April 14, 1942.

J. KAMPPI

2,279,570

GRAB HOOK

Filed June 6, 1941

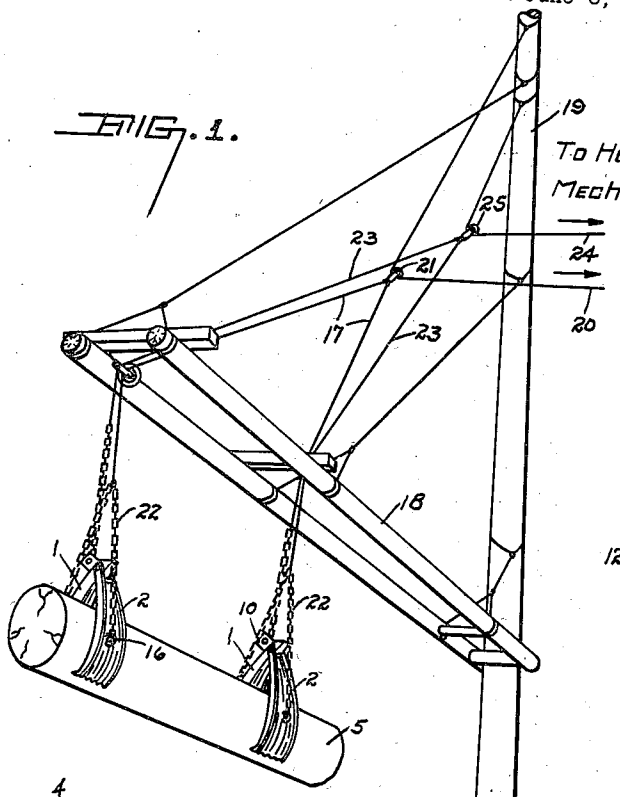


FIG. 1.

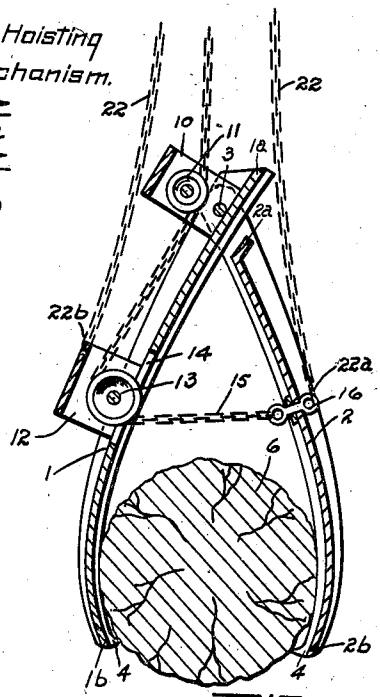


FIG. 4.

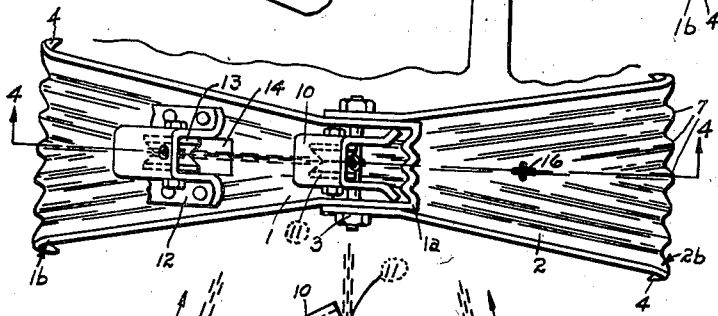


FIG. 2.

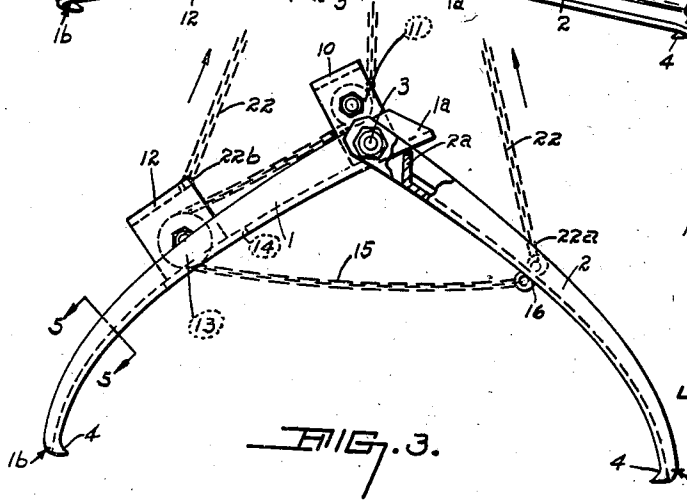


FIG. 3.

