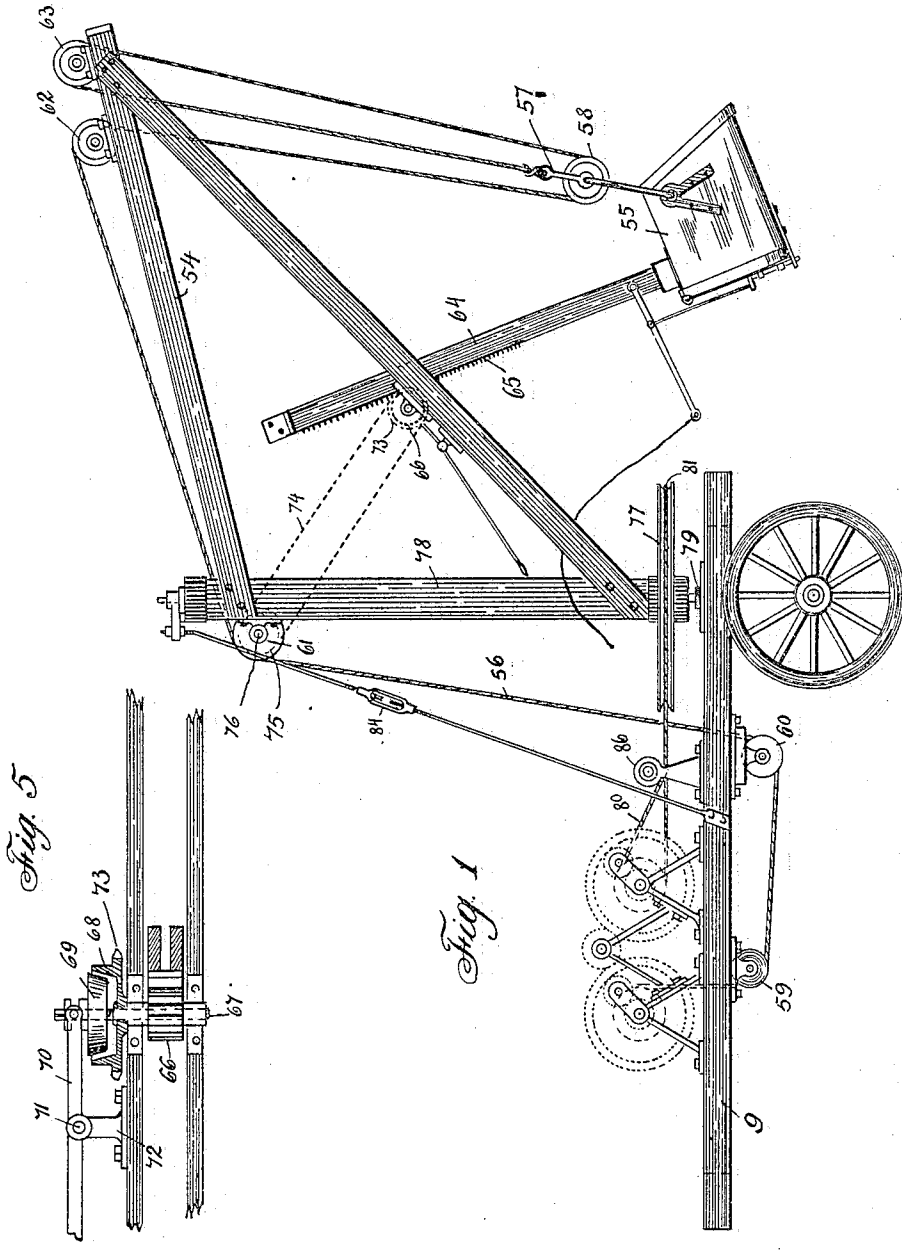


No. 809,689.

PATENTED JAN. 9, 1906.

