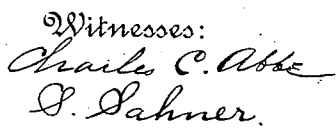


1,018,050.

2 SHEETS—SHEET 1.,



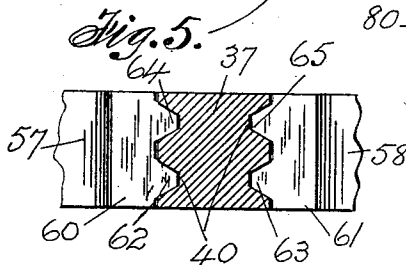
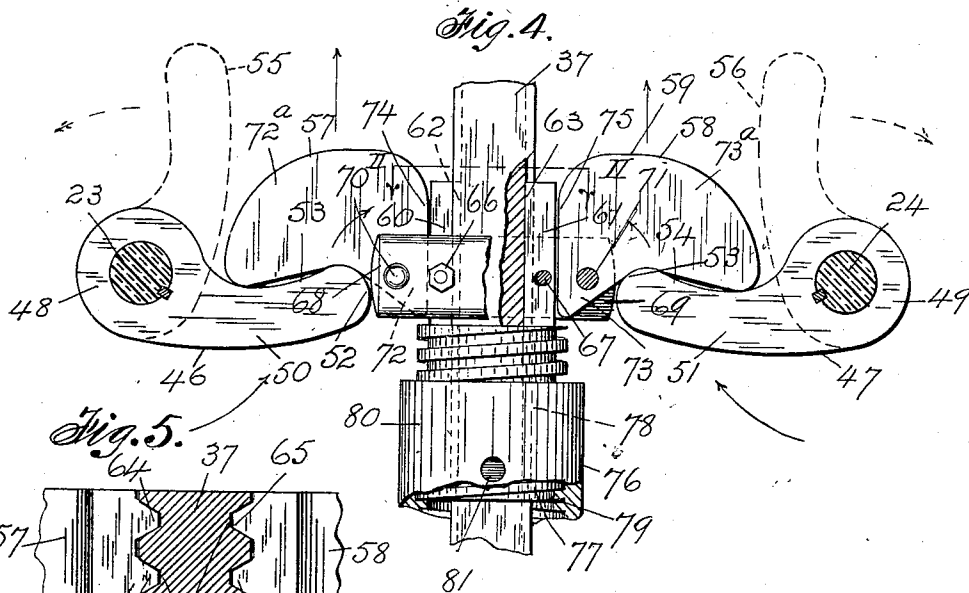
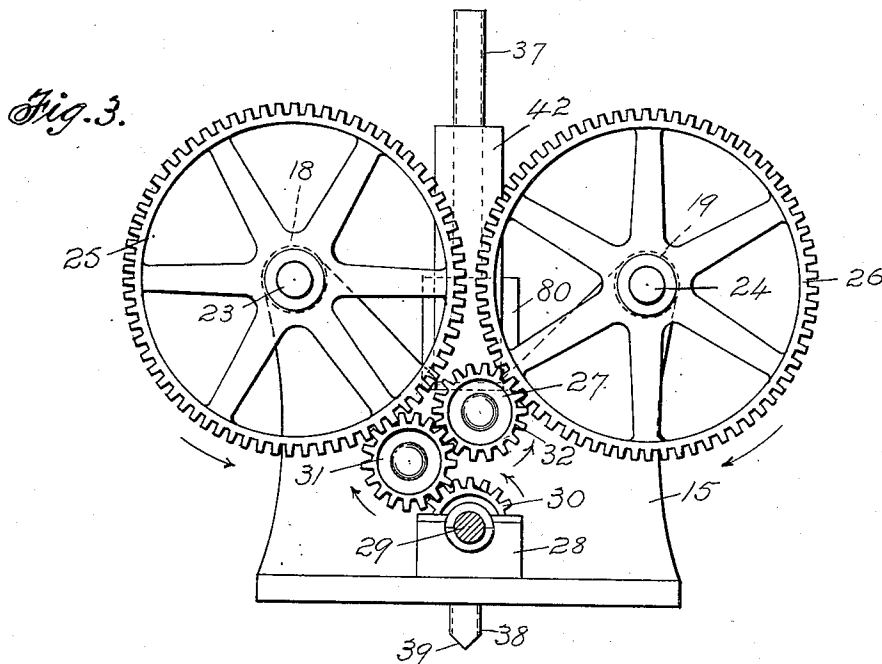
Alexander W. Hassell, Inventor
By his Attorney,
W. T. Griswell