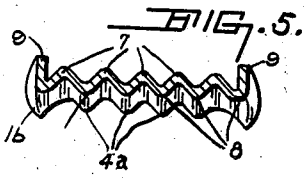


FIG. 5.

INVENTOR
JACOB KAMPPI.
BY
ATTORNEY

Patented Apr. 14, 1942 2,279,570

UNITED STATES PATENT OFFICE

2,279,570

GRABHOOKS

Jacob Kamppi, Astoria, Oreg.

Application June 6, 1941, Serial No. 396,883

7 Claims. (Cl. 294—112)

My invention relates to load lifting and engaging apparatus and is particularly designed for use in lifting round or cylindrically-shaped objects. In this connection, it has particular utility in loading logs. At the present time it is a common practice to engage logs, either in loops or bights of line, or to engage them in tongs having relative sharp points which sink into the logs and are thus secured thereto. With tongs of this character, the logs are frequently punctured to such a depth that a substantial amount of lumber is thus damaged. This is relatively unimportant when logs are used to make rough timbers, but is quite important when so-called "peeler" logs are loaded. "Peeler" logs are used in making veneer stock and the most valuable portion of the log is the external surface thereof, because such surface is more free of knots, pitch pockets and other defects and thus produces more clear ply or veneer stock.

Logs are normally stacked on a truck or on a flat car in a pile and thus the loading mechanism must be designed so that the loading tongs or lines can be freely disengaged without disturbing the stacked relationship. Thus, if loops or bights of line are used for lifting the logs, the line cannot freely be removed without tending to roll the logs, with consequent disturbance to the stack and consequent danger to the operator.

The object of my invention is to provide tong devices in load engaging apparatus of this character, which may engage the logs securely but without damaging them; said tongs are also designed so that they will open only sufficiently to take hold of a log or other object, to quickly and firmly engage a log and lift it into position. The connections are arranged so that the tongs can be easily and quickly disengaged, frequently without manual aid of an operator at the tongs.

A further and more specific object of my invention is to provide tongs of this character, which may engage spherical or irregular objects, similar to so-called grappling hooks, and may set such objects down without causing them to roll.

Further and other detailed objects and advantages of my invention are hereinafter referred to with reference to the accompanying drawing, in which:

Fig. 1 is a more or less diagrammatic view of a spar tree and loading boom, utilizing load engaging apparatus involving my invention;

Fig. 2 is a plan view of loading tongs embodying my invention, looking downwardly upon the upper or non-work engaging faces thereof;

Fig. 3 is a side elevation of such tongs, with portions shown broken away to disclose details of construction;

Fig. 4 is a sectional view taken substantially on the line 4—4 in Fig. 3, illustrating the manner in which said tongs may be utilized for gripping an object of circular cross section; and

Fig. 5 is a sectional view taken on the line 5—5 in Fig. 3, showing a sectional detail of one of said tong members.

My invention concerns, most directly, the construction of tong devices and load engaging apparatus, which devices comprise a pair of tong members 1 and 2, pivotally joined together at one end by a bolt 3. Said bolt connection purposely is not arranged at the extreme end of this tong member, thus the end 1*a* of tong member 1 extends beyond the pivotal bolt connection and engages a flange 2*a* on the other tong member. This limits the outward movement of the tong members as is illustrated in Fig. 3. The tongs may be swung forwardly to the position shown in Fig. 3 as the outermost limit, and I prefer that said tongs be openable to a lesser degree. I preferably define the maximum distance to which the tong members may be spread apart to a position in which the extremities 1*b* and 2*b* are arranged substantially in parallelism.

