(No Model.)

A. BECKERS.

SELF ADJUSTING GRAPPLE.

No. 388,109. Patented Aug. 21, 1888.

FIG. 3.

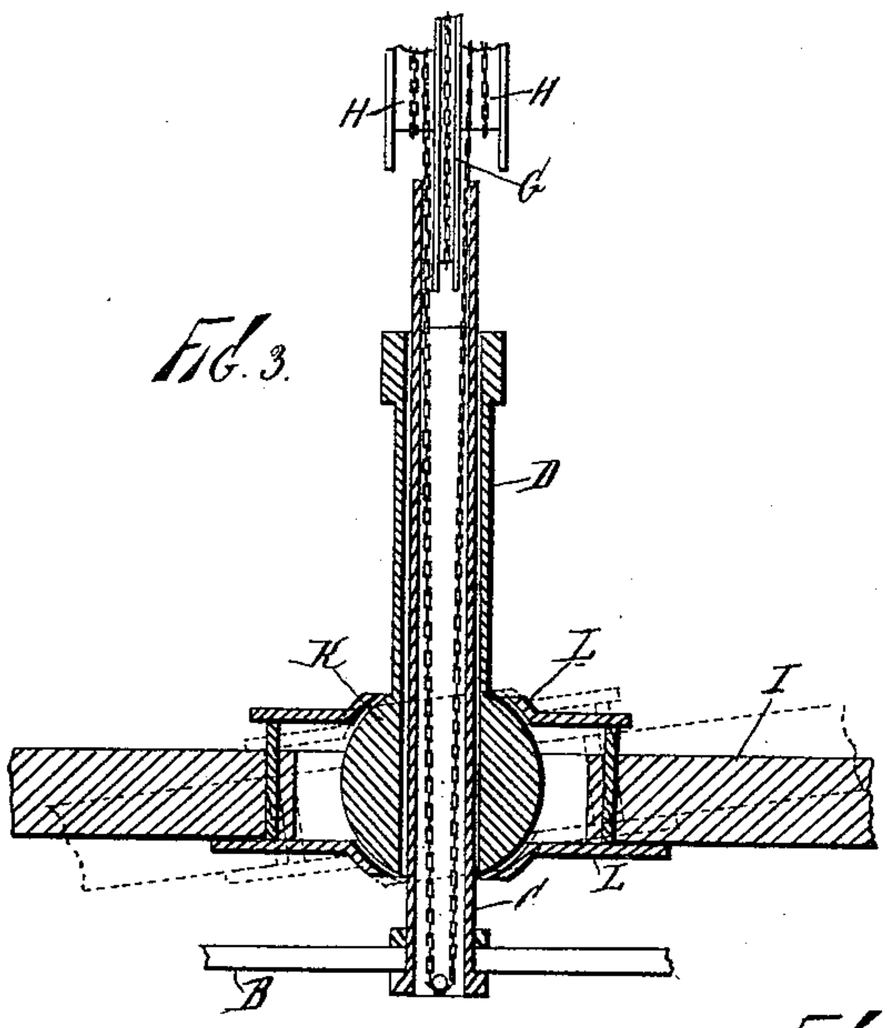


FIG. 4.

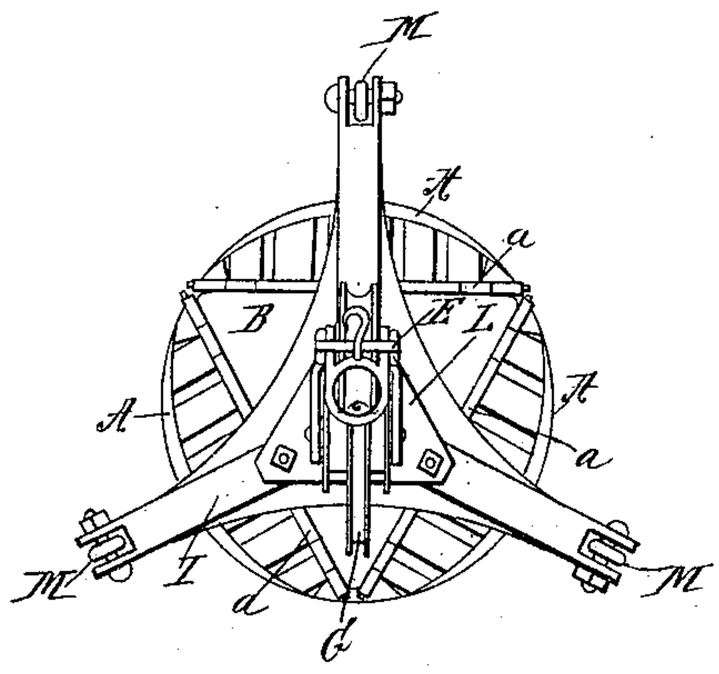


FIG. 5.

