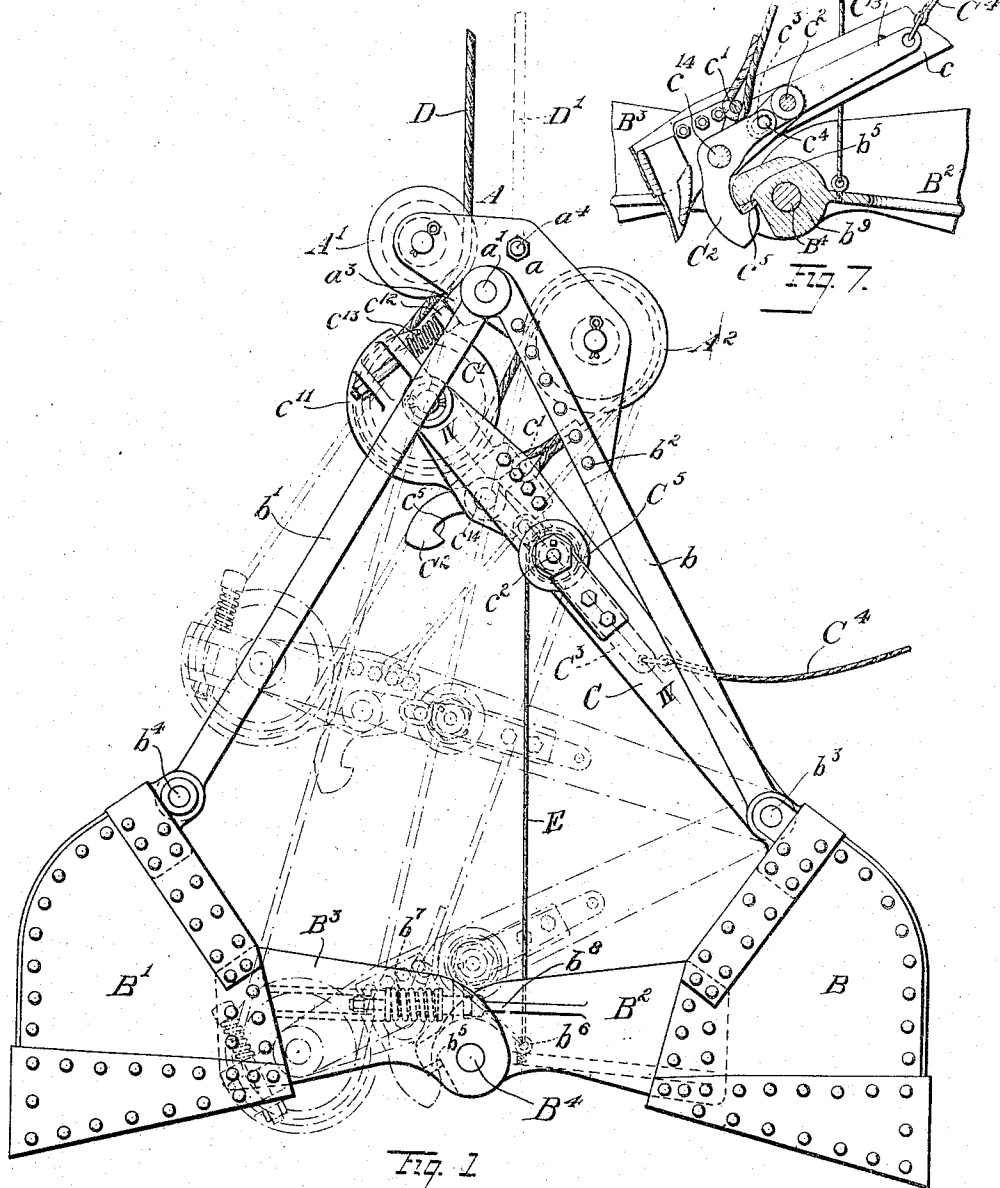


C. C. WILLIAMS.  
CLAM SHELL BUCKET.  
APPLICATION FILED NOV. 27, 190.

937,496.

Patented Oct. 19, 1909.

4 SHEETS-SHEET 1.



Witnesses  
Herman Eisele  
K. F. Jüngling.

Inventor:  
C. C. Williams,  
by A. Merkel  
Attorney

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4 SHEETS—SHEET 2.

