

May 21, 1935.

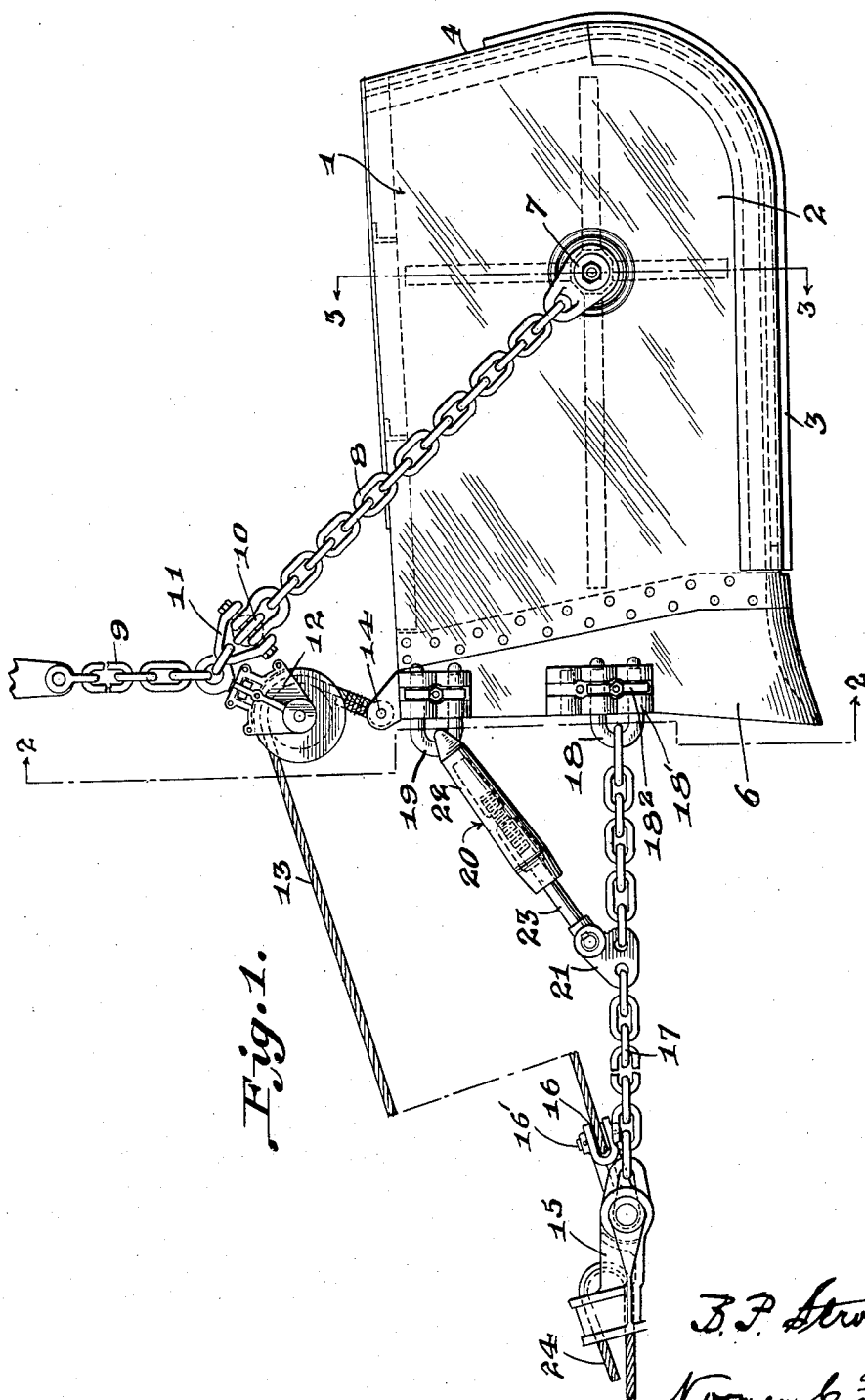
B. P. STRONG

2,001,924

EXCAVATING BUCKET

Filed Oct. 26, 1932

3 Sheets-Sheet 1



Inventor

B. F. Strong

Norman C. Fetter

Attorneys

May 21, 1935.