FIG. 1.

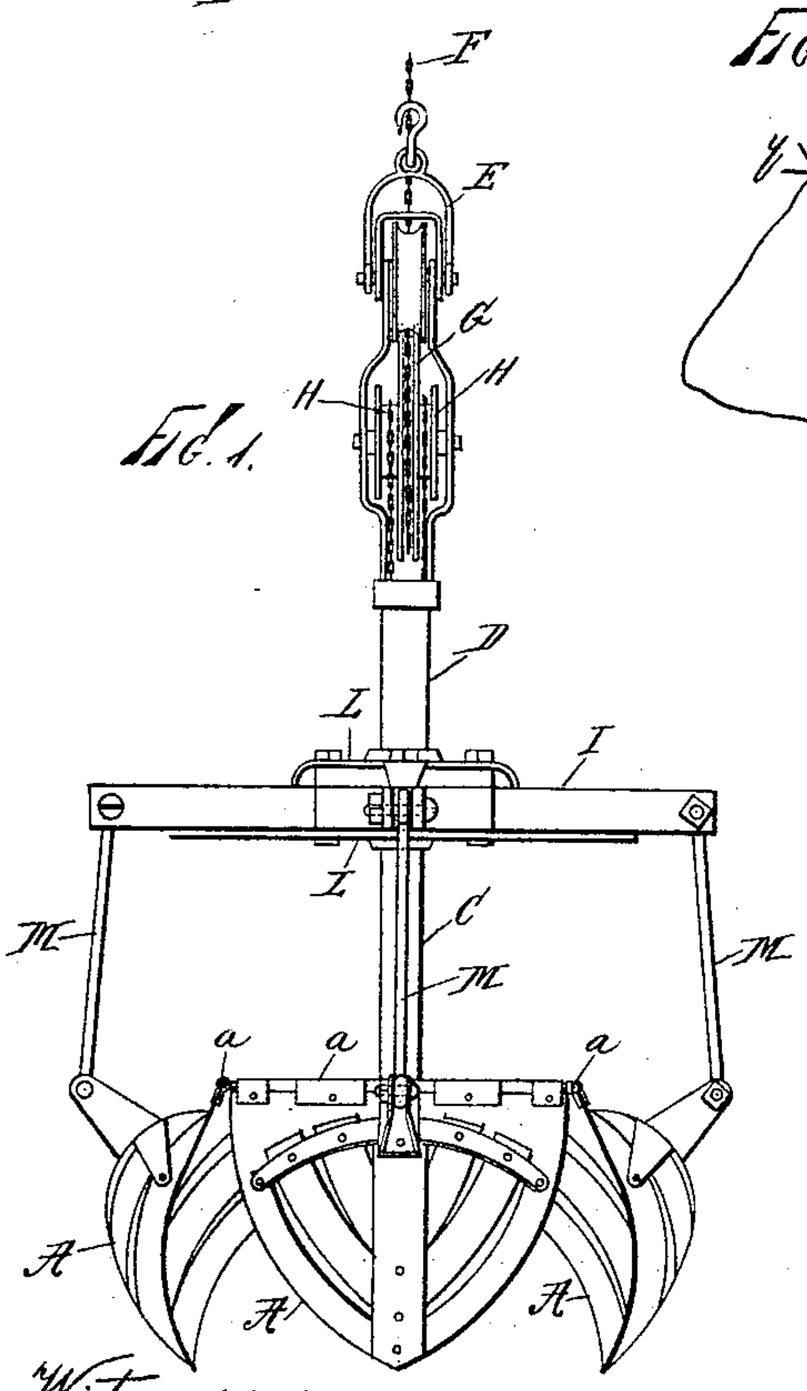
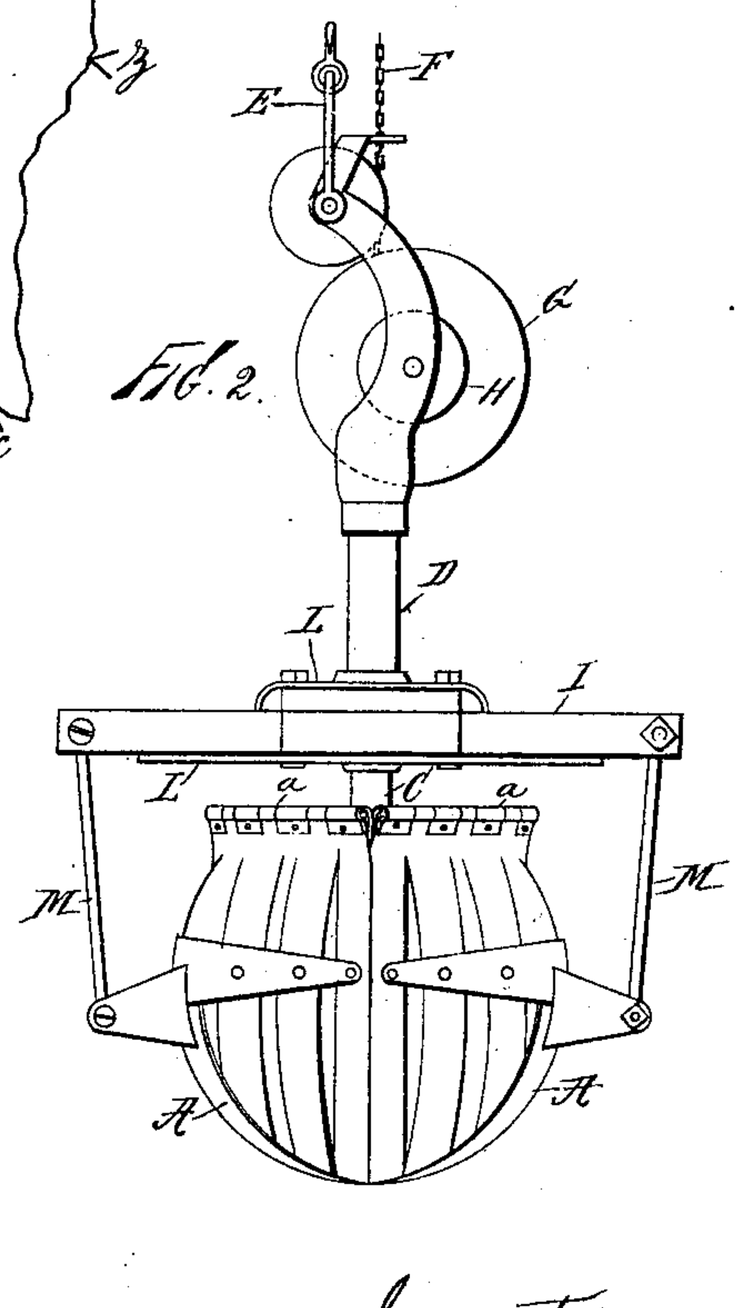


