Jan. 1, 1929. **1,697,290**

A. L. ROWE

ICE SAW AND CRUSHER

Filed Jan. 19, 1927

Fig 1

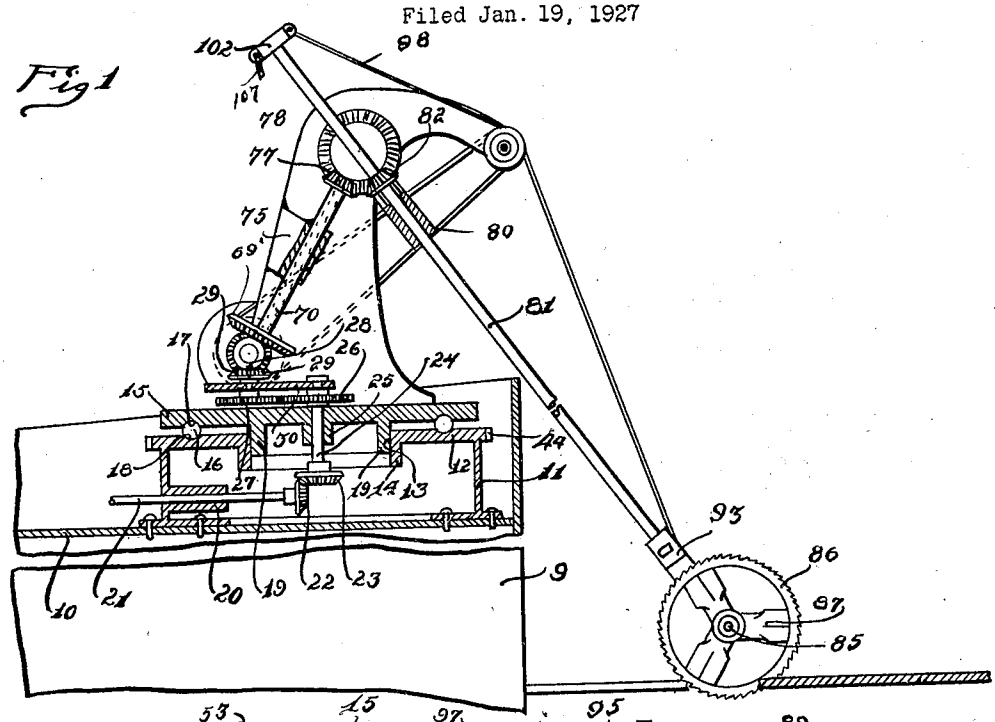


Fig 2

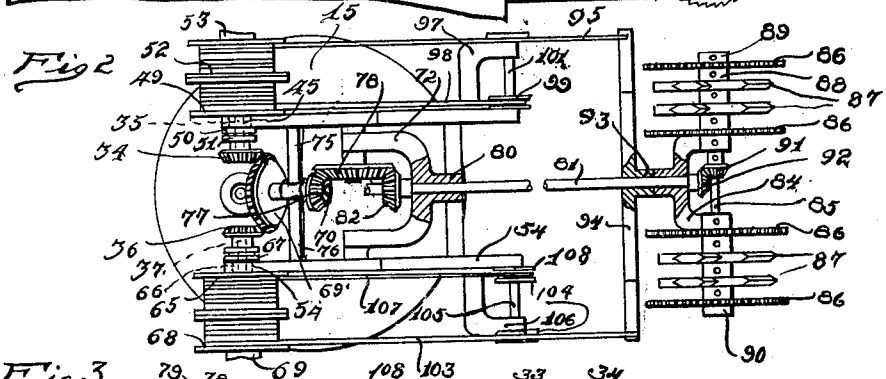


Fig 3

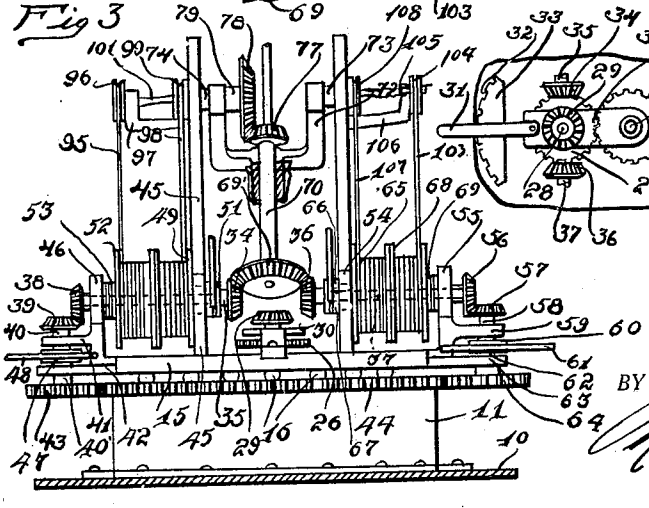
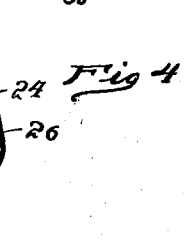


Fig 4



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# UNITED STATES PATENT OFFICE.

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## ICE SAW AND CRUSHER.

Application filed January 19, 1927. Serial No. 162,185.

My invention relates to a new and useful improvement in an ice saw and crusher adapted particularly for mounting on boats for separating and crushing the ice surrounding the boat so as to free the boat from an ice jam and permit its passage through the body of water.

It is an object of the present invention to provide a device of this class which will be simple in structure, economic of manufacture, easily operated and highly efficient in use.

Another object of the invention is the provision of a combination mechanism whereby a sawing and crushing of the ice may be effected at substantially the same time.

Another object of the invention is the provision of a mechanism whereby the cutting apparatus may be rotated in either direction at will.

Another object of the invention is the provision of a mechanism whereby the cutting mechanism may be swung on its mountings to various positions, and whereby the elevation of the mechanism may be determined at will.

Other objects will appear hereinafter.

The invention consists in the combination and arrangement of parts hereinafter expressed and contained.

The invention will be best understood by a reference to the accompanying drawings which form a part of this specification and in which,

Fig. 1 is a side elevational view of the invention showing it applied to a boat with parts broken away and parts in section.

Fig. 2 is a top plan view of the invention with parts broken away and parts shown in section.

Fig. 3 is a rear elevational view of the invention with parts broken away.

Fig. 4 is a fragmentary plan view of the invention taken on substantially line 4—4 of Fig. 1.

As shown in the drawings, the invention is adapted for use on a boat 9 having a deck 10. Secured to the deck 10 by rivets or in any other suitable manner is a platform 11 having a top 12 provided with a central opening 13. Projecting downwardly from the top 12 around the opening 13, is a collar 14. A platform 15 is provided and spaced from the top 12 by means of the ball bearings 16 which engage in a groove 17 formed in the platform 15 and a groove 18 formed in the top 12.