B. P. STRONG

2,001,924

EXCAVATING BUCKET

Filed Oct. 26, 1932

3 Sheets-Sheet 2

Fig. 2.

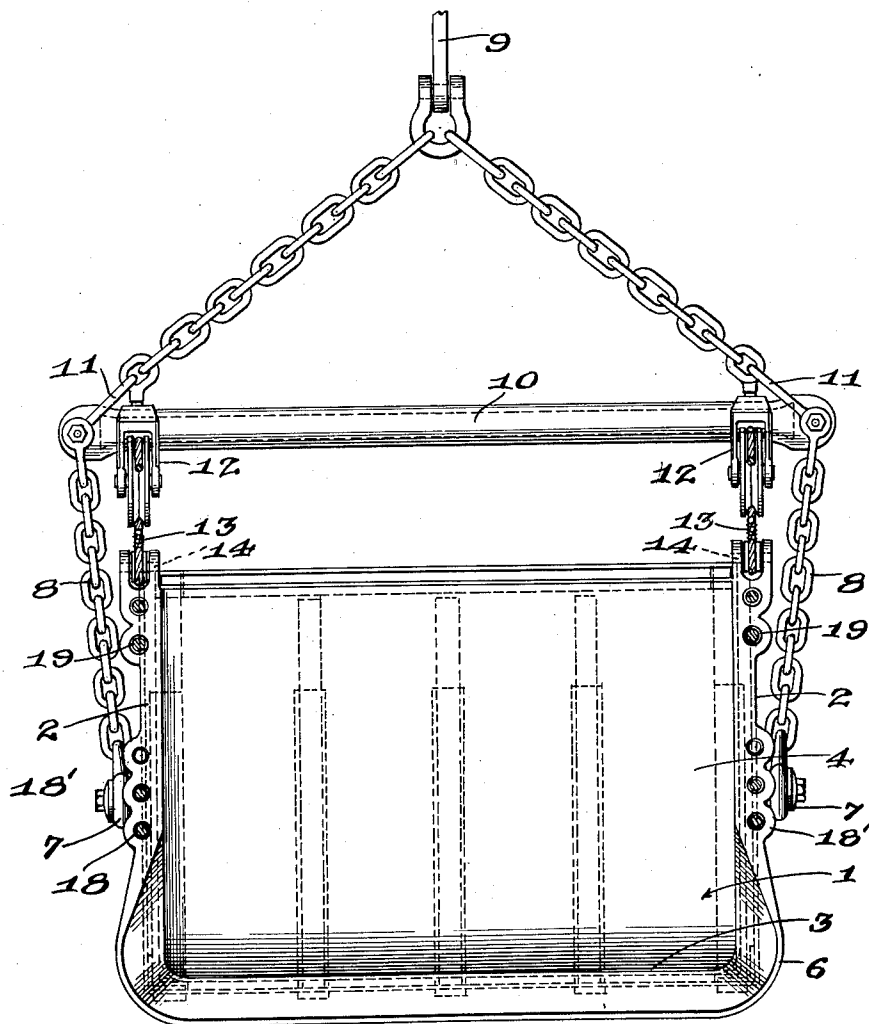
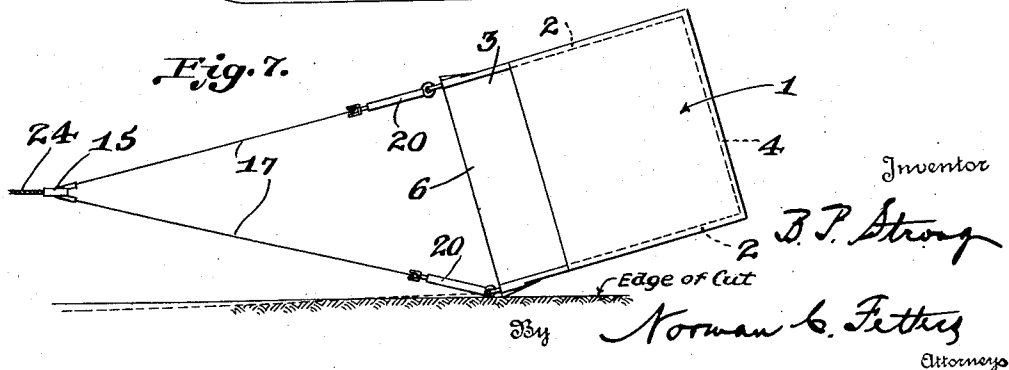