A. F. HUBER.
EXCAVATING MACHINE.
APPLICATION FILED JULY 3, 1905.

4 SHEETS—SHEET 1.



WITNESSES
Max Stengel
J. H. Howell

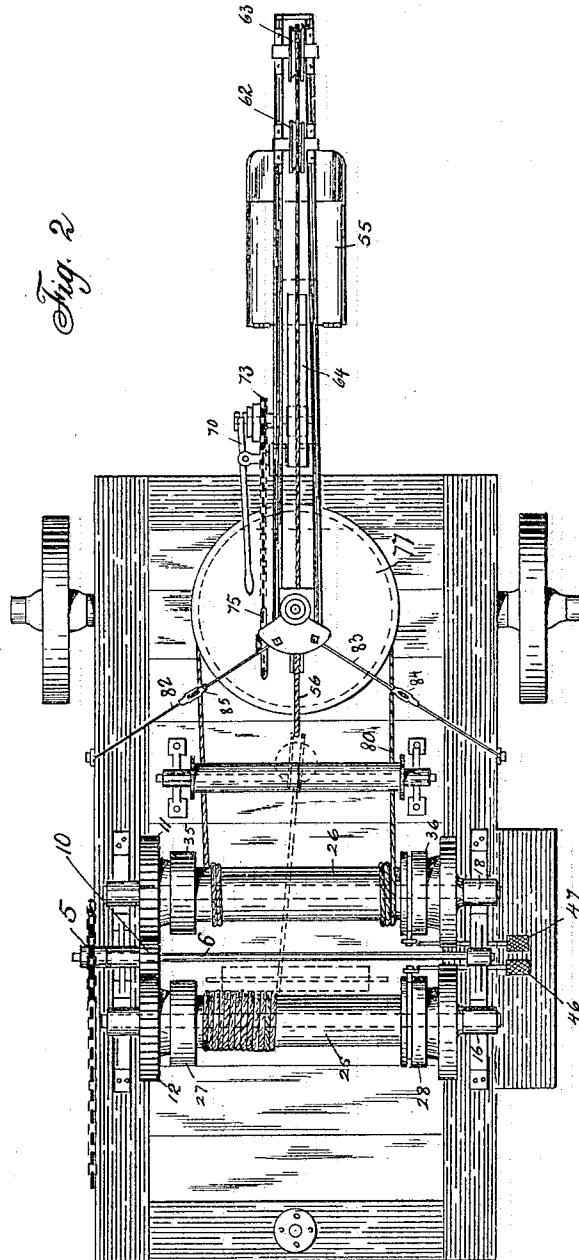
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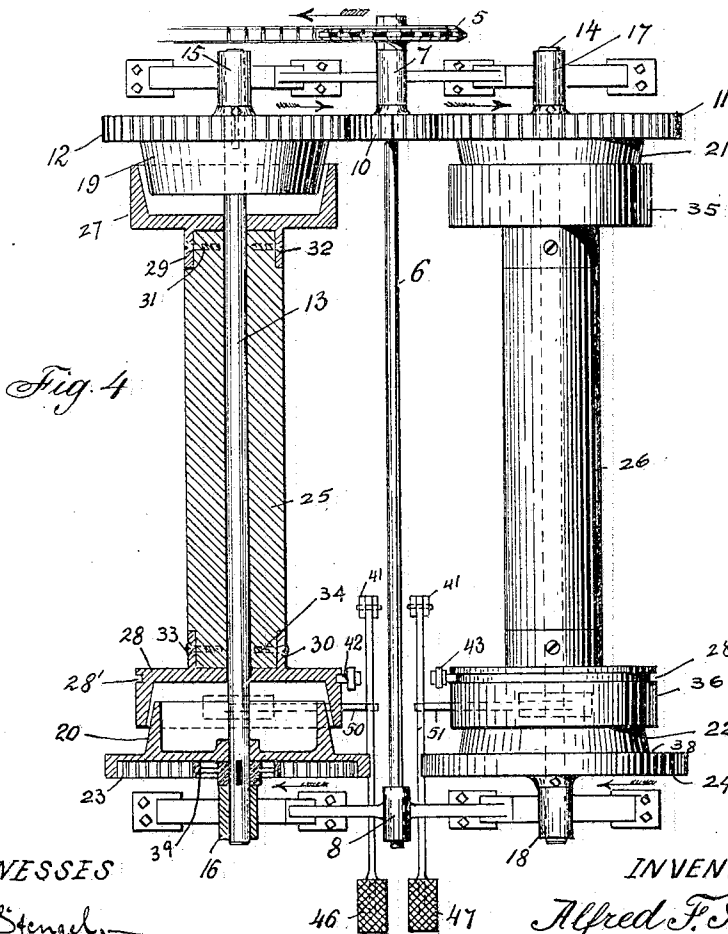
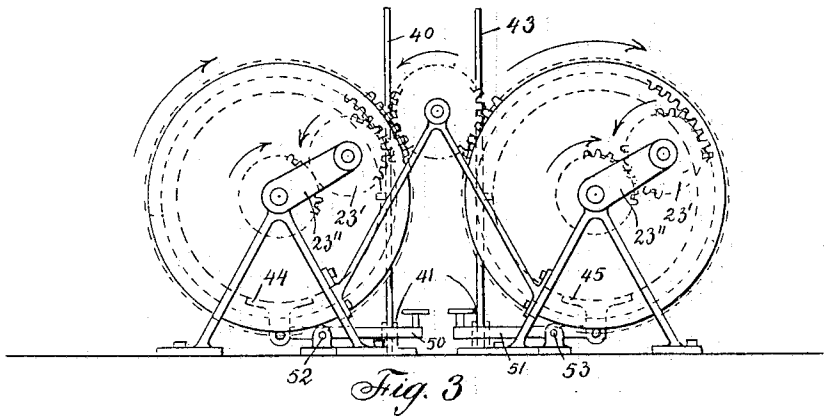
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WITNESSES

