretofore, in ditch making machines it has been impossible to excavate the ditch to any appreciable depth or to elevate the excavated material to a sufficient height to form a levee on account of the steep inclination of the conveyer belt. At a certain critical angle the earth will roll down the conveyer belt instead of being carried upward thereby and the machine will cease to operate.

In the machine of my invention I provide three conveyer belts each adapted to raise the material a part of the distance and arranged in such manner that the angle of inclination of each belt is considerably less than the critical angle. In this manner, by raising the material in steps I am enabled to cut a deeper ditch or raise the material higher than has heretofore been accomplished, so far as I am aware.

Another feature of the invention is the excavating means which is constructed to cut a rectangular furrow and deliver all of the material excavated to the conveyer belt.

Another feature of the excavator is the central blade or tooth set below the horizontal cutting blades which tends to hold the horizontal blades down to the earth and prevent them from riding over the surface without cutting. This central tooth is set below the horizontal blades a short distance so that twigs and roots will not lodge in the angle between the blades and prevent the proper working thereof.

With these and other objects in view, as will more fully hereinafter appear, the invention consists of certain novel features of construction and arrangement of parts,

hereinafter fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

Referring to the accompanying drawings, Figure 1 is a plan or top view of the complete machine. Fig. 2 is a rear elevation taken from the right side of Fig. 1. Fig. 3 is a vertical section taken longitudinally through the center of the truck on which the excavating device is arranged. Fig. 4 is a perspective view of the excavator and a portion of the belt conveyer.

The excavator A is mounted on the lower end of the frame F which is pivotally attached to the side rails B of a vehicle so that the excavator may be raised or lowered depending on the character of the soil being worked. The vehicle is provided with customary rear wheels C—D and a single steering wheel E mounted on a fifth-wheel or turn-table at the forward end.

The excavator is adjusted vertically by means of the lever 43 which operates a shaft 40 arranged across the frame of the vehicle. Arms 41 on the shaft 40 are connected to the excavator by rods 42 so that the excavator is raised or lowered by moving the lever 43. The lever 43 is held in any desired position by means of a latch 45 engaging a toothed rack 44 on the vehicle frame. The means for connecting the excavating appliance to the vehicle body is of a character that permits of all necessary changes or variations in the position of the cutting blades and consists of draft rods 45<sup>a</sup> connecting each side of the excavator to rings 46 in the side of the rail B. The connections between the draft rods and the rings 46 and between the rods and the excavator are loose to permit the vertical adjustment of the excavator.

A novel feature in the excavating appliance A consists in the arrangement of pointed cutting blades in horizontal and vertical positions, so that the completed cutting share cuts simultaneously in three planes, two vertical and one horizontal, forming a rectangular furrow. The upright blades are arranged at the sides of the excavator and are fastened to the frame F and to the horizontal blades s. The forward end of

the blades *t* curves outward from the upper edge to a point 34 where it is joined by the forward edge of the blade *s*. The blades *s* are triangular in shape, the cutting edge slanting back from the point 34, so that it operates with a shearing effect on the material to be excavated.

Detachable cutting blades 35—36 are secured to the excavator blades *s* and *t* respectively, so that they may be removed and sharpened when they become worn, or may be replaced when they are destroyed. Arranged between the side blades *t* and over the rear end of the horizontal blades *s* is an inclined apron *w*. This apron lies over the belt conveyer and serves to direct the excavated material on to the conveyer.

Another novel feature of the excavator is the angular plate or tooth *y* set in the angle formed by the horizontal cutting edges and arranged to present upright faces 37 diverging rearwardly and outwardly toward the horizontal cutting edges. The tooth *y* is placed slightly below the horizontal plates so that it enters more deeply into the earth and holds the horizontal blades down to the work. Another advantage gained by placing the tooth *y* below the horizontal blades is that no sharp angle or corner is formed in which branches of trees and roots may lodge to impair the operation of the excavator. The tooth *y* is especially useful when working in hard or stiff soil where the lumps or clods would have a tendency to lodge in the angle formed by the horizontal blades *s*.

Mounted on the frame *F* in such manner that its forward end passes under the apron *w* is the belt conveyer *G* mounted on rollers 13. Motion is applied to the conveyer *G* from the running gear by means of the chain 15 which operates to rotate one of the rollers 13. Chain 15 is connected to the running gear through gear 17 on the axle. Gear 17 imparts motion to shaft 10 through gear 7 and the sprocket wheel driving the chain is mounted on shaft 10. The belt conveyer *G* is supplied with cleats 3 to assist in transporting the material.