Fig. 7.



May 21, 1935.

B. P. STRONG

2,001,924

EXCAVATING BUCKET

Filed Oct. 26, 1932

3 Sheets-Sheet 3

Fig. 3.

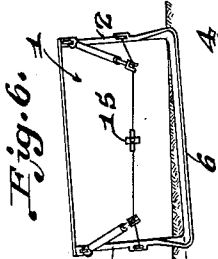
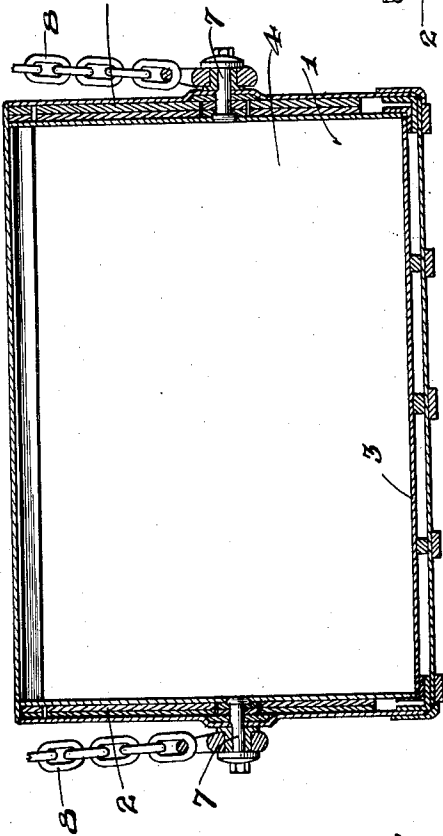


Fig. 4.

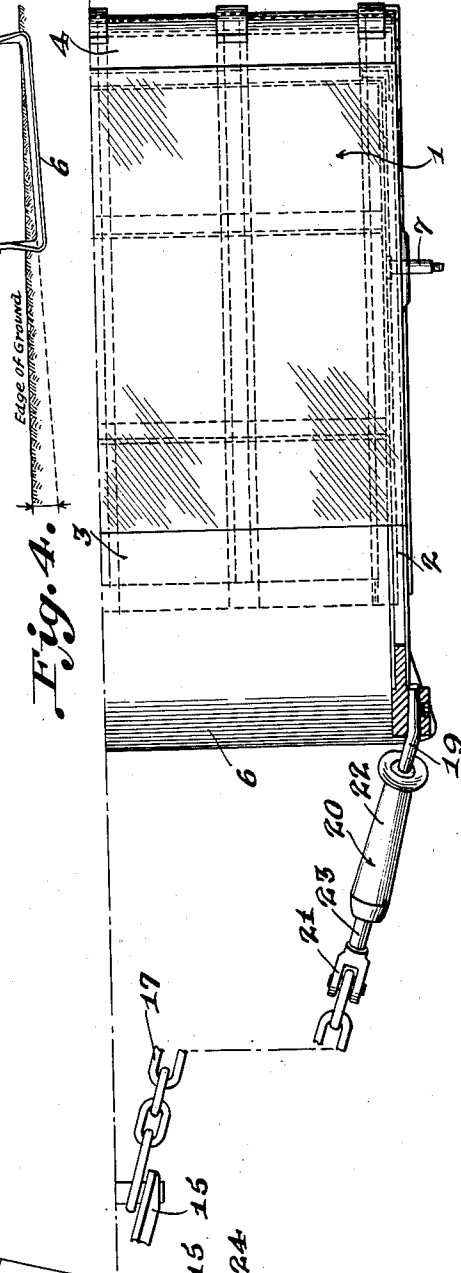
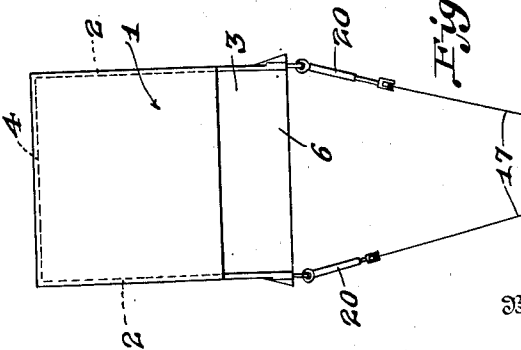