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UNITED STATES PATENT OFFICE.

ALFRED FREDERICH HUBER, OF CHICAGO, ILLINOIS.

EXCAVATING-MACHINE.

No. 809,689.

Specification of Letters Patent.

Patented Jan. 9, 1906.

Application filed July 3, 1905. Serial No. 268,067.

To all whom it may concern:

Be it known that I, ALFRED FREDERICH HUBER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Excavating-Machines, of which the following is a specification.

This invention relates to excavators, dredges, steam-shovels, and the like; and the object of the invention is to provide a machine of this class that shall be particularly adapted for rapid operation, that shall have an arrangement and general construction peculiarly suited for operation by an ordinary traction-engine, and which may be transported readily from place to place by such an engine.

Another object of the invention is to provide an arrangement whereby the usual movements or work of a steam shovel or excavator is accomplished with the fewest and simplest possible parts.

Other objects and advantages will appear from the following description together with the accompanying drawings; and the invention consists in the novel construction and combination of parts pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a machine embodying my invention, the gears being shown by dotted lines. Fig. 2 is a top plan view thereof. Fig. 3 is an end elevation, on an enlarged scale, of the driving-gears. Fig. 4 is a plan view of the mechanism shown in Fig. 3, partly in section. Fig. 5 is a detail view, and Fig. 6 is a side elevation of the machine attached to a traction-engine.

Referring to the drawings, 2 represents an ordinary traction-engine provided with a driving-pulley 3, which drives a belt or sprocket-chain 4, which transmits motion to a sprocket-wheel 5 upon a shaft 6, journaled in bearings 7 and 8 upon the platform 9 of the excavating-machine. A pinion 10 upon the shaft 6 meshes with gear-wheels 11 and 12, which are keyed to shafts 13 and 14, mounted in bearings 15, 16, 17, and 18. Beveled friction wheels or cones 19 and 20 on the shaft 13 and similar wheels or cones 21 and 22 are secured to, respectively, shaft 13 and shaft 14. These cones or wheels are preferably cast integral with the gear-wheels 11 and 12 at one end of shafts 13 and 14 and

with internal gears 23 and 24 upon the opposite ends of shafts 13 and 14.

Upon shaft 13 is loosely mounted a sleeve-shaft 25, and upon shaft 14 is similarly mounted an identical sleeve-shaft 26. Upon the ends of sleeve-shaft 25 are female clutch members 27 and 28, which have hubs 29 and 30, secured to the sleeve-shaft 25 by means of wood-screws 31, 32, 33, and 34. Similar female clutch members 35 and 36 are secured in like manner to sleeve-shaft 26. The male clutch member 19 is in the form of a tapered hub on the internal gear 23 and is loosely mounted on shaft 13 in operative relation to the female clutch member 28, and a similar male clutch member 38 forms a part of the gear 24 and coöperates with the female clutch member 36.

39 is a pinion that is keyed upon shaft 13 and meshes with internal gear 23. The latter meshes with an idler-gear 23', mounted on an arm 23''. A similar pinion (not shown) is mounted securely upon shaft 14 to mesh with the internal gear 24.

The details of the parts mounted upon shaft 14 being identical to the parts mounted on shaft 13, a description of one set of parts will suffice for both.