Projecting downwardly from the under surface of the top 12 is a sleeve 19 engaging in the opening 13, the top 12 and the collar 14 serving as a bearing for the sleeve 19. Positioned interiorly of the platform 11 is a bearing 20 in which is suitably supported a shaft 21 connected to a suitable source of power so as to effect a rotation of the shaft 21 and the bevel gear 22 which is fixedly mounted thereon. This bevel gear 22 meshes with the gear 23 which is fixedly mounted upon the shaft 24 projected from the platform 15 and through a bearing 25 on the under surface thereof. Fixedly mounted on the shaft 24, above the platform 15, is a gear 26 adapted to mesh with a gear 27 which is carried by the shaft 28. Fixedly mounted upon the shaft 28 is a bevel gear 29. This shaft 28 projects from a bar 30 which is pivotally mounted on the shaft 24. Projecting from the bar 30 is an arm 31 adapted to engage notches 32 formed in the segment plate 33 which is mounted on the platform 15. The structure is such that upon disengaging the arm 31 from the notches 32, the shaft 28 may be swung on the shaft 24 as a pivot so as to bring the bevel gear 29 into mesh either with the bevel gear 34 which is fixedly mounted upon the shaft 35, or with the bevel gear 36 which is fixedly mounted upon the shaft 37. The shaft 35 projects through a standard 45 which extends upwardly from the platform 15 and is journalled in this standard and in a support 46 which also projects upwardly from the platform 15. Carried on the outer end of the shaft 35 is a bevel gear 38 meshing with a bevel gear 39 which is fixedly mounted upon the shaft 40. This shaft 40 is journalled in the bracket 41. As an extension to the shaft 40 there is provided a shaft 40′ which is journalled in the bracket 42. Fixedly mounted upon the shaft 40′ is a gear 43 which meshes with the teeth 44 formed on the periphery of the top 12 of the platform 11. Embracing the adjacent ends of the shafts 40 and 40′ is a clutch 47 having the handle 48 whereby the shaft 40′ may be caused to rotate in unison with the shaft 40, when desired. Positioned on the shaft 35 is a drum 49 carrying the sleeve 50 which projects through the standard 45, and which is engageable with the clutch 51 so that the drum 49 may be caused to rotate in unison with the shaft 35, when desired. Mounted on the shaft 35 is another drum 52 adapted to be engaged by the friction clutch 53 so