Fig. 5.



Inventor

B. P. Strong

Norman L. Fetter

Attorneys

UNITED STATES PATENT OFFICE

2,001,924

EXCAVATING BUCKET

Basil P. Strong, Atwater Village, Ohio, assignor
to Blaw-Knox Company, Pittsburgh, Pa., a corporation of New Jersey

Application October 26, 1932, Serial No. 639,683

8 Claims. (Cl. 37-135)

My invention relates to that type of excavating bucket which is suspended from a hoisting mechanism and controlled by a cable emerging from the lower end of a crane boom, and commonly known as a "drag-line bucket".

An object of the invention is to provide a drag line bucket wherein the drag-line connections are made to the bucket proper in such a manner that the usual heavy hood and side walls of the bucket will not be needed, thus materially reducing the weight of the bucket and consequently the cost of same.

Another object is to furnish a means whereby a drag-line bucket can be controlled so that it can be used to cut straight down on a sand or earth bank to collect the loose material into the bucket.

A further object is to provide a drag-line bucket in which the draft can be accurately controlled and regulated.

A still further object is to supply a drag-line bucket with side adjusting means whereby the bucket can be tilted on an angle when operating to cause one corner of the lip to cut sharply into the surface undergoing excavation.

An additional object is to furnish a drag-line bucket with a side adjusting means whereby the bucket can be caused to dig edge-wise into the side of an embankment.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

Referring to the drawings, which show one embodiment of my invention:—

Fig. 1 is a side elevation of the bucket and its operating mechanism.

Fig. 2 is a front elevation taken on line 2-2 of Fig. 1.

Fig. 3 is a vertical cross-section taken on the line 3-3 of Fig. 1.

Fig. 4 is a top plan view of half of the bucket, partly in horizontal section.

Figs. 5, 6 and 7 are diagrams to show how the bucket can be made to cut on various angles.

In the drawings, the scoop 1 is made up preferably of structural steel plates and shapes, and consists of side walls 2 and bottom plate 3, which, in the form of bucket illustrated, is also curved around to form the back wall 4 of the bucket. It will be seen that the front portion of the top, and the front end of the bucket are

open and form no obstruction to the entrance of material being handled or to the piling of same in the bucket. To the forward end of the bucket there is attached by rivets or other means, a cutting plate or lip 6. The bucket is provided at its sides with trunnions 7. Bail chains 8 connect the trunnions with a hoist line 9. Over the top of the bucket, the bail chains are held apart by spreader bar 10 connected thereto by shackle connections 11. On either side of the bucket, I provide a swivel sheave block 12 with cable sheaves over which a dump cable 13 operates. The dump cable has its ends secured to the top edges of the front of the bucket walls 2 by pins 14, and its medial portion freely rides about a pulley 16 carried by a pin 16' on a cable connection 15.

Drag chains 17 extend from cable connection 15 to points approximately central of the front edge of side walls 2, and are flexibly connected thereto by U bolt connectors 18. At the upper front edge of the side walls 2 there are provided another set of U bolt connectors 19 supporting adjustable or extensible members 20 which are attached to the drag chains 17 by connecting links 21. The U bolt connectors permit the entire bucket 1 to swing freely sidewise when it is adjusted to cut into the side of a bank and to take the general direction of the drag chain.

