J. L. POTTER.

HOISTING AND CONVEYING APPARATUS.

APPLICATION FILED MAR. 11, 1912.

1,042,264.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.

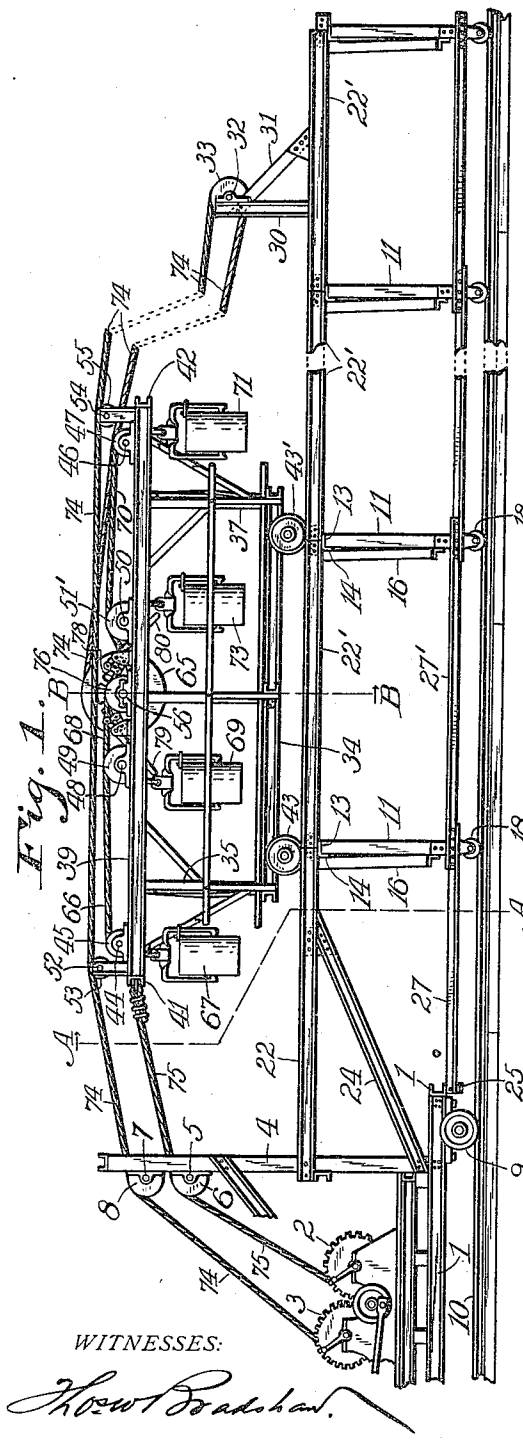

Fig. 1.

