No. 804,091. PATENTED NOV. 7, 1905.

I. BOYD.

ICE CUTTING MACHINE.

APPLICATION FILED JUNE 30, 1904.

2 SHEETS—SHEET 1.

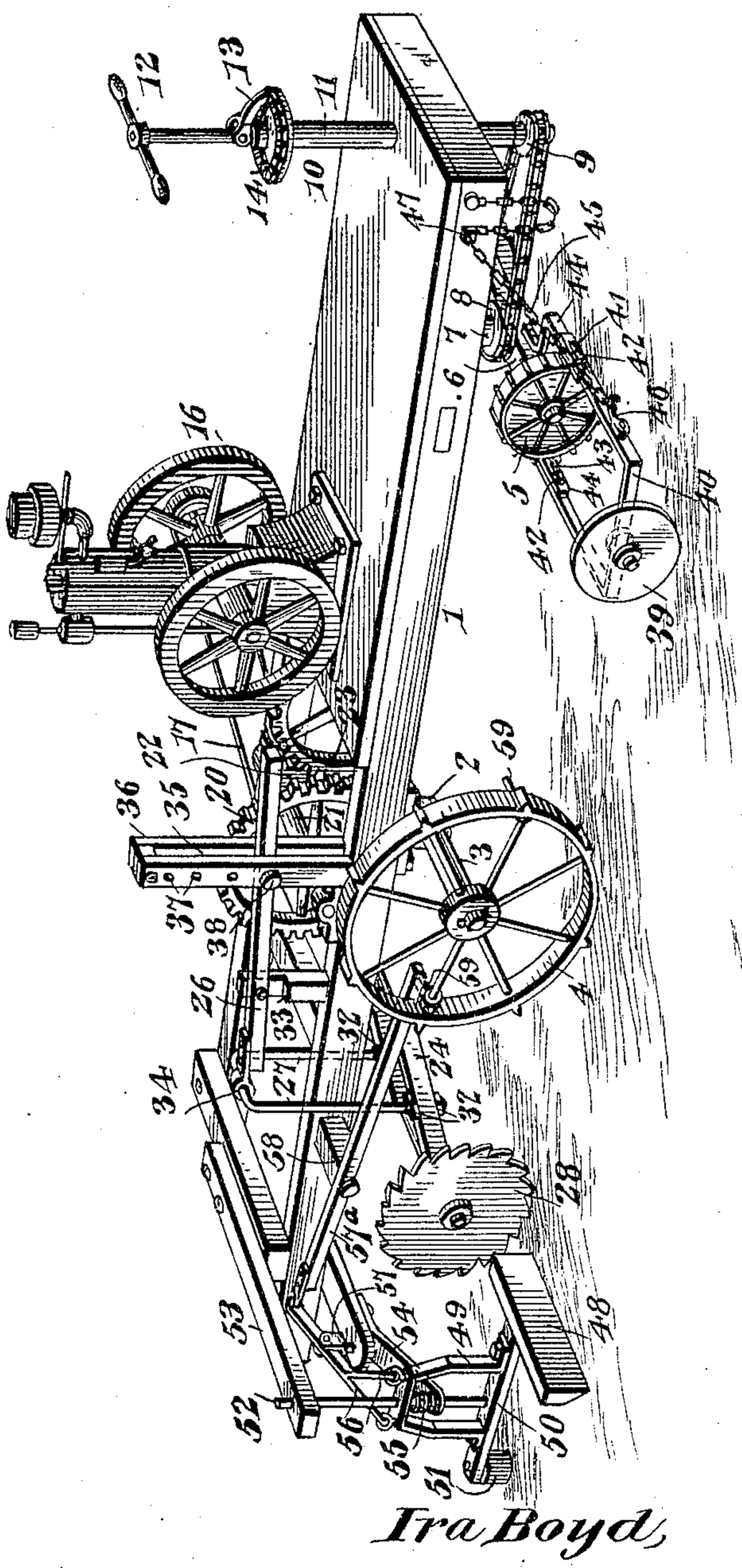

Fig. 1.