The adjustable members 20 are provided with turnbuckles 22 into which are screwed rods 23 which are swivelly connected to links 21. Thus, by turning rods 23, the length of the members 20 can be varied at will.

Drag chain 17 is attached to cable connection 15 which in turn is connected to the main drag line 24.

It will be noted the U bolt connectors 18 are vertically adjustable on the bucket 1 by means of apertured slotted brackets 18' and clamp plates 18". The U bolt connectors can thus be moved up into a higher position when it is desired to cause the bucket to dig more deeply into the material being excavated.

In use, the bucket lines are controlled by two drums on a crane, not shown, one cable from the crane emerging from the lower end of the crane boom and serving to drag the bucket through the material being handled, thereby filling the scoop. This is called the drag-line. The dump cable is connected to the upper front edge of each wall of the bucket, and passes over a sheave, thence to drag line connection which acts also as an equalizer for the dump cable. The hoist cable leading

down from the upper end of the crane boom connects to the bail chains.

The bucket is dropped down upon the material to be handled and then pulled horizontally by the drag cable 24, thus filling the bucket with material. As the bucket is raised out of the material, the drag-line is paid out to correspond with the take-up of the hoist cable, to a point under the upper end of the crane boom, where the load is discharged by releasing the drag cable, thus allowing the bucket to swing about its trunnions and the front end of the bucket to drop by gravity, allowing the material therein to fall out. The bucket is then lowered and the cycle is repeated.

Now it will be seen in digging downward on a bank, the adjustable members 20 serve to transmit the pull from the drag chain to the top of the bucket, and the members are at this time in tension. As soon as the lip of the bucket digs into the material, it tends to rotate the bucket about the center connection, and to put the adjustable members in compression. The adjustable members thus serve or act both in tension and in compression at the various stages of the operation of the bucket.

Since the drag chains and the adjustable members 20 are free to swing sidewise on connector bolts 19, it will be seen that by shortening up the drag chain on one side of the bucket only, the bucket can be caused to operate angularly as shown in Fig. 7, and be caused to cut side-wise into the edge of a cut or bank, so that the bucket can be set down against a wall and be loaded with material close up against the wall or embankment, whereas other types of buckets must be pulled in a straight line toward the crane.

It will also be seen that by shortening the tension-compression or diagonal member 20 on one side of the bucket only, the bucket can be caused to tilt slightly, as shown in Figs. 5 and 6, and the lower corner of the bucket can be made to dig into the earth corner-wise, cutting a sharp V shaped groove. This assists in cutting hard earth or other material which does not yield easily to the cutting action of the bucket.

In lifting the loaded bucket, the weight of the bucket and its contents is taken in a direct vertical line through the front edge of the side plates, thus obviating any possibility of the plates bending or buckling. I therefore do not need to use cross members or the usual heavy hood.

While I have disclosed what I now consider to be a preferred embodiment of the invention, it will be manifest to those skilled in the art that changes may be made in the details disclosed without departing from the spirit of the invention, as expressed in the claims.

What I claim and desire to secure by Letters Patent is:

1. A drag-line bucket comprising a scoop having side walls, a drag-line flexibly connected to the front edge portion of each of said side walls, a rigid lengthwise adjustable tension-compression member interposed diagonally between each drag line and the upper part of each of said side walls and connected to the drag-line and to the upper part of each side wall, a dump cable connected to the front edge portions of each side wall, a drag cable, a pulley carried by the drag cable, the medial portion of the dump cable passing about said pulley, a hoist line, and sheave wheels supported by the hoist line and arranged at the front edge portions of the top of the scoop, said dump cable passing over the said sheave wheels.