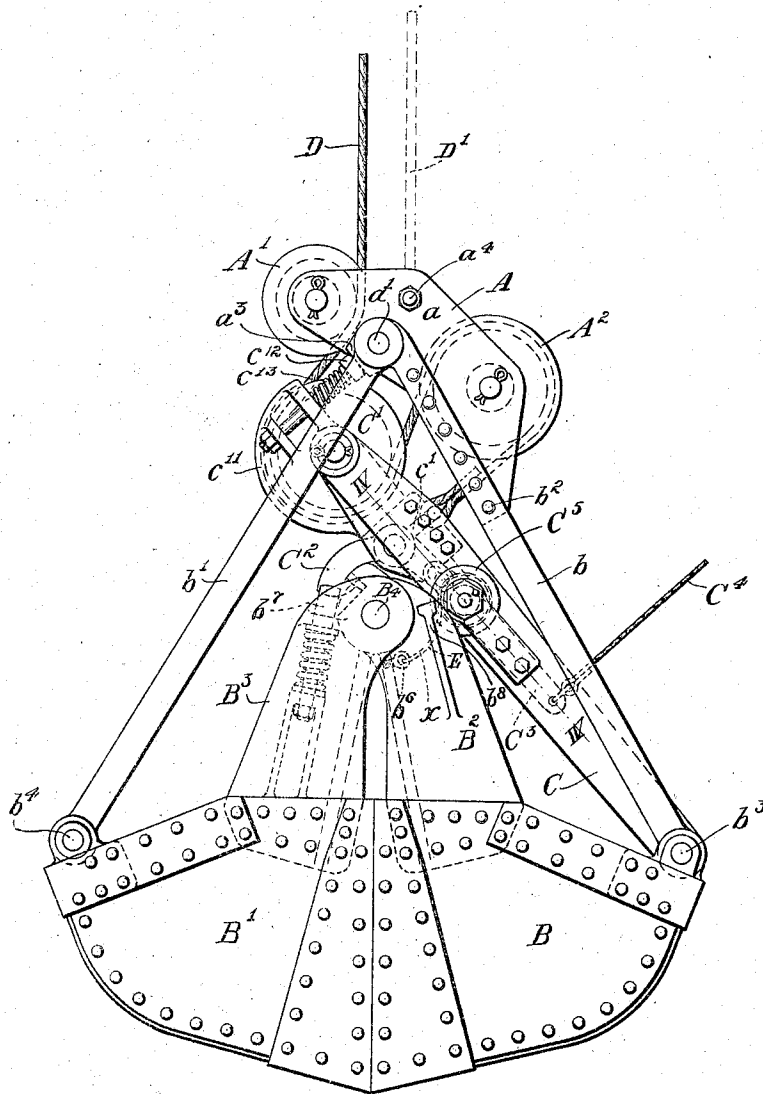


Fig. 2.