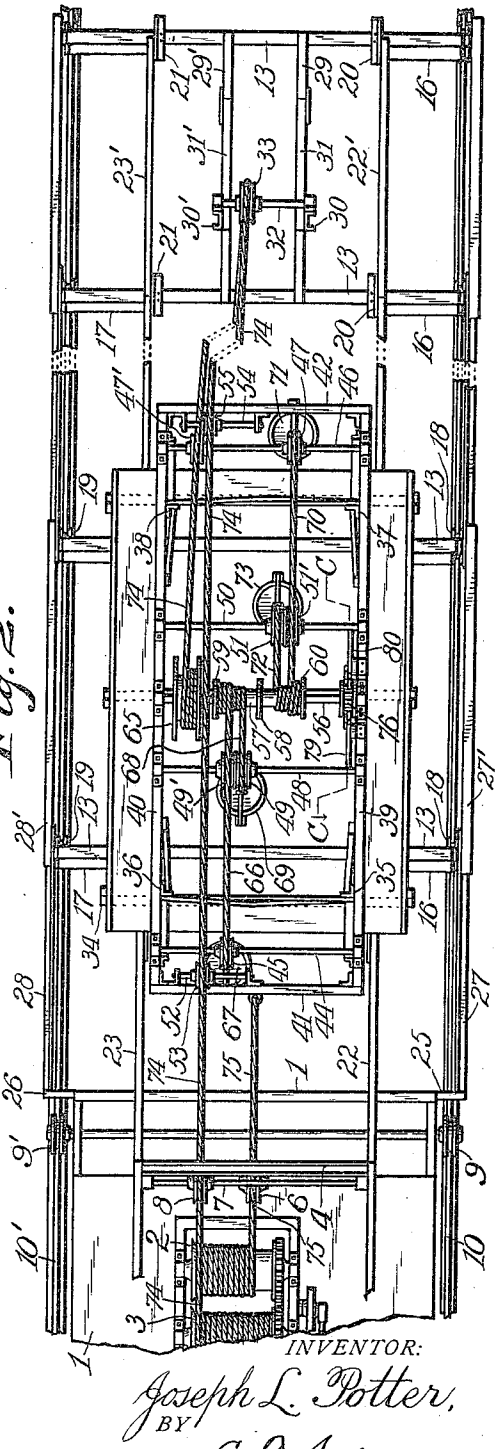

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 4.

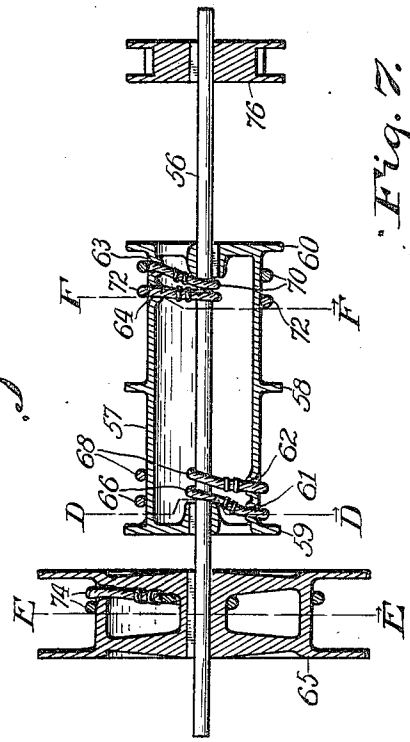


Fig. 7.

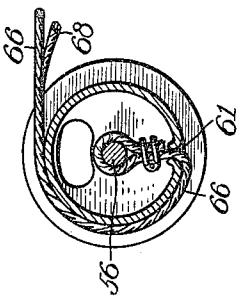


Fig. 9.

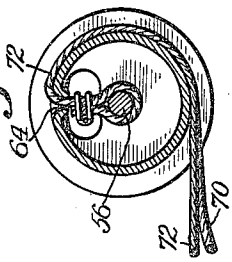


Fig. 6.

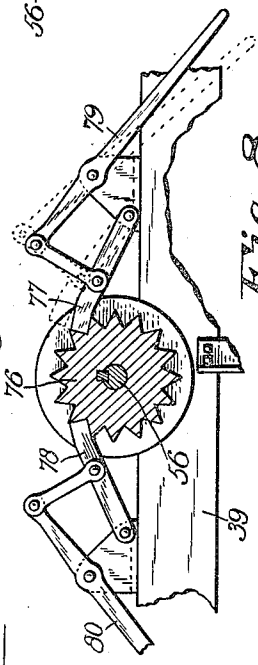


Fig. 8.

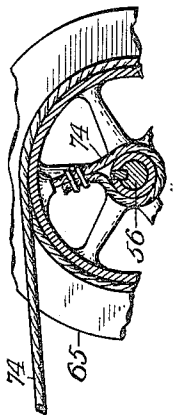


Fig. 3.