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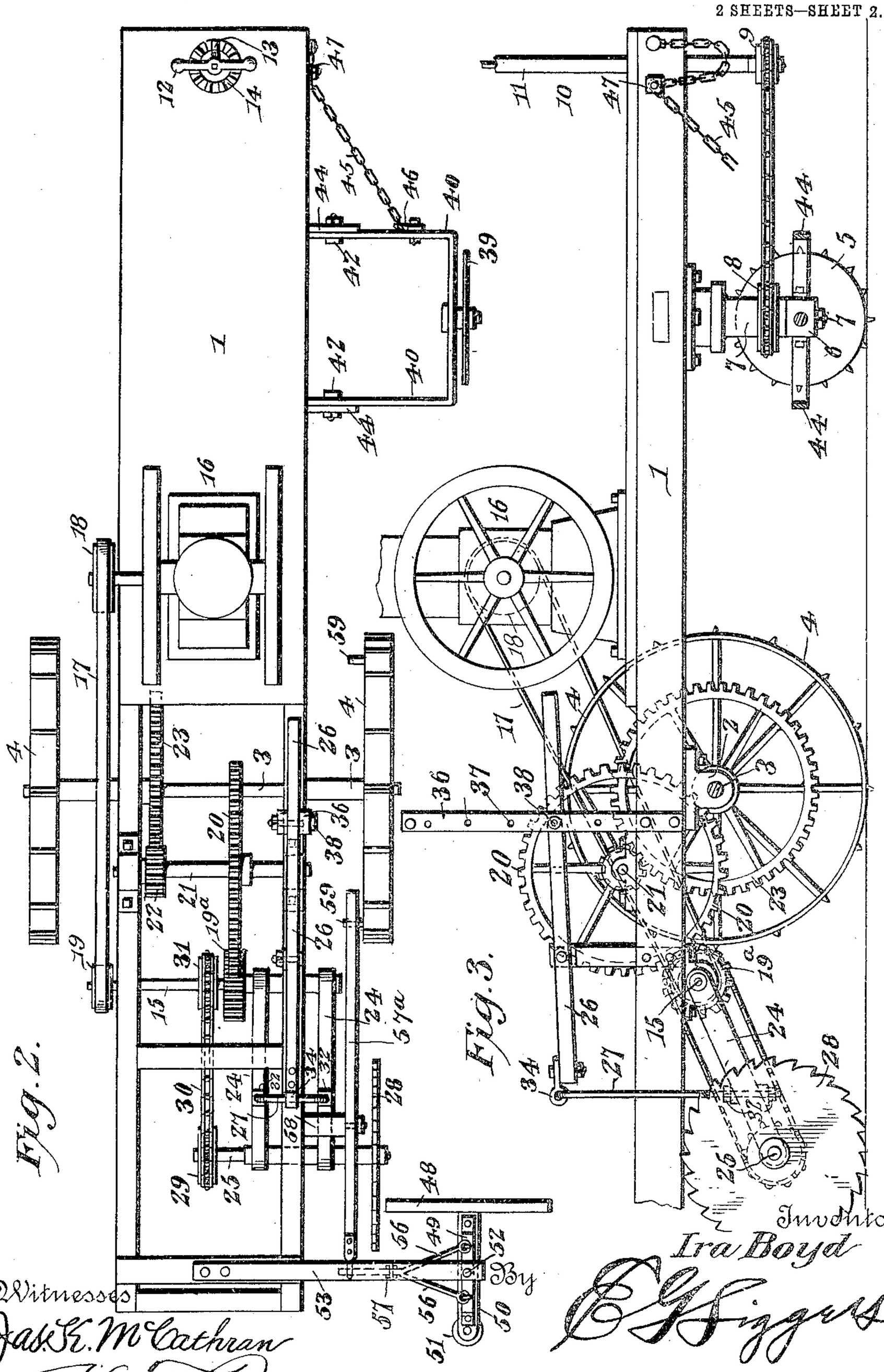

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

IRA BOYD, OF PONDHILL, PENNSYLVANIA.