Witnesses  
Herman Eisele  
K. P. Jerning

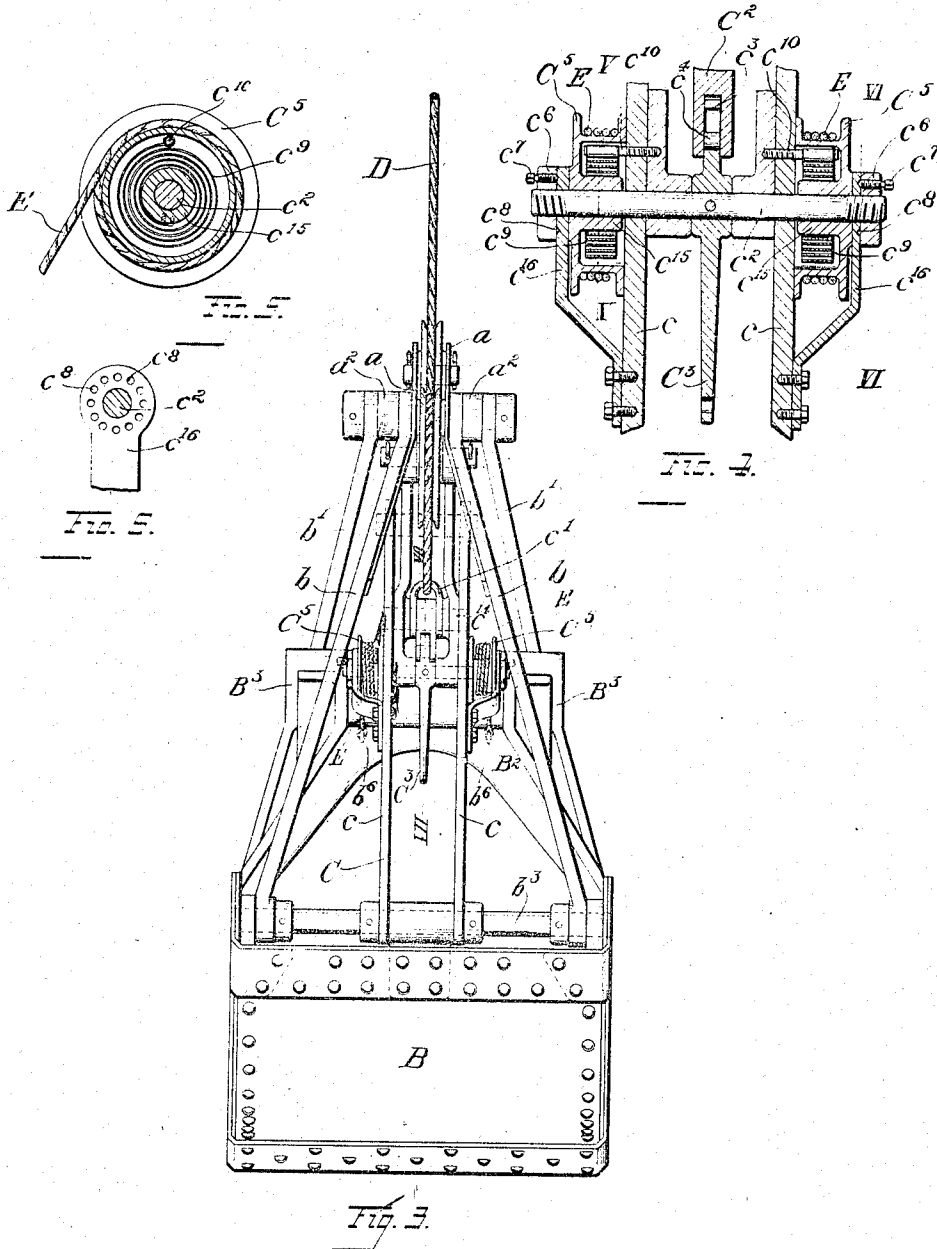
Inventor:  
C. C. Williams,  
by A. M. Mordel,  
Attorney

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4 SHEETS—SHEET 3.



Witnesses  
Herman Esche  
K. F. Jüngling.

Inventor:  
C. C. Williams,  
by A. Merkel,  
Attorney

937,496.

This diagram provides a detailed perspective view of the mechanical assembly shown in Fig. 9. It illustrates the internal components, including the pulleys (A<sup>1</sup>, A<sup>2</sup>, A<sup>3</sup>, A<sup>4</sup>, A<sup>5</sup>) and the various levers and rods (a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z). The assembly is shown in a disassembled state, revealing the internal mechanism.

Witnesses  
Herman Eisele  
K. P. Juenling

Inventor:  
C. C. Williams,  
by A. Merkel,  
Attorney

# UNITED STATES PATENT OFFICE.

CHARLE C. WILLIAMS, OF CLEVELAND, OHIO.

CLAM-SHELL BUCKET.

937,496.

Specification of Letters Patent.

Patented Oct. 19, 1909.

Application filed November 27, 1908. Serial No. 464,724.

To all whom it may concern:

Be it known that I, CHARLE C. WILLIAMS, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Clam-Shell Buckets, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to clam shell buckets, its object being to provide a bucket simple in construction and efficient in its operation.

A further object is to provide a bucket which may be used and operated from the end of a single line, in the bight of a single line, or which may be used and operated with a double line.

The said invention consists of means hereinafter fully described and particularly set forth in the claims.

The annexed drawings and the following description set forth in detail a certain mechanism embodying the invention, the disclosed means however constituting but one of various forms in which the principle of the invention may be used.