It is to be noted that the tong members are curved or cupped upon a relatively wide sweep and said extremities carry prongs thereon which extend normal to the sweep of the tongs at that point. Said prongs face inwardly that is, toward each other, and are of such lengths that they are shorter than the degree of cupping of each of the tong members. I preferably proportion said tong members 1 and 2 and the engagement of the ends 1*a* and 2*a*, respectively, so that the tong members may be arranged to straddle an object with the extremities parallel rather than slightly divergent as shown in Fig. 3. Thus, when the tongs are lifted by the mechanism hereinafter described, said extremities 1*b* and 2*b* may move quickly toward each other to engage a log 5 or a boulder 6 by its sides with the prongs 4 arranged slightly below the diameter thereof. That is, said log or boulder is arranged in the cup of the tongs and the prongs 4 only provide means to prevent the log or boulder from slipping out of the prong member. The prongs, of course, may not easily dig into a rock or other hard object and it is essential that they not puncture a barrel or other container. It is not

desirable either that said prongs project thru the bark of a log to make holes in the outer or sapwood of the logs as has previously been commented upon.

Each of the tong members is provided with a series of corrugations 7 which form projecting longitudinally extending ribs 8 to prevent the tongs from slipping longitudinally of the log, and to accommodate any irregularity in a boulder or other circular or spherical object. The prongs are also corrugated, ribbed or otherwise serrated, as is shown in Fig. 5, so that there is a multiplicity of points 4a underlying the object or engaging to a limited extent, the periphery of the object held by the tongs. Then said tongs preferably diverge toward their extremities as shown in Fig. 2 and longitudinal flanges 9 extend along their longitudinal margins. Said flanges extend away from the engaging surface of the tongs and provide stiffness for said tongs. The corrugations 7 extend fan-shaped toward the extremities, that is, they diverge toward the extremities as shown in Fig. 2, and thus said corrugations tend to form a plurality of V's on the gripping surface of the tongs to prevent longitudinal slipping of the object in said tongs without damaging the surface unduly, which supplement prongs 4 in their action.

The pivotal bolt connection 3 for the tong member passes thru the flanges of the tong members, as is shown in Figs. 2 and 3 and also secured between such flanges adjacent to said pivotal connection is a bracket 10 carrying a sheave 11. Another bracket 12 is riveted, bolted or welded to the back of tong member 1 and carries a sheave 13 journalled therein. Said bracket 12 is secured to the back of tong member 1 at a point intermediate the ends of the latter, as is shown most clearly in Figs. 3 and 4 and preferably is arranged at a point above the top of any potential load to be engaged by said tongs as is shown in Fig. 4. Said bracket 12 overlies an elongated slot 14 in tong 1, so that the sheave 13 may extend into said slot a substantial distance.

A flexible element such as, for example, chain 15 is secured to a link 16, passing thru and engaging the tong member 2 at a point thereon substantially opposite sheave 13. Said flexible element or chain 15 extends across the space between the tong members and takes a bight around sheave 13 and another bight under sheave 11 and is joined to one end of a cable 17, which, in turn, is connected to a hoisting mechanism, indicated but not shown in Fig. 1. Preferably, when the logs are being loaded, there are two sets of tong members carried by or suspended from a loading boom 18 supported and extending laterally from a spar tree 19. Thus, one set of tong members is secured to one end of said cable 17 and the other set to the other end thereof. Loading line 20 passes thru a block 21 engaging an intermediate portion of the cable 17; thus both sets of loading tongs are lifted simultaneously. It is not to be assumed that the specific rigging arrangement is required to practice my invention, but the type shown is illustrated to disclose one embodiment of my invention and its means of use. When the loading line 20 is pulled by the loading mechanism, it takes up the slack in chain 15 and pulls the extremities of the tongs toward each other to engage a log as shown in Fig. 1. Further pull on said loading lines causes both ends of the log to be lifted upwardly toward the under side of the loading boom.

Another set of lines is provided for lowering and releasing the tongs. These lines include a bridle section of chain 22. That is, said chain is bifurcated, one end 22a being secured to link 16 and another end 22b being secured to bracket 12 as is illustrated in Fig. 3. Said length of chain is secured to an end of cable 23. Said cable 23 is also preferably arranged to engage both of the tongs illustrated in Fig. 1. Lowering lines pass about a block 25 engaging an intermediate portion of cable 23, so that both sets of tongs will be actuated simultaneously. Thus when a log is to be disengaged or released from the tongs, the loading line 20 is slacked off and the lowering line 24 is made taut. This tends to pull the tong members apart by pulling on the cable ends in the direction shown in arrows in Fig. 3. It is to be understood that the tong members are quite heavy and have substantial mass and the upper or pivoted ends of the tong members are substantially heavier than the extremities thereof. Thus when the tongs are supported by chains 22, the central portion, including the pivotal connection, bracket 10, sheave 11 and the other mechanisms thereto, tend to move downwardly until the end 1a abuts with the flange 2a to limit the outward movements thereof. Thus, by putting tension in the lowering line 23, a log or other object can be readily disengaged from the tongs without much effort. Also, the log or other object does not tend to roll, because the tongs are arranged only at the side of the log or other object and move directly away from said side, without tending to roll or tip the log or other object, in effecting its disengagement. Thus the tongs embodying my invention set the log or other object down without any great difficulty.