ICE-CUTTING MACHINE.

No. 804,091. Specification of Letters Patent. Patented Nov. 7, 1905.

Application filed June 30, 1904. Serial No. 214,803.

To all whom it may concern:

Be it known that I, IRA BOYD, a citizen of the United States, residing at Pondhill, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Ice-Cutting Machine, of which the following is a specification.

The invention relates to improvements in ice-cutting machines.

The object of the present invention is to improve the construction of ice-cutting machines and to provide a simple and efficient one adapted to carry its motive power and capable of rapidly cutting ice into cakes of the desired size.

A further object of the invention is to provide an ice-cutting machine of this character adapted to accurately cut ice into strips of the desired width and capable of automatically breaking the strips into cakes of the desired size, thereby obviating the necessity of sawing a strip of ice transversely to divide it into cakes.

With these and other objects in view the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion, size, and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a perspective view of an ice-cutting machine constructed in accordance with this invention. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 designates a supporting-frame consisting of a suitable platform mounted upon wheels and carrying the ice-cutting mechanism. The frame is provided at opposite sides with suitable bearings 2 for the reception of a rear axle 3, which is provided with propelling or traction wheels 4, having spurs or projections at its periphery for engaging the ice. The rear axle is located slightly in rear of the center of the machine, and the front of the frame is supported by front wheels 5, arranged on the journals of a front axle 6. The front axle is pivotally connected with the frame by a king-bolt or vertical pivot 7, which carries a sprocket-wheel 8, and the latter is connected with a sprocket-pinion 9 of a steering-shaft 10, whereby the axle is turned to change the direction of the machine. The vertical steering-shaft extends through a fixed tube or sleeve 11 and is provided at its upper end with a handle-bar 12 or other suitable means for partially rotating it. It is locked in its adjusted position by means of a dog or pawl 13, pivotally mounted on the upper portion of the steering-shaft and arranged to engage the teeth of a horizontal ratchet-wheel 14. The horizontal ratchet-wheel 14 is fixed to the upper end of the tube or sleeve. When the steering-shaft is partially rotated, motion is communicated to the axle through the sprocket-gearing, and the machine may be readily turned in either direction. The front wheels are also provided at their peripheries with spurs or projections for engaging the ice to prevent them from slipping. The vertical tube or sleeve extends through the platform and depends from the same, as clearly shown in Figs. 1 and 3.

Mounted upon the rear portion of the frame in suitable bearings is a transverse drive-shaft 15, which is driven by an engine 16 or other suitable motor and is connected with the same by a belt 17; but any other form of gearing, either sprocket or spur, or any other means may be employed for communicating motion from the engine to the drive-shaft. The belt 17 is arranged on suitable pulleys 18 and 19 of the engine and drive-shaft, respectively. The drive-shaft is connected with the rear axle by a train of spur-gearing; but any other form of gearing may be employed for this purpose. A spur-pinion 19^a is keyed or otherwise fixed to the drive-shaft and meshes with a gear-wheel 20 of a counter-shaft 21, which carries a pinion 22. The pinion 22 meshes with a gear-wheel 23, which is keyed or otherwise fixed to the rear axle. The number and diameter of the gears may be varied to drive the machine at the desired speed. The drive-shaft also forms a pivot for an oscillatory saw-carrying frame 24, which is composed of parallel side bars suitably connected. The oscillatory saw-carrying frame is provided at its outer end with suitable bearings for a saw arbor or shaft 25, and it is connected with an adjusting-lever 26 by a yoke 27, which straddles one of the

side sills or beams of the main or supporting frame. The rotary or circular saw 28 is fixed to the outer end of the saw arbor or shaft, which carries a sprocket-pinion 29 at its inner end, and the sprocket-wheel 29 is connected by a sprocket-chain 30 with a sprocket-wheel 31 of the drive-shaft. The sprocket-gearing, which communicates motion from the drive-shaft of the saw-arbor, permits the saw-carrying frame to oscilliate to raise and lower the saw; but any other form of gearing may be employed for communicating motion from the drive-shaft to the saw-arbor. As the machine advances the saw, which is operated simultaneously with the traction or propelling wheels, cuts a kerf in the ice, as will be readily apparent, and the saw is adapted to be adjusted vertically to suit the thickness of the ice. Also saws of various diameters may be employed.