that this drum, when desired, may be caused to rotate in unison with the shaft 35.

The shaft 37 is projected through the standard 54 which extends upwardly from the platform 15, this standard serving as a bearing for the shaft 37. Fixedly mounted upon the shaft 37 is a bevel gear 56 adapted to mesh with a bevel gear 57 which is fixedly mounted upon the shaft 58, this shaft being journalled in a bracket 59 and extending into the friction clutch 60 which is provided with the operating handle 61. Shaft 62 serving as an extension of shaft 58, also engages in the clutch 60 and is journalled in the bracket 63. Fixedly mounted upon the shaft 62 is a pinion 64 meshing with the teeth 44. The clutch arrangement is such that the shaft 58 and the extension shaft 62 may be caused to rotate in unison at will.

Mounted upon the shaft 37 is a drum 65 provided with a sleeve 66 which extends through the standard 54 and engages the friction clutch 67 so that this drum may be caused to rotate in unison with the shaft 37 at will. A similar drum 68 is mounted on the shaft 37 and adapted to engage the friction clutch 69 so that this drum may be caused to rotate in unison with the shaft 37, as desired.

On account of the swingable mounting of the shaft 28 on the bar 30, it is evident that the bevel gear 29 may be brought into mesh either wth the bevel gear 34 or 36 at will.

Meshing with the bevel gears 34 and 36 is a large bevel gear 69 which is fixedly mounted on the shaft 70, this shaft extending through brackets 75 and 76 which project inwardly from the standards 54 and 45 respectively.

Carried at the upper end of the shaft 70 is a bevel gear 77 adapted to mesh with a large bevel gear 78 which is journalled on a shaft 79 projecting into the yoke 72 and in axial alignment with the trunnions 73 and 74. Projecting through a bearing 80 on the yoke 72 is a shaft 81 which carries a bevel gear 82 meshing with the gear 78. The bevel gear 82 is arranged to rotate with the shaft 81 while at the same time the shaft 81 may move axially of the gear 82. This shaft 81 extends through a bearing 83 formed on the yoke 84 through the arms of which is projected a shaft 85. Fixedly mounted upon the shaft 85 are saw wheels 86 and crusher blades 87, the saw wheels 86 and the crusher blades 87 being spaced apart by suitable collars 88, a collar 89 being secured at one end of the shaft and a collar 90 at the other end of the shaft 85. A bevel gear 91 is carried by the shaft 81 and meshes with a bevel gear 92 carried by the shaft 85 so that a rotation of the shaft 81 will effect a rotation of the saws 86 and the crushers 88. As clearly shown in Fig. 2, these crusher blades are sharpened at their edges so as to simulate quite closely an axe head. A collar 93 is fixedly mounted upon the shaft 81 at a cross arm 94, this cross arm extending outwardly beyond the extremities of the shaft 85, as shown in Fig. 2.

A shaft 81 is slidably mounted in the bearing 80 for a purpose appearing hereinafter.

Wound upon the drum 52 is a cord 95 which passes over a pulley 96, carried by a bracket 97 projecting outwardly from the standard 45. The end of the gear 95 is secured to one end of the cross arm 94. Wound on the drum 49 is a cord 98 which extends over the pulley 99 mounted on the shaft 101 which projects through the standard 45 and through the bracket 97. This gear 98 passes below the pulley 99 and extends upwardly and is connected to a cross arm 102 which is fixedly mounted on the upper end of the shaft 81. Wound upon the drum 68 is a gear 103 which passes over the pulley 104 mounted on the shaft 105 which extends through the bracket 106 and through the standard 54, the end of this gear being attached to the opposite end of the cross arm 94. Wound on the drum 65 is a gear 107 which passes below the pulley 108 and is fastened to the other end of the cross arm 102.