A. W. HASSELL.
 SUBAQUEOUS ROCK BREAKER.
 APPLICATION FILED JULY 26, 1910.

1,018,050.

Patented Feb. 20, 1912.

2 SHEETS—SHEET 2.



Witnesses:
 Charles C. Abbe
 S. Schner.

Alexander W. Hassell, Inventor
 By his Attorney
 W. T. Cuswell

UNITED STATES PATENT OFFICE.

ALEXANDER W. HASSELL, OF JERSEY CITY, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO HASL-COE CONSTRUCTION COMPANY, A CORPORATION OF NEW YORK.

SUBAQUEOUS ROCK-BREAKER.

1,018,050.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed July 26, 1910. Serial No. 573,864.

To all whom it may concern:

Be it known that I, ALEXANDER W. HASSELL, a citizen of the United States, and a resident of Jersey City, county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Subaqueous Rock-Breakers, of which the following is a full, clear, and exact specification.

15 This invention relates to a class of machines adapted more particularly for use in submarine work to clear the bottom or bed of bodies of water of masses of rock or the like.

20 My invention has for its primary object to provide a power driven stone crushing machine adapted to be applied to a boat, or float, or the like and which may be efficiently used more especially in submarine work for crushing large bodies of stone, or the like, and to provide a form of machine wherein a plurality of the crushers may be used simultaneously in order to facilitate the work of clearing the rocky bed of a body of water.

25 Another object of the invention is to provide a form of drill which may be made of a given weight and after being elevated to the required height is released and crushes the rock it contacts with by force of the blow.

30 Still another object of the invention is to provide means adapted to effectually lift the weighted drill in succession, and to provide means for positively releasing the drill from its engagement when in position.

35 A further object of the invention is to provide effective means to adjust the raising means whereby the drill will be released at a predetermined height so as to regulate the force of the blow of said drill upon the rock.

40 Furthermore, my invention consists of certain other novel features and parts as hereinafter described and more particularly pointed out in the claims at the end of the description, and illustrated in the accompanying drawings forming a part of this specification, in which:

50 Figure 1 is a top plan view of a stone crushing machine constructed according to my invention. Fig. 2 is a side view thereof. Fig. 3 is an end view of the device illus-

trating the train of gears for transmitting the power to operate the drill. Fig. 4 is an enlarged view, partly in section and partly fragmentary, of the parts used in conjunction with the drill, and Fig. 5 is a section taken on the line II—II of Fig. 4.

Upon any suitable support, such as a boat, or lighter, or float, may be arranged the cross-plates 10 of any suitable number and made of any preferred material. To the cross-plates 10 are fastened by bolts 11 or otherwise the bed or base plates 12 and 13 of the frame 14 of my stone crushing machine. The frame 14 consists mainly of end brackets or standards 15 and 16 and any desired number of intermediate brackets or standards 17. The brackets or standards 17 are spaced apart from the brackets 15 and 16, and may be formed integral with or made separate and connected to the bed plates 12 and 13. As shown in Fig. 3, each of the standards 15, 16 and 17 has the upper part thereof formed in substantially a V-shape thereby providing two oppositely disposed heads, as 18 and 19, in each of which is formed a bearing, as 20 and 21. In the bearings 20 is journaled a shaft 23 longitudinally of the machine, and in the bearings 21 is also journaled a similar longitudinal shaft 24.