2. In a drag-line bucket, a drag cable, a scoop,

drag lines connecting the cable to opposite sides of the front edge portions of the sides of the scoop, a hoist line, sheave wheels supported by the hoist line and positioned above the sides of the scoop at the front end of the latter, a pulley operatively connected to the drag cable, and a dump cable passing about said pulley and sheave wheels and having its ends connected to the sides of the scoop at the front end portions of the latter.

3. In a drag-line bucket, a drag cable, a scoop, drag lines connecting the cable to opposite sides of the front edge portions of the sides of the scoop, a hoist line, sheave wheels supported by the hoist line and positioned above the sides of the scoop at the front end of the latter, a pulley operatively connected to the drag cable, a dump cable passing about said pulley and sheave wheels and having its ends connected to the sides of the scoop at the front end portions of the latter, trunnions projecting from the sides of the scoop near the rear end of the latter, and bail chains operatively connecting said trunnions to said sheave wheels.

4. In a drag-line bucket, a drag cable, a scoop, drag lines connecting the cable to opposite sides of the front edge portions of the sides of the scoop, a hoist line, sheave wheels supported by the hoist line and positioned above the sides of the scoop at the front end of the latter, a pulley operatively connected to the drag cable, a dump cable passing about said pulley and sheave wheels and having its ends connected to the sides of the scoop at the front end portions of the latter, and a rigid diagonally arranged expansible and contractible member connecting a medial portion of each of the drag lines to an upper edge portion of a side of the scoop.

5. A drag-line bucket comprising a hoist cable, a scoop having trunnions projecting from its sides, bail chains connecting the trunnions to the hoist cable, a spreader bar connecting the bail chains and holding said chains apart, a drag cable, drag lines connecting said cable to the front edge portions of the sides of the scoop, a pulley carried by the drag cable, sheave wheels connected to the bail chains, and a dump cable passing about said pulley and said sheave wheels and having its ends secured to the upper edge portions of the sides of the scoop at the front portion of the latter.

6. A drag-line bucket comprising a hoist cable, a scoop having trunnions projecting from its sides, bail chains connecting the trunnions to the hoist cable, a spreader bar connecting the bail chains and holding said chains apart, a drag cable, drag lines connecting said cable to the front edge portions of the sides of the scoop, a pulley carried by the drag cable, sheave wheels connected to the bail chains, a dump cable passing about said pulley and said sheave wheels and having its ends secured to the upper edge portions of the sides of the scoop at the front portion of the latter, and combined tension and compression members connecting medial portions of the drag lines to the upper edge portions of the sides of the scoop at the front end of the latter and diagonally interposed between the drag lines and the front of the scoop.

7. A drag line bucket comprising a scoop having side walls, a pair of drag lines, each drag line being flexibly connected to the front edge portion of one of said side walls, trunnions on the side walls positioned rearwardly of the front end of the scoop, bail chains, a hoist line, each bail chain having one of its ends connected to

- the hoist line and its other end connected to one of the trunnions, a spreader bar connected to the medial portions of the bail chains for holding said chains apart, a sheave attached to each bail chain, and a dump cable passing over said sheaves and connected to the drag cable intermediate its ends and to the upper end of the forward portion of the side walls of the scoop.
8. A drag line bucket comprising a scoop having side walls, a pair of drag lines, each drag line being associated with each side wall, universal joints flexibly connecting each drag line to the front edge portion of its respective side wall, a tension compression member interposed diagonally between each drag line and the upper part of each of said side walls, flexible connecting means joining each drag line to its respective tension compression member, universal joints connecting said tension compression members to the upper part of each of said side walls, a drag cable, the front ends of the drag lines being connected to the rear end of said cable, trunnions on the side walls positioned rearwardly of the front end of the scoop, bail chains respectively associated with said trunnions, a hoist line, each bail chain having one of its ends connected to the hoist line and its other end connected to its respective trunnion, a spreader bar connected to the medial portions of the bail chains and holding said chains apart, a sheave secured to each bail chain, and a dump cable passing over said sheaves and connected to the drag cable and to the upper end of the forward portion of the side walls of the scoop.

BASIL P. STRONG.