FIG. 2.



Witnesses:
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L. H. Osgood.

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UNITED STATES PATENT OFFICE.

ALEXANDER BECKERS, OF HOBOKEN, NEW JERSEY.

SELF-ADJUSTING GRAPPLE.

SPECIFICATION forming part of Letters Patent No. 388,109, dated August 21, 1888.

Application filed April 19, 1888. Serial No. 271,184. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER BECKERS, of Hoboken, county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Self-Adjusting Grapples, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to means employed for grasping and raising (or lowering) masses of solid matter, and particularly rocks and stones, from beneath the surface of water; but my improved device may be employed in other situations and for other uses, as will be seen from a consideration of its construction.

Devices of the general class to which my invention pertains are commonly known as "grapples," being employed to grapple stones or rocks, stumps, timbers, or piles, and all manner of irregular objects which it may be desired to move.

The principal object of my invention is to produce a simple, strong, and powerful grapple which will automatically adjust itself to any irregular surface or object and seize or grapple the same at three points not in line with each other, thus insuring a firm hold upon the object and obviating slipping or turning thereof; and secondary objects are to so construct the grapple that it may be employed for elevating and discharging numbers of small objects, as broken stone, coal, &c., and secure certain advantages in the matters of construction and operation, as will hereinafter appear.

To accomplish all of this my improvements involve the application of a movable or adjustable tripod or frame in connection with three hinged jaws or claws of the grapple, and certain new and useful peculiarities of construction, relative arrangements, or combinations of parts and principles of operation, all of which will be herein first fully described, and then pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a view in elevation representing my improved grapple open (or partly open) ready to take its load. Fig. 2 is also a view in elevation, but showing the hooks or claws closed, forming a cage or bucket. Fig. 3 is a sectional view upon a scale enlarged beyond previous figures, showing the manner of mounting the tripod so that it may tilt or tip to conform to the position required by the shape of the object being grappled. Fig. 4 is a plan view showing the tripod and the grapple below it. Fig. 5 is a plan of any object of any irregular form which may be seized or grappled by the improved device at any three points not on the same side.