The gears 11 and 12, which are keyed to shafts 13 and 14, being in mesh with pinion 10, will be rotated in the same direction—that is, in a direction opposite to the direction of rotation of sprocket-wheel 5 and shaft 6. (Indicated by the arrow in Fig. 4.) In Fig. 4 the sleeve-shaft 25 is shown in a position where its female clutch members 27 and 28 are disconnected from both of the male clutch members 19 and 20. The same applies to sleeve-shaft 26, which is not shown in section. If clutch member 27 is moved into engagement with clutch member 19, the sleeve-shaft 25 will rotate with shaft 13 or in the same direction as said shaft 13. Clutch member 20, however, does not, like member 19, receive its motion direct from shaft 13, but through the pinion 39, fast upon shaft 13, and internal gear 23, loose upon said shaft. As the latter therefore rotates in opposite direction to shaft 13 when sleeve-shaft 25 is moved to place clutch member 28 in engagement with clutch member 20, sleeve-shaft 25 will be rotated in a direction opposite to that in which it is rotated by clutch members 19 and 27.

The mechanism for shifting sleeve-shaft 25

and its clutch members 27 and 28 along shaft 13 consists of a lever 40, which is fulcrumed at 41. On this lever is a pin 42, which engages a slot 28', and when the lever is moved the sleeve-shaft 25 is moved with it. A similar lever 43, arranged in an identical manner relatively to sleeve-shaft 26, performs the same service for the latter. Brakes 44 and 45 are provided for holding sleeve-shafts or drums 25 and 26 stationary. These brakes are arranged to bear against the peripheries of clutch members 28 and 36 and are operated through foot-levers 46 and 47, pivoted, respectively, at 48 and 49. Said foot-levers rest on brake-levers 50 and 51, fulcrumed at 52 and 53, and when the foot-levers are depressed the brakes 44 and 45 are pressed into frictional engagement with clutch members 28 and 36.

Sleeve-shafts 25 and 26 are of suitable diameters to serve as winding-drums for the ropes by means of which the crane 54 and scoop 55 are operated. -On drum 25 is wound the end of a rope or chain 56. The opposite end of this rope or chain is secured to a clevis 57, pivoted to the axis of a pulley 58, on which the scoop 55 is hung. The rope or chain 56 passes under pulleys 59 and 60, journaled in bearings on the under side of platform or frame 9. Thence said rope or chain passes over a pulley 61, mounted on the swinging crane or derrick 54, thence over a pulley 62, thence over pulley 58, thence over a pulley 63 and to the clevis 57. When chain or rope 56 is wound upon drum 25, the scoop 55 will, accordingly, be raised, and when the rope or chain is unwound from the drum the scoop will be lowered and the shifting of the motion of drum 25, as previously explained, is accomplished by means of the lever 40. The above-described raising and lowering of the scoop will be in the path of a circular arc by reason of the fact that the scoop is mounted on an arm 64, upon which is a rack 65, meshing with a pinion 66, journaled on the crane 54, assuming, of course, that the pinion 66 remains stationary. Said pinion is keyed to a shaft 67, upon one end of which is a female clutch member 68, that has a spline-and-feather connection with shaft 67. Keyed upon the latter is a cooperating male clutch member 69, which is pivoted to a lever 70, fulcrumed at 71 to a bracket 72, mounted on the crane 54. Clutch member 69 is therefore movable by said lever along the shaft 67 into and out of engagement with clutch member 68. The latter has a sprocket-wheel or gear portion 73 driven by a chain or belt 74, that receives motion from a sprocket wheel or gear 75, keyed to the shaft 76, to which the pulley 61 is also keyed. By throwing the clutch member 69 into engagement with clutch member 68 the former will be rotated with the latter together with pinion 66, and as the latter meshes with rack 65 the arm

64 will be moved longitudinally either upward or downward, depending upon the direction of motion of bucket or scoop 55. When the operator at lever 40 swings the scoop upward or downward, as the case may be, another operator standing upon the turntable 77 is enabled, through lever 70, to change the swinging movement of the scoop to a vertical, horizontal, or modified swinging movement.

The vertical post 78 of the crane, together with turn-table 77, rotates on a bearing 79 and the crane is swung on its axis of rotation by means of a rope, belt, or chain 80, the ends of which are wound around the drum 26. The rope or the like 80 passes around the turntable in a groove 81 and the swinging of the crane is controlled by the lever 43 and by the same operator who controls lever 40 and foot-levers 46 or 47, controlling the brakes. Bracerods 82 and 83 support the post 78 in a vertical position. Said rods consist of two parts connected by turnbuckles 84 and 85, by means of which said rods may be lengthened or shortened to adjust the axis of rotation of the crane. The driving rope, belt, or chain 80 passes under an idler-roller 86, which brings both of the runs of the former in alignment with the groove 81.