One end of each of the longitudinal shafts 23 and 24 extends somewhat beyond the end surface of the standard 15. The extended end of shaft 23 carries a driving gear 25, and the extended portion of the shaft 24 carries a driving gear 26, which gears form a part of a train of gears 27 which are adapted to transmit the power for operating the longitudinal shafts 23 and 24 simultaneously. A bracket 28 is arranged upon the cross-plate 10 which supports the standard 15, and journaled in a bearing of said bracket is the driving shaft 29 which may be driven by any suitable motive power. One end of the driving shaft 29 is revolutely held in the standard 15, and upon said shaft between the bracket 28 and standard 15 is keyed a gear 30 meshing with a gear 31 which meshes with the driving gear 25. Also meshing with the gear 31 is a gear 32, of a like circumference, and said gear meshes with the driving gear 26. Each of the gears 31 and 32 is held upon short studs 33 and 34.

which are journaled in the standard 15 in eccentric arrangement so as to impart opposite rotation of the driving gears 25 and 26, and evidently as the driving gears 25 and 26 should be revolved at a slow speed the gears 31 and 32 are smaller in dimensions than said driving gears.

Midway of the standards 15, 16 and 17 is fastened a longitudinal supporting plate 35 having guide openings, as 36, therethrough centrally of the space between said standards, and any number of said openings may be provided in accordance with the number of drills it is desired to use in a machine. Through one of the openings 36 is guided the vertical bar or crusher 37, and upon the lower end of said bar is formed a drill 38 which has a beveled edge, as 39, or may be of any other suitable shape so as to adapt the drill to crush rock of various degrees of hardness. The crusher bar 37 is preferably square or rectangular in form and upon two or both of the opposed side faces of said crusher bar are provided parallelly arranged grooves 40 extending throughout its entire length. A bracket or straddle bar 41 having two legs 42 and 43 and a head-plate 44 is connected by bolts 45 or otherwise upon the upper surface of the supporting plate 35, and in the head-plate 44 is formed an opening through which is guided the upper part of the crusher bar 37.

To raise the crusher or vertical bar 37 to the required height I provide lifting elements 46 and 47, each having a body 48 and 49 which is keyed upon the shafts 23 and 24 respectively. Each of the lifting elements 46 and 47 has a curved arm 50 and 51 projecting from the body 48 and 49. The free ends of the curved arms 50 and 51 are rounded, as at 52 and 53, so as to form a compound curved edge in the form of a cam 53 and 54 upon the upper edge of each of said arms. The curved arms 50 and 51 are disposed so that the rounded ends are positioned in opposed relation upon the same plane, and as indicated in the dotted lines, as at 55 and 56, said arms will move in opposite directions when the longitudinal shafts 23 and 24 are rotated.

When the lifting elements 46 and 47 are in normal position to raise the crusher bar 37 the cam edges 53 and 54 of the curved arms 50 and 51 are in engagement with the levers 57 and 58 of the raising means 59. As illustrated in Fig. 4, the raising means 59 consists of two gripping members or plates 60 and 61, each of which is provided with a jaw, as at 62 and 63, Fig. 5, having teeth 64 and 65 adapted to engage in the grooves 40 of the crusher bar 37. The gripping members or plates 60 and 61 are loosely pivoted upon bolts, as 66 and 67, which are eccentrically arranged so that the upper end of the teeth 64 and 65 of the jaws 62

and 63 will tightly engage in the grooves 40 of the crusher bar 37 for effectually raising said bar, and will automatically swing from releasing engagement with the bar 37 when relieved of the force of pressure from the levers 57 and 58 as hereinafter described. The bolts 66 and 67 pass through links or cross-plates, as 68 and 69, and through apertures in the opposed ends of each of said plates are directed bolts 70 and 71. Between the link plates 68 and 69 and upon the bolts 70 and 71 are pivoted the angular parts, as 72 and 73, of the levers 57 and 58. Each of the levers 57 and 58 has a weighted body 72^a and 73^a one end of which is provided with a straight edge 74 and 75 to correspond with the straight edge of the gripping members or plates 60 and 61. A cam edge is formed underneath each of the levers 57 and 58 by curving part of each body 72^a and 73^a, and thereby forming the angular parts 72 and 73, for the purpose of eccentrically pivoting said levers. By eccentrically pivoting the levers 57 and 58 as described when the raising means 59 is operated by the lever elements 46 and 47 to elevate the crusher bar 37 the straight edges 74 and 75 of the angular parts 72 and 73 will force the gripping plates 60 and 61 into engagement with said crusher bar, and when the lever members 57 and 58 are released the weight of each body thereof will free the raising means 59 from the crusher bar 37 and permit the same to drop automatically from a given height.