In said annexed drawings:—Figure 1 is a front elevation of a bucket embodying my invention showing same in its normal or open position and arranged to be suspended from the end of and operated by a single line. Fig. 2 is a front elevation of such bucket showing same in its closed position. Fig. 3 is a side elevation of the bucket showing the parts in the position illustrated in Fig. 2. Fig. 4 is a detail section, on an enlarged scale, taken upon the plane indicated by line IV—IV in Fig. 1. Fig. 5 is a detail section of the mechanism shown in Fig. 4 taken upon the plane indicated by line V—V, Fig. 4. Fig. 6 is a detail section taken upon the plane indicated by line VI—VI in Fig. 4. Fig. 7 is a detail section taken upon the planes indicated by line VII—VII in Fig. 3, portions of the mechanism traversed by said plane being shown in elevation. Fig. 8 is a front elevation of the upper portion of the bucket embodying my invention in a modified form. Fig. 9 is a side elevation of the mechanism shown in Fig. 8. Fig. 10 is a detail cross section of one of the sheaves constituting a part of my invention shown in

Figs. 8 and 9, and Fig. 11 is a similar section 55 of a modified form of sheave.

Referring now to Figs. 1, 2 and 3, A is a frame which forms part of the support for the scoop members B and B'. This frame consists of two oppositely disposed plates a a 60 which are secured to each other by various pins and other parts forming bearings for the sheaves and supporting arms as will hereinafter appear. Mounted in this frame is a main supporting journal pin a' which 65 projects therefrom on opposite sides and forms a journal for two sets of oscillatory depending arms b b and b' b', which are therefore angularly movable relatively to each other. The two arms b are fixed to the 70 frame by means of rivets b<sup>2</sup>, and the upper journaled ends of both arms are separated from each other by means of separators a<sup>2</sup> a<sup>2</sup>, as shown in Fig. 3.

Transverse rods b<sup>3</sup> and b<sup>4</sup> are suitably se- 75 cured to the upper outer ends of the scoop members B and B' respectively and upon these rods are journaled the lower ends of the two sets of arms b b and b' b', as shown in said Fig. 3. Projecting from the upper 80 inner side of the scoop member B' are two arms B<sup>3</sup> B<sup>3</sup> and projecting between these two arms is a bifurcated casting B<sup>2</sup> secured in a similar position to the inner side of the scoop member B. The arms B<sup>3</sup> B<sup>3</sup> and B<sup>2</sup> 85 are bored horizontally to receive a pivotal rod B<sup>4</sup>. It will therefore be seen from the above construction that the frame A and arms b b and b' b' form supporting means 90 for the scoop members, and that each scoop member has three axes of oscillation, the one coinciding with the axis of pin a' and fixed relatively to the said frame and two axes of oscillation fixed relatively to the scoop members, namely those axes coinciding 95 with the axes of rods b<sup>3</sup> and B<sup>4</sup>, as to member B, and those coinciding with the axes of rods b<sup>4</sup> and B<sup>4</sup>, as to member B'. Two of the axes in the construction shown coincide with each other in the axis of rod B<sup>4</sup> 100 and may be considered fixed relatively to each other. It is obvious that these axes need not coincide however, but may be entirely separate and distinct. These latter coinciding axes, have a movement toward 105 and from the frame and the weight of the arms B<sup>2</sup> and B<sup>3</sup> B<sup>2</sup> is made such that the scoop members will assume their open posi-

tion shown in Fig. 1 as a result of the action of gravitation independently of the weight of the material which the bucket may carry and which may also tend to cause the scoop members to assume this open position.

Mounted upon the central portion of the rod  $b^3$  is an oscillatory closing arm C, whose main portion is constructed of two side bars  $c c$  as shown in Fig. 3. Upon the outer end of this closing arm C is mounted a sheave  $C'$  and fixed across the two side bars is a pin  $c^{14}$  upon which is pivoted a shackle  $c'$ . To this shackle is secured the end of a suspending line D. Mounted in the frame A are two sheaves  $A'$  and  $A^2$  and the line D passes around sheave  $A'$  upon the inside, then around sheave  $C'$ , around sheave  $A^2$  and has its end secured in the shackle  $c'$  previously mentioned. It will therefore be seen that the line D and sheaves  $A' A^2$  constitute the suspending means for the bucket, and it will also be seen that when the latter is suspended from said line solely, it will tend to raise the arm C into the position shown in Fig. 1.