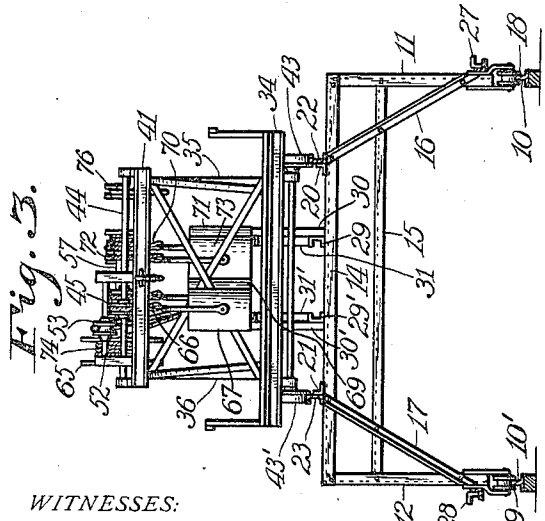
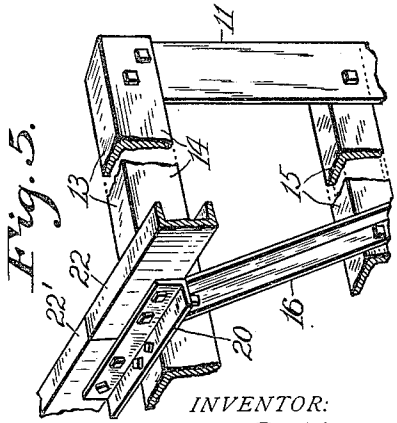


Fig. 5.



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HOISTING AND CONVEYING APPARATUS.

1,042,264. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed March 11, 1912. Serial No. 682,847.

To all whom it may concern:

Be it known that I, JOSEPH L. POTTER, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Hoisting and Conveying Apparatus, of which the following is a specification, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

This invention relates to apparatus for hoisting material or substance and conveying and discharging the material or substance, as in the construction of sewers or in the making of trenches, the invention having reference more particularly to machines for hoisting and conveying large quantities of earth at each operation.

The object of the invention is to provide improved hoisting and conveying apparatus that shall be so constructed as to be capable of hoisting the maximum quantity of earth from the trenches and conveying and discharging the earth to fill the trenches at each operation of the machine as the masonry or construction work progresses, in order to facilitate the work and save valuable time in the operations.

A further object is to provide an improved trench machine that may be simply and strongly constructed and adapted to be conveniently shipped in knock-down condition and readily set up for use.

A still further object is to provide a portable knock-down trench machine that shall be capable of hoisting and conveying four buckets of earth with a relatively short conveyer at each operation of the machine, without adding materially to the number of parts or cost of construction of the machine, especially with reference to the hoisting cables, and also the conveyer.

With the above-mentioned and other objects in view, the invention consists in improved hoisting and conveying apparatus comprising a trestle, and an improved conveying car carrying four buckets and so constructed that all the buckets may be hoisted or lowered in unison by means of a single hoisting cable. The invention consists further in the novel parts, and in the novel combinations and arrangements of parts, as hereinafter particularly described and defined in the accompanying claims.

Referring to the drawings, Figure 1 is a side elevation of the improved hoisting and conveying apparatus in which portions of the trestle and the hoisting cable are broken away; Fig. 2, a top plan of Fig. 1; Fig. 3, a transverse section approximately on the line A A in Fig. 1; Fig. 4, a fragmentary section approximately on the line B B in Fig. 1; Fig. 5, a fragmentary perspective view partially broken away showing a portion of the trestle; Fig. 6, a fragmentary section approximately on the line C C in Fig. 2; Fig. 7, a section on the line D D in Fig. 4; Fig. 8, a fragmentary section on the line E E in Fig. 4, and Fig. 9, a section on the line F F in Fig. 4.

Similar reference characters in the different figures of the drawings indicate corresponding elements or features of construction herein referred to.

In order to fully describe and explain the construction and purpose of the invention, a hoisting engine which may be of any suitable or well known construction is shown in connection with the invention, but being well understood is not shown or described in all its details. The engine car comprises a main frame 1 on which is mounted a suitable engine having two winding drums 2 and 3, a suitable upright frame 4 being erected on the main frame. The upright frame supports a horizontal shaft 5 on which is a guide sheave 6, the frame supporting also a similar shaft 7 on which is a guide sheave 8, the sheaves being supported at a suitable height as may be required. The engine car is provided with a suitable number of wheels 9, 9′, which are mounted on track rails 10, 10′, arranged at opposite sides of the line of the trench.