In all these figures like letters of reference, wherever they occur, indicate corresponding parts.

A A A are the jaws or claws of the grapple. These are three in number, which, in order that they may be amply strong, are preferably made of steel, (though, of course, other metal might be used,) and they are each hinged to a top plate or block, B, of general triangular shape, the hinges *a a a* being as long as convenient, so as to provide against any side racking or twisting under heavy loads. The jaws are so fashioned that they will close together, as in Fig. 2, when desired, and they are swelled out from point to hinge to contribute strength and stiffness, and so that when used as a cage or basket or bucket the grapple may contain a considerable quantity of material. The jaws are built up of open-work suitably braced so that the bucket or cage may be drained. The grapple is mounted upon the end of a rod, C, which slides up and down independently of an outer tube or sleeve, D. The sleeve D is carried by any suitable rope, chain, or cable connection, E, by which the whole machine may be raised or lowered after the manner of grapples of its general class. The rod or tube C is raised or lowered through the medium of an independent chain, rope, or cable, F. This, in the form shown, revolves a wheel, G, to which are applied two smaller wheels or drums, H H, over which are wound the chains, ropes, or cables which connect with the rod or tube C. Direct connection might, of course, be made between chain or cable F and rod C; but by multiplying the power in the manner indicated, or in any other manner substantially the same, a more powerful closing of the jaws together is insured, and thus a more secure grasp upon the object is attained, as is well understood.

I is a tripod or other frame mounted upon

the sleeve D, and mounted in such a way that it may tip or tilt toward either point or in any direction. It is made amply heavy, and the mounting consists of a ball-and-socket joint, of which K is the ball, secured upon the lower end of sleeve D, and of which the socket-plates are represented at L L. This is the simplest and best form of joint for the tripod which I have been able to devise. It answers all the required purposes, but for many uses may be variously modified, so that the required universal tipping be permitted.

From the ends of the tripod or frame hinged rods M M M are connected with the hinged jaws. These rods are rigid or unyielding, except at the hinges, so as to properly transmit the strains between the tripod and jaws and hold the latter firmly. When the rod or bar C is elevated with respect to D, it is plain that the jaws must close toward each other. In grappling any irregular object—as, for instance, that intended to be shown in Fig. 5—the grapple is lowered over it and the rod C elevated. The jaws commence to close and move until two of them come in contact with the object—say at the points *x* and *y*. Then as the strain continues the tripod tips until the other jaw or claw reaches its nearest point—say at *z*—and in this manner the object is seized at three points, so that when it leaves its bed it cannot tip sufficiently to free it from the grapple, as frequently occurs when seized only at two points, as in former constructions.

No matter how irregular may be the shape of the object, the improved grapple always conforms to it and seizes it at three points, from which it cannot escape. When once seized, the object is quite certainly held until released by elevating the sleeve D. The saving thus effected in raising and lowering the grapple after ineffectual attempts to grasp a load will be readily understood and appreciated by those accustomed to work with such machines.

While principally intended to grapple heavy loads, the improved device in the form shown may also be employed to take loads of smaller-sized objects, after the manner of the "clam-shell" buckets. Being lowered upon the working bank or bed, (say of coals or broken stones,) the tipping tripod permits each of the three jaws to touch the material, no matter how much it may be inclined. Then, by raising on the bucket, the jaws at once commence to gather their load. With but two shells, as formerly constructed, if one touches the bank and the other not, the dipper comes up without its load.

The uses of the improved grapple are many and cannot all be specified. It will be sufficient to observe that it may be employed for any and all purposes to which, by its peculiar principle of universal adjustment, it may be adapted, and when constructed substantially in accordance with the explanations given it will be found to admirably answer the objects of the invention, as previously set forth.

Having now fully described my invention, what I claim as new herein, and desire to secure by Letters Patent, is—

1. In a grapple, the three jaws hinged upon a triangular base, and a tripod connected with said jaws by the hinged rigid rods and mounted upon a ball-and-socket joint, the parts being combined and arranged for operation, substantially as shown and described.

2. In a grapple, the open-work jaws hinged upon a triangular base-piece, the tipping or tilting tripod connected with said jaws by the hinged rigid rods, the operating rods or sleeves, and hoisting chains or cables connected with the tripod and jaws, all combined and arranged substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

ALEXANDER BECKERS.

Witnesses:

W. J. MORGAN,

WORTH OSGOOD.