Oscillatorily mounted upon the pin  $c^{14}$ , Fig. 7, is a dog  $C^2$  whose outer end is pivotally connected with a lever  $C^3$  mounted upon a pivotal pin  $c^2$ . The inner end of this lever is provided with a slot  $c^3$  which engages a pin  $c^4$  fixed in the outer end of the dog  $C^2$ . A hand line  $C^4$  is connected with the outer end of the lever  $C^3$ , and the inner end of the dog  $C^2$  is provided with the nose  $c^5$ . The location of the dog is such that when the closing arm C is lowered the nose  $c^5$  is adapted to engage a lip  $b^5$  formed upon the central portion or cross bar  $b^0$  of the arm  $B^2$  as shown in Fig. 7. It will therefore be seen that the said closing arm C may be fixed relatively to the axis of bar  $B^4$  and when raised will effect the movement of said axis toward the frame A and in consequence effect the closing movement of the scoop members. It will also be further observed that by raising the outer end of lever  $C^3$  the dog may be disengaged from the casting  $B^2$  and the scoop members thereby permitted to assume their open position as a result of the action of gravitation.

The releasing lever  $C^3$  is fixedly secured to the pin  $c^2$  and the latter extends laterally through the side bars  $c c$  and through two brackets  $c^{10} c^{16}$ , which are secured to the said side bars as shown in Fig. 4. The outer ends of this pin are provided with right and left hand threads respectively and engaging these threads are two nuts  $c^6 c^6$ . These nuts are fixedly and adjustably secured relatively to the brackets  $c^{10} c^{16}$  by means of set screws  $c^7 c^7$  passing therethrough and adapted to engage any one of various depressions  $c^8 c^8$  arranged circumferentially around the axis of the pin and upon the outer faces of the brackets  $c^{10} c^{16}$  as shown in Fig. 6. Intermediately of these brackets and the side

bars  $c c$  and upon the pin  $c^2$  are loosely mounted two drums  $C^5 C^5$ . These drums are made hollow and provided with hubs  $c^{15} c^{15}$ . To each such hub is secured the inner end of a spiral spring  $c^9$ , the outer ends of which are secured to pins  $c^{10} c^{10}$  fixedly secured to the side bars  $c c$ . Between the flanges of these drums are wound two lines  $E E$  one end being secured to the drums and the other ends being secured to eye-bolts  $b^6 b^6$  suitably secured to a convenient portion of the arm  $B^2$ , as shown in Figs. 1 and 3. The springs are arranged so that they will be wound up during the opening movement of the bucket and will therefore be in tension when the parts are in the position shown in Fig. 1, that is when the bucket is in its open position. The lowering movement of the closing arm will therefore be accompanied by an automatic winding up of the lines  $E$  upon their respective drums, as will be readily understood.

The upper ends of the brackets  $c^{10} c^{16}$  are unsupported save for the pin  $c^2$  and the latter passes loosely therethrough. It will therefore be seen that these brackets have a certain amount of lateral flexibility and may therefore be pressed against the adjacent faces of the drums to effect a braking action. This braking action is obtained by operating the release lever  $C^3$  and consequently operating the pin  $c^2$  upon its axis. The threads on the ends of this pin are so arranged that when the outer end of lever  $C^3$  is raised the ends  $c^6 c^6$  will be drawn inwardly while held in a rotatively fixed position by the set screws  $c^7 c^7$ . This action it will be seen presses the upper end of the brackets  $c^{10}$  against the drums to a degree proportionate to the amount of movement imparted to the lever  $C^3$ . It will also be seen that this pressure may be adjusted by suitably adjusting the nuts  $c^6$  in various positions circumferentially relatively to the axis of the pin  $c^2$ . The ends of the lines  $E$  which are attached to the eye-bolts  $b^6 b^6$  are however arranged so as to be in a slacked position, as shown in Fig. 2 at  $a$ , when the bucket is in its closed position, and the dog  $C^2$  is in engagement with the arm  $B^2$ . This permits the bucket to open slightly, and therefore the said arm  $B^2$  to drop a short distance, after the dog has been released before the drums are rotated and therefore before the braking action is applied. Such arrangement hence permits the disengagement of the dog by actuating the lever  $C^3$ , even though this action, no matter to what extent it may be carried out, retards, tends to retard or even fixes the drums  $C^5 C^5$ . After such release and slight opening movement of the bucket, this braking action may be diminished or increased by slacking away or pulling on the hand line  $C^4$ , as will be readily understood.

A suitable housing  $c^{11}$ , Figs. 1 and 2, is provided for protecting the sheave  $C'$  from becoming clogged with the contents of the scoop members and upon this housing is mounted a buffer consisting of a slidable bolt  $c^{12}$  which may be actuated downwardly and retained in an upward position by a coil spring  $c^{13}$  surrounding same and intermediate of the head of the bolt and the housing. The arm  $b$  is provided with an abutment  $a^3$  located in the path of movement of the head of the bolt  $c^{12}$ . When the scoop members are in their closed position and the closing member  $C$  in the corresponding position, the head of said bolt is in contact with said abutment  $a^3$ , as shown in Figs. 1 and 2.