In carrying out the objects of the invention a trestle preferably is provided which is connected to the engine car to run on the track rails with the engine car. Each bent of the trestle comprises two upright legs 11 and 12 and a cap beam secured to their upper ends, the beam being composed of L-section bar iron or steel, one wing 13 of which is placed horizontally upon the tops of the legs and the other wing 14 against the side face of the legs. The bent comprises also a beam 15 which is secured to the two legs below the cap beam, and two angle braces 16 and 17 secured to the legs 11 and 12 respectively and also to the cap beam and to the parallel beam. The legs are provided with wheels 18 and 19, respectively, that are supported on the track rails. The top of

each cap beam is provided with two transversely extending anchor blocks 20 and 21.

Two track rails 22 and 23 are supported at one end on one bent and secured to the anchor blocks thereon, the opposite end of the rails being secured to the upright frame 4 and they serve as connecting beams. Other similar track rails 22′ and 23′ are similarly connected to the anchor blocks of other cap beams so as to form practically continuous rails spliced upon the bents. Angle bars 24 are connected to the main frame of the engine car and also to the track rails. The end of the main frame of the engine car on which the upright frame 4 is erected is provided with lateral extensions 25 and 26 to which tie-bars 27 and 28 are connected, the latter being connected also to the legs 11 and 12 of the first bent from the engine car, other tie-bars 27′ and 28′ being connected also to the lower portions of the legs of each two most adjacent bents. Two beams 29 and 29′ are mounted in relatively close relation on the two cap beams outermost from the engine car and between the track rails 22′ and 23′, and they support two posts 30 and 30′ provided with angle bars 31 and 31′, respectively, a shaft 32 being mounted on the posts and having a guide sheave 33 thereon commonly termed a tail sheave.

A suitably framed conveying car is provided which comprises an open, rectangular platform frame 34 having two end posts 35 and 36 on one end thereof, and two similar posts 37 and 38 on the opposite end thereof, being corner posts which support an open, rectangular gear frame which comprises a beam 39 supported on the posts 35 and 37 and a beam 40 supported on the posts 36 and 38, the beams being of suitable length so as to extend over beyond the end posts, an end beam 41 secured to one end of the side beams 39 and 40 and an end beam 42 secured to the opposite ends of the side beams, the gear frame therefore, being longer than the platform frame so as to extend beyond the opposite ends of the latter. The conveying car comprises also a suitable number of carrying wheels, 43, 43′, mounted on the track rails of the trestle. The conveying car comprises also suitable frame braces which are obvious and unnecessary to describe in detail. A shaft 44 is supported on one end portion of the gear frame and has a guide sheave 45 thereon, a similar shaft 46 being supported on the opposite end portion of the gear frame and having a sheave 47 and preferably also a sheave 47′ thereon, the two sheaves being at a suitable distance apart. Another shaft 48 is supported on the gear frame parallel to the shaft 44 and somewhat nearer to it than to the shaft 46 and it has a sheave 49 and preferably also a sheave 49′ thereon, arranged close together, and it should be understood that if desired the sheaves 49 and 49′ may be formed integrally. Another shaft 50 is supported on the gear frame parallel to the shaft 46 and somewhat nearer to the shaft 46 than to the shaft 44 and it has a sheave 51 and preferably also a sheave 51′ thereon, arranged closely together, the sheaves obviously being formed integrally if desired. A shaft 52 is suitably mounted on the end beam 41 and somewhat higher than the plane of the shafts 44 and 46 and it has a sheave 53 thereon, another shaft 54 being mounted similarly on the beam 42 and having a sheave 55 thereon. A main shaft 56 is rotatably mounted on the gear frame between the shafts 48 and 50 and it has a double winding drum 57 secured thereto, the drum having an external rib or collar 58 thereon midway of its ends so that the drum practically constitutes two drums, the end portions of which have guide flanges 59 and 60 thereon. The drum is hollow and the shell has two apertures 61 and 62 therein near one end portion thereof and also two apertures 63 and 64 near the opposite end portion to receive cables. A bull wheel 65 is secured also to the main shaft. A cable 66 is passed through the aperture 61 and secured to the shaft 56 to be wound onto the drum 57, the cable extending off from the upper portion of the drum over the sheave 45 and also over the sheave 49 if the latter is provided, and a suitable dump bucket 67 is connected to the end of the cable and operates beyond the plane of one end of the upright frame of the hoisting car. A cable 68 is passed through the aperture 62 and secured to the shaft 56 to be wound on the drum and it extends from the uppermost portion of the drum over the sheave 49 and downward, a similar bucket 69 being connected to the cable and operating through the open platform frame of the conveying car. It will be seen that the cables 66 and 68 are simultaneously wound onto the drum or unwound therefrom. A cable 70 is passed through the aperture 63 and secured to the main shaft 56 to be wound on the drum and it extends from the undermost portion of the drum upward over the sheave 47 and thence down and preferably is guided upon the sheave 51′ if the latter is provided, a dumping bucket 71 being connected to the end cable and operating beyond the plane of the opposite end of the upright frame of the hoisting car. Still another cable 72 is passed through the aperture 64 and is secured also to the main shaft and it extends away from the undermost side of the drum 57 and over the sheave 51, a similar bucket 73 being connected to the end of the cable and operating through the open platform frame of the conveying car. It will be seen therefore that the cables 70 and 72 are wound up simultaneously and that the buckets 71 and