In operation, when the shaft 21 is rotated the arm 31 may be swung to bring the gear 28 into mesh with either the gear 34 or the gear 36 so as to effect a rotation of the shaft 81, and thus cause the saws 86 and the crushers 88 to rotate, the direction of rotation being dependent upon whether the gear 28 is in mesh with the gear 34 or with the gear 26. Should it be desired to swing the device on the sleeve 19 as a pivot, the clutch 47 may be closed to effect a rotation of the gear 43, whereupon the device will rotate on the sleeve 19 as a pivot.

The drums are utilized for raising and lowering the crushing and cutting mechanism, and this is effected by closing the clutches 51 and 53, and 69 and 67. When the clutches 67 and 51 are closed, the drums 65 and 48 will be rotated in the direction of the rotation of the shafts 37 and 35, the direction of rotation being dependent upon which of these shafts is driven by the bevel gear 28. By rotating these drums in one direction, the cords will be wound on the drums, thus causing a downward thrust of the shaft 81, the drums 52 and 68 unwinding to permit its movement. By allowing the drums 65 and 49 to idle and winding the drums 52 and 68, a raising of the shaft 81 will be effected, sliding the shaft in its bearings on the yoke. Should it be desired to tilt the entire mechanism without varying the position of the shaft 81 relatively to the yoke, the drums 65 and 49 may be locked against rotation on the shaft by means of the clutches and the drums 68 and 52 set into rotation to wind the cords thereon, thus causing a tilting of the yoke and the shaft 81 on the trunnions 73 and 74 as a pivot.

With a device constructed in this manner it is thus evident that the crushing and cutting mechanism may be swung to various positions over the side of the boat so as to clear the way for the boat in a field of ice and permit its passage therethrough.

The device may be mounted at any desired position on the boat, and if desired, a plurality of the platforms 11 may be used, and the mechanism moved from station to station.

While I have illustrated and described the preferred form of my invention, I do not wish to limit myself to the precise form of structure shown, but desire to avail myself of such variations and modifications as may come within the scope of the appended claims.

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

1. A device of the class described comprising; a supporting platform; a plate rotatably mounted on said platform; supporting members projecting upwardly from said plate; a shaft carried by said supporting members, said shaft being tiltable relatively thereto; means for rotating said shaft; cutting members; crushing members; and means for rotating said cutting members and said crushing members simultaneously with the rotation of said shaft; and means for rotating said plate about said platform.

2. A device of the class described comprising: a supporting platform; a plate rotatably mounted on said platform; supporting members projecting upwardly from said plate; a shaft carried by said supporting members, said shaft being tiltable relatively thereto; means for rotating said shaft; cutting members; crushing members; means for rotating said cutting members and said crushing members simultaneously with the rotation of said shaft; and means for moving said cutting and crushing members vertically relatively to said plate.

3. In a device of the class described, a shaft; a bearing for said shaft; a plurality of crushing members on said shaft; a second shaft; means on said second shaft for rotating said first mentioned shaft; means for rotating said second mentioned shaft; and a bearing for said second mentioned shaft, said second shaft being movable axially of said bearing and of its rotating means.

4. In a device of the class described, a shaft; a bearing for said shaft; a plurality of crushing members on said shaft; a second shaft; means on said second shaft for rotating said first mentioned shaft; means for rotating said second mentioned shaft; a bearing for said second mentioned shaft, said second shaft being movable axially of said bearing and of its rotating means; and means for moving said shaft axially at will in either direction.

5. In a device of the class described, a plurality of crushing members; supporting means for said crushing members, said crushing members being rotatable; a shaft; means for rotating said shaft, the rotation of said shaft effecting a rotation of said crushing members; a support for said shaft, said shaft being movable axially of said support; standards for supporting said support, said support and said shaft being tiltable relatively to said standards; means for moving said shaft axially in either direction, the axial movement of said shaft effecting bodily movement of the supporting means of said crushing members, said supporting means for said crushing members being carried by said shaft upon tilting movement thereof.

In testimony whereof I have signed the foregoing specification.

AMBROSE LEONARD ROWE.