Upon the inside of one of the arms  $B^2$  is mounted a similar spring-actuated buffer bolt  $b^7$ , as shown in dotted lines in Figs. 1 and 2, and upon the arm  $B^2$  is formed an abutment  $b^8$  which is adapted to come in contact with the head of the bolt when the scoop members are at or near their extreme open position as shown in Fig. 1. This latter buffer arrangement breaks the jar to the mechanism at the end of the opening movement, as will be readily understood. It will also be readily understood that two of these buffering devices might be provided on opposite sides of the arm  $B^2$ .

Assuming the parts to be in the position shown in Fig. 1, the device operates as follows. The bucket is lowered to the material which it is desired to load into the scoop members by slacking away on the suspending line  $D$ . When the latter reach such material, the line  $D$  is still further slacked away so as to lower the closing arm  $C$  and permit the closing arm  $C$  to engage the cross bar  $b^9$  of arm  $B^2$  as shown in Fig. 7. After this engagement is accomplished the line  $D$  is then pulled upwardly, thereby raising the closing arm  $C$  together with the arms  $B^2$  and  $B^3$ . This action therefore accomplishes the closing of the bucket and causes the parts to assume the position shown in Fig. 2. A further raising of the line  $D$  now hoists the bucket and its contents. When the bucket has been conveyed to the desired point at which its contents are to be discharged, the hand line  $C^4$  is pulled so as to oscillate the dog  $C^2$  and disengage same from the lip  $b^5$ . This disengagement is permitted without bringing into play the braking action on the drums  $C^5$   $C^6$  by reason of the presence of the slack, shown in dotted lines at  $x$ , Fig. 2, as previously explained. As soon as the nose  $b^5$  is disengaged, the opening operation begins and the inner ends of the scoop members descend a distance sufficient to take up the slack in the lines  $E$   $F$ . As soon as this slack is taken up a further opening movement of the scoop members rotates the drums  $C^5$  and winds up the springs thereof. By regulat-

ing the degree of braking action by varying the pull on the hand line  $C^4$ , such opening movement may be effected at various speeds and therefore controlled as desired. When the scoop members reach their extreme open position, the buffer bolt  $b^7$  will have engaged the abutment  $b^8$  and broken the jar attending the completion of such movement, as will be readily understood. It will also be noted that when the parts are in the position shown in Fig. 2 the weight of the scoop members and contents being supported directly from the closing arm  $C$  tends to counteract the tendency of the suspending line  $D$  to compress the spring  $c^{13}$  of the buffer bolt  $c^{12}$ . Immediately upon release of the scoop members for the opening movement the point of application of the force exerted to pull the arm  $C$  downwardly is changed from a point intermediate of the ends of said arm, and represented by the axis of the pin  $c$  and transferred to a point on said arm represented by the axis of the sheave  $C'$ . This action tends to still further raise the arm  $C$  and such tendency is counteracted by the spring  $c^{13}$ . This spring therefore serves to eliminate any deleterious effects which the jar attending such change of the point of application might otherwise produce. It will also be observed that by means of the hand line  $C^4$  and the brake mechanism above described, by properly adjusting the nuts  $c^8$   $c^9$ , as before stated, a sufficient braking action may be obtained to completely counteract the force tending to open the scoop members, so that such opening movement may be entirely arrested at any required point therein.

When it is desired to use the above construction as a "two-rope bucket", an additional line  $D'$  shown in dotted lines in Figs. 1 and 2 is secured to a suitable bolt such as  $a^4$  mounted in the frame  $A$ . In such event the line  $D'$  would be used only as a hoisting line and line  $D$  as a closing line. When so used the dog  $C^2$  is permitted to remain continuously in engagement with the arm  $B^2$  and the bucket permitted to open by merely slacking away on line  $D$ , the closing movement being effected as before by raising such line  $D$ .