73 move in unison and also in unison with the buckets 67 and 69. In the interest of clearness the bucket carrying cables are shown in Fig. 2 as being farther apart on the winding drum than they are in practice, and it should be understood that the arrangement is such that all the buckets are brought approximately into one vertical plane corresponding to the middle of the trench in operation.

In order to operate all the buckets simultaneously or to move the conveying car and the buckets away from the engine car, a cable 74 is connected to the winding drum 3 and extends over the sheave 8 and thence over the sheaves 53 and 55, thence around the sheave 33 and back over the sheave 49′ to the bull wheel 65 to which it is suitably connected, preferably by passing the cable through a suitable aperture in the wheel and securing the end of the cable to the hub of the wheel. In order to move the conveying car toward the engine car a cable 75 is connected to the drum 2 and extends over the sheave 6, the end of the cable being connected to the end beam 41 of the gear frame of the conveying car.

In order to lock the main shaft 56 against rotation, a toothed wheel 76 is secured thereto adjacent the side beam 39 of the gear frame, and two dogs 77 and 78 are suitably supported pivotally to engage the toothed wheel at opposite sides thereof, suitable levers 79 and 80 being provided for withdrawing the dogs from the toothed wheel when desired, as illustrated more clearly in Fig. 6.

In practical use the drums 2 and 3 are controlled by one man, and a sufficient number of men are employed in the trench to quickly fill the buckets when lowered, and one or more men are employed for discharging the loads from the buckets. When the buckets are filled the conveying car is held by means of the cable 75, the dogs 77 and 78 are withdrawn and the drum 3 is operated so as to wind up the cable 74 which turns the bull wheel 65 and causes the double drum 57 to wind up the four cables connected thereto, thereby hoisting all the buckets in unison. If the earth is to be moved away from the engine car, as is customary, the dogs 77 and 78 are permitted to drop into contact with the toothed wheel 76 and then the cable 74 is properly wound onto the drum 3 while the drum 2 is permitted to run loose and unwind the cable 75 therefrom, so that the conveying car is moved toward the tail sheave 33. If then the dog 77 is withdrawn by means of its lever 79 the weight of the loads will cause the buckets to descend if the cable 74 be permitted to pay out from the drum 3. After dumping the loads of earth the opposite dog is withdrawn and the buckets are lifted as before, after which the dogs are permitted to lock the main shaft and then the conveying car is returned by means of the cable 75 while the cable 74 is paid out from the drum 3. After the conveying car is in proper position the drum 2 is stopped and the cable 74 is permitted to run off from the drum 3 while the buckets descend into the trench by force of gravity, the operations being continued repeatedly as may be required.