The sides of the yoke pierce the sides of the oscillatory saw-carrying frame and are provided with nuts 32 for engaging the same. The adjusting-lever, which extends longitudinally of the machine, is located at one side thereof, being fulcrumed on a post or support 33, which extends upward from the supporting-frame. The rear end of the adjusting-lever is provided with an eye or bearing 34, and the front arm operates in an opening 35 of a post 36, preferably composed of two side pieces spaced apart and suitably connected. The post is provided at intervals with perforations 37 for the reception of a pin 38, which also pierces the adjusting-lever, whereby the saw is secured in its adjustment.

After the machine has cut one kerf in the ice the machine is returned to its starting-point, and a rotary guide-wheel 39, which is located at a point beyond the plane of the saw, is arranged in the kerf for guiding the machine, whereby cakes of ice may be accurately cut the desired width. The guide is adjustable both laterally of the machine and vertically, and it is supported by an open frame 40 of approximately rectangular form, provided at opposite sides with slots 41 for the reception of bolts 42 or other suitable fastening devices, which also pass through slots 43 of horizontal bars 44. The bars 44, which are disposed transversely of the machine, are secured at their inner ends to the front axle, at the front and rear faces thereof, and are angularly bent to clear the adjacent front wheel. The slots, which may be of any desired length, permit the frame 40 to be moved outward and inward, and the bolts form pivots when adjusting the guide-wheel vertically, as they permit the frame 40 to swing upward and downward. The guide-carrying frame is supported or braced by a chain 45, arranged at a slight angle to the front side of the frame 40 and having one of its outer links engaging a hook 46 of the said frame 40. The chain is secured at its inner portion to the supporting-frame by a bolt having a removable nut 47. The bolt of the supporting-frame passes through one of the links, and its nut 47 engages the same. By means of the fastening devices of the supporting-frame and the hook of the guide-carrying frame the chain may be varied in length to suit the position of the guide-carrying frame 40.

The ice is weakened by a blade 48 to enable it to be easily and accurately broken into cakes, and this blade is secured to a vertically-movable ice-breaking frame 49, which is automatically operated by the means hereinafter described to break into cakes the strip of ice cut by the machine, thereby obviating the necessity of sawing the ice transversely for that purpose. The vertically-movable ice-breaking frame is substantially U-shaped to form a yoke, which is provided at its bottom with a horizontal bar 50, extending in advance and in rear of the frame. The blade 48 is arranged transversely of the machine at the front end of the bar 50, which is disposed longitudinally of the machine and which is provided at its rear end with a block or piece 51, forming an ice-engaging head and adapted to engage and break the ice in rear of the saw. The transverse blade 48, which extends across the strip to be broken, is provided with a lower cutting edge, and it is adapted to weaken the ice, and thereby assist in breaking the same. The vertically-movable ice-breaker is guided by a vertical rod 52, depending from the laterally-extending bar 53 of the supporting-frame and piercing the yoke or frame 49 and the bar 50. The lower portion of the guide-rod is supported by a brace 54, on which is seated a cushioning-spring 55, adapted to cushion the ice-breaker. The coiled spring is interposed between the brace 54 and the top of the yoke.

The ice-breaker is provided at the top of the yoke with eyes, into which are linked corresponding eyes of the arms of a forked lever 56, fulcrumed between its ends on a suitable support 57 and connected at its inner end to the rear end of a longitudinally-disposed operating-lever 57[a]. The operating-lever, which is fulcrumed between its ends on a suitable support 58, has its front end arranged adjacent to one of the traction-wheels 4, which is provided with tappets 59, adapted to engage and oscillate the longitudinal lever. When the front end of the longitudinal lever 57 is raised, the outer arm of the transverse lever 56 will also be raised, and the ice-breaker will be permitted to drop and break the ice as soon as the tappet releases or disengages itself from the longitudinal lever 57. The traction or propelling wheels may be of any desired number, and any number of tappets may be employed to cause cakes of the desired size to be broken off by the machine.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. In an ice-cutting machine, the combination with cutting mechanism, of means for automatically striking the ice at intervals for breaking cakes of the desired size, and a transversely-disposed blade movable with the said striking means and connected between its ends with the same, substantially as described.