When the bucket is to be hung in the bight of a line the above described arrangement is used, the frame and sheaves mounted therein being however of a modified construction, as shown in Figs. 8 and 9. In such case three sheaves  $A^2$ ,  $A^4$  and  $A^5$ , the latter compound, are mounted in the frame and the line  $D$  passing around same as shown in Fig. 8, and sheave  $C'$  is also made compound, so as to augment the closing force. In the construction illustrated, I have shown, however, the sheaves  $C'$  and  $A^5$  to be of double construction, as shown in section in Fig. 10. It will therefore be seen that to lower the

closing arm C, it is merely necessary to hold one side of the line D stationary and slack away on the other side. To effect the closing operation, the one side of the line D and the other side is raised as will be readily understood. To raise or lower the entire bucket, both sides of the line D are raised or lowered, as the case may be.

When sheaves C' and A<sup>s</sup> are of double construction, they are arranged and constructed as shown in Fig. 10. In this construction of sheave, the one part a<sup>s</sup> is provided with an extended hub a<sup>o</sup> which is bored to receive the journal pin a'. This hub is turned down to form a journal for the other part a<sup>s</sup> of the sheave so that this latter part may rotate independently of the part a<sup>s</sup>. The inner flanges of these parts a<sup>s</sup> and a<sup>o</sup> are made thin so as to bring the two bights of the rope close together, thereby reducing the angularity of that portion of the rope between the sheaves C' and A<sup>s</sup> and consequently reducing the tendency of the rope to become disengaged from the flanges. The sheave C' is constructed in the same way.

When a bucket of this type is being raised and lowered, both parts of the sheaves C' and A<sup>s</sup> will rotate at the same rate of speed and the bearing in the part a<sup>s</sup>, referring to sheave A<sup>s</sup>, will receive the entire frictional wear due to such rotation. The corresponding part of sheave C' will act in a like manner. When, however, the closing arm C is being raised or lowered, the sheave parts of the respective sheaves will rotate at different velocities and the frictional wear on the bearing of least length, instead of being confined entirely thereto is distributed over it and the bearing surface of the other part. This very materially increases the length of life of this type of compound construction of sheave over that heretofore used, in which the two sheaves were mounted side by side upon a common bearing pin.

If desired, the sheaves C' and A<sup>s</sup> may be of triple construction as shown in Fig. 11, in which event two extended hub portions are provided, as shown, and as will be readily understood.

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

1. In a device of the class described, the combination of two scoop members and means for supporting same, said members arranged to normally assume their open position as a result of gravitation; means attachable to and detachable from said scoop members; a line connected with said means; means for disconnecting said attachable and detachable means from their connection with said scoop members; and means for controlling the opening operation of said scoop members whereby the speed of such operation may be regulated.

2. In a device of the class described, the combination of two scoop members and means for supporting same, said members arranged to normally assume their open position as a result of gravitation; means for causing said members to assume their closed position; means for detachably securing said members to said closing means; means for actuating said securing means to release said members; and means for controlling the movement of said members after said release.

3. In a device of the class described, the combination of two scoop members and means for supporting same, said members arranged to normally assume their closed position as a result of gravitation; closing means including a line adapted to raise and lower the bucket together with means for detachably engaging said scoop members to effect the closing operation; manually operated means for disengaging said members from said closing means; and means arranged to control the rate of opening movement of said scoop members after such disengagement.

4. In a device of the class described, the combination of two scoop members and means for supporting same, said members arranged to normally assume their closed position as a result of gravitation; closing means including a line adapted to raise and lower the bucket together with means for detachably engaging said scoop members to effect the closing operation; manually operated means for disengaging said members from said closing means; and a brake connected with the latter and adapted to control the rate of opening movement of same.

5. In a device of the class described, the combination of two scoop members and means for supporting same, said members arranged to normally assume their closed position as a result of gravitation; closing means including a line adapted to raise and lower the bucket together with means for detachably engaging said scoop members to effect the closing operation; means for disengaging said members from said closing means; and a brake mounted upon said closing means arranged to control the rate of opening movement of said scoop members after such disengagement.

6. In a device of the class described, the combination of a suitable support; arms oscillatorily mounted upon said support; two scoop members supported thereby, each having an axis of oscillation on one of said arms; a member located intermediately of said scoop members and upon which each of the latter has a second axis of oscillation; means arranged to be connected with or disconnected from said members and having an axis of oscillation on one of the latter; a line connected with said latter means arranged to

actuate same to effect the closing movement of the members; and means for effecting disconnection of said attachable and detachable means from said members.