As shown in Fig. 6, the rear end of the platform 9 is coupled onto a beam 87, projecting from the rear of the traction-engine 2. The latter, therefore, serves both as the driving-engine for the crane mechanism and as a draft-engine to move the excavating-machine from place to place.

I claim as my invention—

1. In an excavating-machine, a frame or platform; a crane; a bucket-arm having a gear-rack thereon; a pinion in mesh with said gear-rack; a sprocket-wheel mounted on the axis of said pinion, a winding-drum; a rope, cable or the like having one end wound upon said drum connected with said bucket-arm to move the latter in the arc of a circle about said pinion, said rope or cable passing over a series of pulleys one of which has a driving sprocket-wheel portion for driving said first-mentioned sprocket-wheel; a sprocket-chain which connects said sprocket-wheels, whereby simultaneous rotary and longitudinal movement may be imparted to said bucket-arm, and a clutch mechanism for throwing the pinion meshing with said gear-rack in and out of operative connection with said drum and cable.

2. In an excavating-machine, the combination with a pivotally-movable crane having a bucket-arm and bucket mounted thereon, of a winding-drum; a rope and series of pulleys connecting said bucket and drum for raising and lowering the former by the latter, and a mechanism driven by said rope for imparting longitudinal movement to said bucket-arm.

3. In an excavating-machine, a crane; a revolubly and longitudinally movable bucket-arm; a reel and cable arranged to raise and lower said arm, and a mechanism driven by said cable for moving said arm longitudinally; a shaft upon which said reel is revolubly mounted; clutch members upon, respectively, said reel and shaft and at opposite ends thereof, the clutch members at one end of the reel and shaft being arranged to rotate in one direction and the clutch members at the opposite end of the reel and shaft arranged to rotate in the opposite direction, and means for shifting said shaft and reel relatively to each other, whereby the motion of the reel may be reversed, as specified.

4. In an excavating-machine, the combination with a crane, of a bucket-arm revolubly and longitudinally movable upon said crane, a reel and cable arrangement for raising and lowering said arm in a circular arc; a mechanism driven by said cable for simultaneously moving said arm longitudinally; a driving-shaft; a pair of driven shafts arranged to be rotated by said driving-shaft in the same direction; sleeve-shafts or reels mounted on said driven shafts for longitudinal and rotary movements thereupon, said sleeve-shafts or reels having female clutch members at opposite ends thereof, and said driven shafts having male clutch members adapted to cooperate with said female clutch members, the male clutch member at one end of each of said driven shafts being arranged to be rotated by said driving-shaft in one direction and the male clutch members at the opposite ends of said driven shafts being arranged to be rotated by said driving-shaft in the opposite direction; means for shifting said sleeve-shafts or reels from one set of clutch members to the other to reverse the direction of motion, and means whereby one

of said reels is caused to rotate said crane while the other reel operates said bucket-arm to move same revolubly and longitudinally. 45

5. In an excavating-machine; a platform; a crane revolubly mounted thereupon; means for adjusting the axis of rotation of said crane; a bucket-arm having a bucket thereon; a reel or drum 25 and a cable arranged to raise and lower said bucket-arm in a circular arc; a mechanism driven by said cable adapted to, simultaneously with the raising and lowering of said bucket-arm in a circular arc, move said arm longitudinally; said reel 25 having female clutch members 27 and 28 on opposite ends thereof; a shaft 13 upon which said reel is rotatively and longitudinally movable, said shaft having thereon male clutch members 19 and 20 adapted to cooperate with, respectively, said female clutch members 27 and 28; means whereby said shaft drives one of said female clutch members, when connected therewith, in one direction of rotation, while the same shaft is adapted to drive the other female clutch member in the opposite direction of rotation when connected with the latter member, a lever for shifting said female clutch members in and out of engagement with the respective male clutch members; a reel 26 similar to reel 25 and a shaft 14 similar to shaft 13, said reel 26 and shaft 14 having cooperating clutch members identical to, and relatively movable as, the clutch members for reel 25 and shaft 13, and means whereby said crane is revolved by said reel 26. 50 55 60 65 70 75

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALFRED FREDERICH HUBER.

Witnesses:

PAUL GERHARDT.
TH. BROOKSIDE