2. In an ice-cutting machine, the combination with cutting mechanism, of an ice-breaker arranged to strike partially-severed ice for breaking the same into cakes, a transverse blade located in advance of and carried by the ice-breaker and means for operating the ice-breaker, substantially as described.

3. In an ice-cutting machine, the combination with cutting mechanism, of an ice-breaker arranged to engage partially-severed ice for breaking the same into cakes, means for operating the ice-breaker at intervals, and means carried by the ice-breaker for weakening the ice at the place where it is to be broken, substantially as described.

4. In an ice-breaking machine, the combination with cutting mechanism, of an ice-breaker provided with a blade for weakening the ice and means carried by the ice-breaker in rear of the blade for striking the ice to break the same, substantially as described.

5. In an ice-cutting machine, the combination of a main frame, wheels supporting the same, one of the wheels being provided with a tappet, an ice-breaker located at one side of the main frame, a transverse lever mounted on the main frame and connected at its outer end with the ice-breaker, and a longitudinal lever also mounted on the frame and having one end arranged in the path of the said tappet, the other end of the longitudinal lever being connected with the inner end of the transverse lever, substantially as described.

6. In an ice-cutting machine, the combination with cutting mechanism, of an ice-breaker arranged to strike the partially-severed ice, a blade carried by the ice-breaker for weakening the ice, a cushioning-spring arranged in the path of the ice-breaker, a rotary element provided with a tappet, a vibratory lever arranged in the path of the tappet, and means for connecting the lever with the ice-breaker, substantially as described.

7. In an ice-cutting machine, the combination of a main frame provided with a vertical guide, a vertically-movable ice-breaker mounted on the guide and provided with ice-engaging means, a lever disposed transversely of the machine and connected with the ice-breaker, a lever extending longitudinally of the machine and connected with the transverse lever, and a rotary element having a tappet for engaging the longitudinal lever, substantially as described.

8. In an ice-cutting machine, the combination with a supporting-frame, and cutting mechanism, of a vertically-movable ice-breaker guided on the supporting-frame and comprising a yoke, a bar secured to the yoke, and an ice-engaging head arranged at the rear end of the bar, means for operating the ice-breaker, and a transverse blade arranged at the front end of the bar, substantially as described.

9. In an ice-machine, the combination with means for cutting longitudinal kerfs in ice, of a transverse blade arranged to extend across the space between the kerfs to chip or weaken the ice at the point where it is to be broken, and means located in rear of the blade for striking the ice to break the latter, substantially as described.

10. The combination of a frame, an axle provided with wheels, cutting mechanism, a guide-carrying frame mounted on the axle at the inner side of one of the wheels and receiving the latter and extending beyond the same, and a guide mounted on the outer portion of the guide-carrying frame, substantially as described.

11. In an ice-cutting machine, the combination of a frame, a front axle pivotally connected with the frame, wheels mounted on the front axle, supporting-bars extending laterally from one side of the frame and mounted on the front axle and provided between their ends with pins to clear the adjacent wheel, said bars being slotted, a transverse rectangular frame having slotted sides, a guide carried by the rectangular frame, and fastening devices passing through the slots of the bars and the rectangular frame and securing the latter in its adjustment, substantially as described.

12. An ice-cutting machine provided with an ice-breaker provided at the front with a transverse blade for weakening the ice to be broken, said ice-breaker being also provided at the back with a head for engaging the ice to break the same, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

IRA BOYD.

Witnesses:
D. O. COUGHLIN,
CHAS. A. SHEA.