In order to adjust the raising means 59 so that the crusher bar 37 will be released at a predetermined height to regulate the force of the blow of the drill 38 I provide a form of adjusting means 76. The adjusting means 76 includes a sleeve 77, and interiorly thereof is formed an opening, as indicated by dotted lines 78, Fig. 4, through which passes the crusher bar 37. Exteriorly of the sleeve 77 are formed helical threads 79, and encircling said sleeve is a jacket 80, that is carried upon the supporting plate 35. The jacket 80 is preferably circular in form and is provided interiorly thereof with helical threads which mesh with the helical threads 79 of the sleeve 77. In the jacket 80, are arranged a plurality of openings or recesses, as 81, for reception of a key or spanning wrench by which said jacket may be rotated for raising or lowering the sleeve 77 and thereby adjusting the raising means 59 so that the crusher bar 37 will be given the required plunge.

It is to be understood that changes may be made in the form of my improved stone crushing machine, or in the proportions and forms of the parts thereof, and I may use any suitable means for applying the same to a vessel or other place, without departing from the scope and spirit of the invention, therefore I do not wish to be limited to the

particular form of machine herein described and shown.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a device of the class described in combination, lifting means, a crusher bar, and a gripping device adapted to cooperate with said lifting means and said crusher bar; said gripping device including means for gripping the crusher bar when the gripping device is engaged by the lifting means, and means for disengaging the gripping device from the crusher bar when the gripping device is disengaged from the lifting means; and means for limiting the downward movement of the gripping device.

2. In a device of the class described in combination, lifting means, a crusher bar, and a gripping device; said gripping device including a clamping plate in operative relationship to the crusher bar, and a lever arm in operative relationship to the lifting means, the relationship of parts being such that the clamping plate is in operative engagement with the crusher bar when the lifting means is in operative engagement with the lever arm, and the clamping plate is disengaged from the crusher bar when the lifting means is disengaged from the lever arm.

3. In a device of the class described in combination, lifting means, a crusher bar, and a gripping device; said gripping device including means for engaging the crusher bar, and means for automatically disengaging the crusher bar from the gripping device when the crusher bar is raised to a predetermined point; and means for limiting the downward movement of the gripping device.

4. In a device of the class described in combination, lifting means, a crusher bar, and a gripping device; said gripping device including means for automatically engaging

the crusher bar, and means for automatically releasing the crusher bar.

5. In a device of the class described in combination, horizontal transmission shafts, elevating elements on said shafts, a crusher bar, a gripping device slidable on said crusher bar, said gripping device including means for automatically gripping said crusher bar and automatically disengaging said crusher bar, and means for adjusting the gripping device with relation to the transmission shafts.

6. In a device of the class described in combination, horizontal transmission shafts, lifting elements on said shafts, a crusher bar, a gripping device, said gripping device including means for automatically engaging the crusher bar at a point predetermined with reference to the transmission shafts, and means for automatically releasing the crusher bar from the gripping device at a point predetermined with reference to the transmission shafts.

7. In a device of the class described in combination, horizontal transmission shafts, lifting elements thereon, a crusher bar, and a gripping device; said gripping device including clamping plates adapted to engage the crusher bar and lever arms adapted to engage the lifting elements, and means for adjusting the gripping device with reference to the transmission shafts; the construction and arrangement of parts being such that the clamping plates automatically engage the crusher bar when the lifting elements engage the lever arms, and the clamping plates automatically disengage the crusher bar when the lifting elements disengage the lever arms.

This specification signed and witnessed this 22nd day of July A. D. 1910.

ALEXANDER W. HASSELL.

Witnesses:

ROBT. B. ABBOTT,
S. SAHNER.