5 7. In a device of the class described, the combination of a suitable frame; two scoop members each having three axes of oscillation, one fixed relatively to said frame and two fixed relatively to said members, one of  
10 each of the latter axes of each member respectively being fixed relatively to each other, these latter axes having a movement toward and from said frame; positive means for effecting such movement toward the latter and connectible with and disconnectible  
15 from said members so as to be rendered, when so connected, fixed relatively to the last named axes; a yielding connection between said positive means and said members; means for actuating such positive  
20 means; and means for effecting such disconnection.

8. In a device of the class described, the combination of a suitable frame; two scoop  
25 members each having three axes of oscillation, one fixed relatively to said frame and two fixed relatively to said members, one of each of the latter axes of each member respectively being fixed relatively to each  
30 other, these latter axes having a movement toward and from said frame; positive means for effecting such movement toward the latter and connectible with and disconnectible from said members so as to be rendered,  
35 when so connected, fixed relatively to the last named axes; a yielding connection between said positive means and said members together with brake mechanism controlling said connection; means for actuating  
40 such positive means; and means for effecting such disconnection.

9. In a device of the class described, the combination of a suitable frame; two scoop  
45 members each having three axes of oscillation, one fixed relatively to said frame and two fixed relatively to said members, one of each of the latter axes of each member respectively being fixed relatively to each  
50 other, these latter axes having a movement toward and from said frame; positive means for effecting such movement toward the latter and connectible with and disconnectible from said members so as to be rendered,  
55 when so connected, fixed relatively to the last named axes; a yielding connection between said positive means and said members together with brake mechanism controlling said connection; means for actuating  
60 such positive means; and means for effecting such disconnection, such latter means adapted to actuate said brake.

10. In a device of the class described, the combination of a suitable frame; two scoop  
65 members each having three axes of oscillation, one fixed relatively to said frame and

two fixed relatively to said members, one of each of the latter axes of each member respectively being fixed relatively to each other, these latter axes having a movement toward and from said frame; positive means  
70 for effecting such movement toward the latter and connectible with and disconnectible from said members so as to be rendered, when so connected, fixed relatively to the last named axes; a yielding connection between  
75 said positive means and said members together with brake mechanism controlling said connection; means for actuating such positive means; and manually operated means for effecting such disconnection.  
80

11. In a device of the class described, the combination of a suitable frame; two scoop  
85 members each having three axes of oscillation, one fixed relatively to said frame and two fixed relatively to said members, one of each of the latter axes of each member respectively being fixed relatively to each other, these latter axes having a movement toward and from said frame; positive  
90 means for effecting such movement toward the latter and connectible with and disconnectible from said members so as to be rendered, when so connected, fixed relatively to the last named axes; means for actuating  
95 such positive means; a yielding connection comprising a spring-actuated drum and a connecting line wound thereon and having one end connected with said scoop members; a brake for controlling the rotation of said  
100 drum; and manually operated means for controlling the action of said brake.

12. In a device of the class described, the combination of two scoop members; means  
105 for suspending said members in a normally open position; a closing member adapted to be connected with said scoop members and detachable therefrom, and controllable brake mechanism connecting said members and  
110 closing member including a drum and line connected therewith; said drum arranged to automatically wind in said line when said members are engaged in their closing movement.

13. In a device of the class described, the combination of two scoop members; means  
115 for suspending said members in a normally open position; a closing member adapted to be connected with said scoop members and detachable therefrom; and controllable brake mechanism connecting said scoop members  
120 and closing member including a spring actuated drum and a line connected therewith; said spring arranged to actuate said drum to wind in said line when said scoop members are engaged in their closing movement.  
125

14. In a device of the class described, the combination of two scoop members; means  
130 for supporting same comprising a frame and two sets of arms mounted thereon, one set

having an axis of oscillation on the latter, each set having the lower ends of its members pivotally secured to the outer ends of said scoop members respectively; and means  
 5 connected with said frame for suspending and closing said scoop members.

15. In a device of the class described, the combination of a frame; two scoop members having their outer ends oscillatorily supported from said frame; means for raising  
 10 and lowering the inner ends of said scoop members; and a buffer member intermediate of said frame and said scoop members.

16. In a device of the class described, the  
 15 combination of a frame; two scoop members

having their outer ends oscillatorily supported from said frame; means for raising and lowering the inner ends of said scoop members and including a member attach- 20 able to and detachable from said scoop members; and a buffer member intermediate of said frame and attachable and detachable member.

Signed by me, this 23d day of November, 1908.

CHARLÈ C. WILLIAMS.

Attested by:

WM. R. MILLER,  
 A. E. MERKEL.