The frame *F* is arranged at a sufficient angle so that the rear end of the conveyer *G* is elevated above the transverse conveyer *H* and all material carried by conveyer *G* is discharged onto conveyer *H*. The construction of conveyer *H* is similar to that of conveyer *G* and it operates to transport and discharge the material over the side of the machine. Motion is imparted to conveyer *H* by means of chain 21 operating on the sprocket wheels 19—20. Motion is imparted to sprocket wheel 20 from the running gear through bevel gears 14—18 and the shaft 16.

The frame *P* carrying the conveyer *H* is arranged to be tilted so that the discharge end may be raised as conditions require. The frame *P* is hinged to the vehicle frame

at 51 and is held in the raised position by being clamped to the slotted member 52, which is formed on a curve concentric with the hinge 51. By placing the conveyer *H* at the desired angle the material is raised in two steps to a higher level than would be possible with one transverse conveyer.

In forming ditches of any substantial depth or in building levees, the amount of earth excavated renders it necessary that the material be carried a farther distance before it is discharged from the machine, or that it be elevated to a greater height. To perform this function I use an auxiliary frame *L* hinged to the vehicle frame at its inner end and supported by the wheel 33 at its outer end. The wheel 33 running over the irregularities in the ground and on the slope of the dump maintains the outer end of the frame a certain distance above the ground at all times. Mounted on the frame *L* so that the outer end thereof projects over and above the wheel 33 is the frame *K* on which is mounted a belt conveyer *M*, of substantially the same design as the other conveyers. Motion is imparted to the conveyer *M* from the running gear by means of the sprocket wheel 4 engaging the chain 15. The sprocket wheel 4 is mounted on a shaft which is connected by universal joints with the shaft 23 on the side of the frame *L*. Grooved pulleys 27 on the shaft 23 are connected by cross belts with the pulleys 5 mounted on the shafts of the rollers 6 on which the conveyer *M* is carried. As a means of holding the frame *L* at the proper angle, a rope 29 fastened to the outer end of the frame is attached to a winding post 31 on the main frame of the vehicle.

The machine thus constructed is especially adapted to be used in cutting ditches and raising levees, being readily operated by animal power and managed with ease by ordinary workmen.

A tongue 47 and whiffle trees 48 attached to the front of the carriage frame furnish the means for connecting draft animals to the machine and the carriage frame being mounted at the front on a single steering wheel enables the direction of the travel to be controlled and varied as conditions require.

I claim:

1. In an excavating machine the combination of a vehicle frame, a longitudinally arranged angularly adjustable frame thereon, excavating means on the forward end of said frame, a belt conveyer on said frame, a transversely arranged angularly adjustable frame below the rear end of the conveyer, a belt conveyer on said transverse frame, a laterally extending frame attached to the vehicle frame and supported at its outer end by a wheel, and a belt conveyer on said lateral frame to receive the excavated

material from the transverse conveyer, and means connected to the running gear of the vehicle for driving said conveyers.

5 2. In an excavating machine, the combination of a vehicle frame, a longitudinally  
arranged angularly adjustable frame there-  
on pivoted near its center to the vehicle  
10 frame, excavating means on the forward end  
of the longitudinal frame, means for adjust-  
ing the frame at varying angles, a belt con-  
veyer on said frame, a transversely arranged  
angularly adjustable frame arranged on the  
15 vehicle frame below the rear end of the belt  
conveyer, a belt conveyer on said transverse  
frame, a laterally extending frame remov-  
ably attached to the vehicle frame and sup-  
ported at its outer end by a wheel, the inner  
20 end of said lateral frame lying below the  
discharge end of the transverse conveyer,  
a belt conveyer on the lateral frame to re-

ceive the excavated material from the trans-  
verse conveyer and means connected to the  
running gear of the vehicle to operate said  
conveyers.

3. An excavating implement comprising 25  
two parallel vertically arranged shares, two  
horizontal shares arranged therebetween,  
the cutting edges of the horizontal shares  
extending backwardly at an angle to the di-  
rection of movement of the implement, an 30  
inclined bottom between the two vertical  
shares lying partly over the rear ends of the  
horizontal shares, and a central pointed  
tooth lying in the angle formed by the cut-  
ting faces of the horizontal shares and be- 35  
low the plane of the horizontal shares.

MARTIN H. BLANCHARD.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."