Having thus described the invention, what is claimed as new is—

1. Hoisting and conveying apparatus including a movable conveying car, a drum rotatably mounted on the car and having two cables connected to one end portion and two cables connected to the opposite end portion thereof, each cable having a hoisting device connected thereto, and guide sheaves for the cables mounted on the conveying car.

2. Hoisting and conveying apparatus including a movable conveying car, a drum rotatably mounted on the car, a single guide sheave mounted on the car, two adjacently arranged guide sheaves mounted on the car between the drum and the single guide sheave, two cables connected to the drum and extending therefrom together in one direction, one over one of the two adjacent sheaves and the other over the remaining one of the two sheaves and also over the single sheave, and two buckets connected to the two cables respectively.

3. Hoisting and conveying apparatus including a conveying car, a hollow winding drum rotatably mounted on the car and having two apertures in one end portion of the periphery and also two apertures in the opposite end portion of the periphery thereof, two cables secured in one end portion and two cables secured in the opposite end portion of the drum and extending through the adjacent apertures, two cables leading in one direction and the remaining two cables leading in the opposite direction from the respective ends of the drum, each cable having a lifting device thereon, and separate guide sheaves for the different cables mounted on the car.

4. Hoisting and conveying apparatus including a conveying car, a gear frame mounted on the car and projecting beyond two opposite ends thereof, two far-away sheaves mounted on the two projecting portions respectively of the gear frame, two intermediate sheaves mounted on the gear frame between the far-away sheaves, a drum rotatably mounted on the gear frame between the two intermediate sheaves, two cables connected to the drum and extending together therefrom in one direction, one over one of the intermediate sheaves and the other over one of the far-away sheaves,

and two other cables connected also to the drum and extending together therefrom in an opposite direction, one over the remaining one of the intermediate sheaves and the other over the remaining one of the far-away sheaves, each cable having a lifting device thereon.

5. In hoisting and conveying apparatus, the combination of a conveying car comprising an open rectangular platform frame and an open rectangular gear frame mounted upon and projecting beyond the platform frame in opposite directions, hoisting gearing mounted on the gear frame including two pairs of cables, the two cables of one pair extending together in one direction, the two cables of the remaining pair extending together in an opposite direction, four hoisting buckets, connected to the several cables respectively, and guide sheaves for the cables mounted on the gear frame, two of the sheaves for two of the cables being on the two projecting portions respectively of the gear frame.

6. In hoisting and conveying apparatus, the combination with an engine car, a hoisting engine on the car, and a trestle, of a conveying car mounted on the trestle, a cable connected with the engine and the conveying car, a main shaft rotatably mounted on the conveying car, a drum and also a bull wheel secured to the shaft, two sheaves arranged separately on one side and two sheaves arranged separately on the opposite side of the drum and supported by the conveying car, four cables connected to the drum and extending over different sheaves, each cable having a bucket thereon, a tail sheave mounted on the trestle, and a hoisting cable connected to the bull wheel and extending about the tail sheave and to the hoisting engine.

7. In a quadruple-bucket hoisting and conveying car, the combination of means on the car for hoisting two buckets into the car and two buckets beyond opposite ends respectively of the car, all the adjacent buckets being approximately equi-distant apart, with a movable trestle supporting the car.

8. In a movable quadruple-bucket hoisting and conveying car, the combination of means on the car for hoisting two buckets into the car and two buckets beyond opposite ends respectively of the car, and a holding cable connected to the top of the car, with a movable engine car, a hoisting engine on the engine car connected with the holding cable, and a cable connected also with the hoisting engine and the hoisting means.

9. In hoisting and conveying apparatus, the combination with a movable engine car, a movable trestle connected to the engine car, and a hoisting engine on the engine car, of a movable conveying car on the trestle provided with four equi-distantly spaced guide sheaves, four cables guided on the four sheaves respectively, four hoisting buckets connected to the four cables respectively, means on the conveying car for operating the cables, a holding cable connected with the hoisting engine and the top of the conveying car, a draft cable connected with the hoisting engine and also with the cable-operating means, and guides for the draft cable.

In testimony whereof, I affix my signature in presence of two witnesses.

JOSEPH L. POTTER.

Witnesses:
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