Inasmuch as my invention does not pertain directly to the details of the loading mechanism nor to the specific rigging therefor, I have not attempted to describe all of the details of the rigging nor the manner in which the logging boom is secured to the spar tree. As a matter of fact, my invention is not limited to operating with a logging boom or spar tree, but is adaptable to any type of loading apparatus or rigging therefor. It relates to the rigging only as said rigging is necessary to lift the tongs, bring them together to engage an object and to disengage them, when the object engaged is to be released, as I have previously described.

I claim:

1. In load engaging apparatus, a pair of tongs pivotally joined together adjacent one end, the opposed faces of said tong members being slightly curved toward each other and inturned serrated prongs formed at the free extremities of each of said tong members, extending substantially normal to the curved face of each tong member, said prongs being of such length as to be less than the maximum rise of the arc formed by the tong member upon which they are formed.

2. In load engaging apparatus, a pair of tongs pivotally joined together adjacent one end, the opposed faces of said tong members being slightly curved toward each other, and longitudinally extending ribs extending fan-shaped along the face of each of said tong members.

3. In load engaging apparatus, a pair of tongs pivotally joined together adjacent one end, the opposed faces of said tong members being slightly curved toward each other, operating connections for said tongs comprising a flexible element secured to one tong member and engaging the other in a bight of said element, functioning

to draw said members towards each other and to lift said tongs, means for spreading said tong members apart, and a stop for said tongs limiting the relative outward movement thereof to a point where the free extremities of said tongs are in substantial parallelism with each other.

4. In load engaging apparatus, a pair of tongs pivotally joined together adjacent one end, the opposed faces of said tong members being slightly curved toward each other, operating connections for said tongs comprising a flexible element secured to one tong member and engaging the other in a bight of said element, functioning to draw said members towards each other and to lift said tongs, a guide element secured to said tongs adjacent their pivotal connection, about which guide element said flexible element passes, and a bridled connection joined to said tong members adjacent the point of securing and engaging of said flexible member, respectively, with the tong members for spreading said tong members apart.

5. In load engaging apparatus, a pair of tongs pivotally joined together adjacent one end, the opposed faces of said tong members being slightly curved toward each other, operating connections for said tongs comprising a flexible element secured to one tong member and engaging the other in a bight of said element, functioning to draw said members towards each other and to lift said tongs, a guide element secured to said tongs adjacent their pivotal connection, about which guide element said flexible element passes, a bridled connection joined to said tong members adjacent the point of securing and engaging of said flexible member, respectively, with the tong members for spreading said tong members apart, and a common link securing said connections and said flexible element to a tong member.

6. In load engaging apparatus, a pair of tongs pivotally joined together adjacent one end, the opposed faces of said tong members being slightly curved toward each other, inturned serrated prongs formed at the free extremities of each of said tong members, extending substantially normal to the curved face of each tong member, said prongs being of such length as to be less than the maximum rise of the arc formed by the tong member upon which they are formed, operating connections for said tongs comprising a flexible element secured to one tong member and engaging the other in a bight of said element, functioning to draw said members towards each other and to lift said tongs, and means for spreading said tong members apart.

7. In load engaging apparatus, a pair of tongs pivotally joined together adjacent one end, the opposed faces of said tong members being slightly curved toward each other, inturned prongs formed at the free extremities of each of said tong members, extending substantially normal to the curved face of each tong member, said prongs being of such length as to be less than the maximum rise of the arc formed by the tong member upon which they are formed, operating connections for said tongs comprising a flexible element secured to one tong member and engaging the other in a bight of said element, functioning to draw said members towards each other and to lift said tongs, means for spreading said tong members apart, and a stop for said tongs limiting the relative outward movement thereof to a point where the pronged ends are in substantial parallelism with each other.

JACOB KAMPPI.