

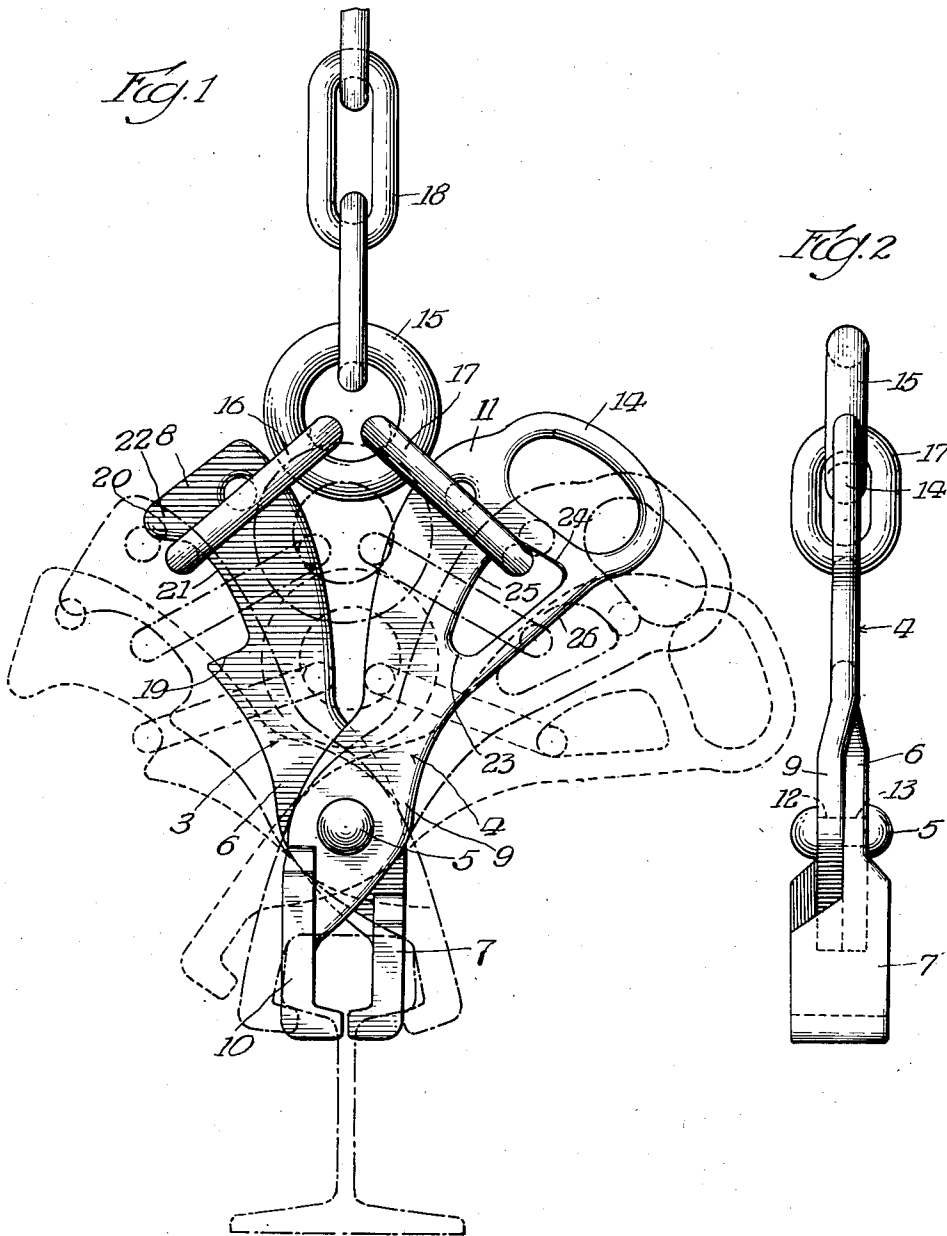
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TONGS

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TONGS

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The present invention relates generally to tongs. More particularly, the invention relates to those tongs which are adapted to be used in connection with a crane or hoist to grip and lift steel shapes, castings, rails, frogs, switches and other heavy articles and comprise (1) a pair of complementary tong-members which are pivotally connected together intermediate their ends and have oppositely facing jaws at the lower ends thereof and handle parts at their upper ends, (2) a ring which overlies the handle parts of the tong-members and is adapted for attachment to the hoisting block of the crane or hoist with which the tongs are used, and (3) a pair of toggle links which extend between and are connected to the ring and the handle parts of the tong-members and operate in response to upward movement of the ring relatively to the tong-member to swing the handle parts together and thus cause the jaws to swing into gripping relation with the article to be lifted.

Heretofore, it has been customary in the manufacture of tongs of this type, to connect pivotally the toggle links to the handle parts of the tong-members and to make the toggle links as short as possible in order to increase to the greatest possible extent the gripping action of the jaws in response to upward movement of the ring relatively to the tong-members. In practice it has been found that tongs which are so manufactured have certain disadvantages. In the first place, when the toggle links are connected pivotally to the handle parts of the tong-members, the gripping action of the jaws decreases as the jaws are swung together with the result that thin objects cannot be properly and safely gripped and lifted by the jaws. Secondly, when short toggle links are employed between the ring and the handle parts of the tong-members, the width of opening of the jaws at the lower ends of the tong-members is limited.

The primary object of the invention is to provide tongs of the type under consideration which are generally an improvement upon and are more efficient in operation than previously designed tongs of the same general character, by reason of the fact that the toggle links are connected to the handle parts of the tong-members in such a manner that the gripping action of the jaws remains substantially the same regardless of the extent to which the jaws are opened, and thus the jaws are adapted effectively and safely to grip thin articles as well as thick ones.

Another object of the invention is to provide tongs which are generally of new and improved

construction and may be produced at a low and reasonable cost.

Other objects of the invention and the various advantages and characteristics of the present tongs will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a side view of a pair of tongs embodying the invention, illustrating in detail the specific manner in which the toggle links are connected to the handle parts of the tong-members so that the gripping action of the jaws remains the same regardless of the extent to which the jaws are opened; and

Figure 2 is an edge view of the tongs.

The tongs which form the subject matter of the invention are adapted to be used in connection with a crane or hoist to grip heavy articles such as steel shapes, castings, rails, frogs and switches, and comprise a pair of elongated, complementary tong-members 3 and 4. These members are preferably drop forged. They are designed to be suspended from the hoisting block of the crane or derrick with which the tongs are used, and are pivotally connected together intermediate their ends by means of a pivot pin 5. The tong-member 3 embodies a flat, intermediate part 6 and is shaped so as to include a jaw 7 at its lower end and a handle 8 at the upper end thereof. The jaw 7 is formed integrally with the intermediate part 6 of the tong-member 3 and is thicker than the intermediate part in order to afford a comparatively large gripping surface. The handle part 8 of the tong-member 3 is formed integrally with the intermediate part 6 and is substantially longitudinally aligned with the jaw. The tong-member 4 embodies a flat, intermediate part 9 and is shaped so that it has a jaw 10 at its lower end and a handle part 11 at the upper end thereof. The intermediate part 9 fits directly against the intermediate part 6 of the tong-member 3 and has an aperture 12 through which extends one end of the pivot pin 5. The other end of the pivot pin extends through an aperture 13 in the intermediate part 6 of the tong-member 3. The pivot pin 5 operates to connect the tong-members so that the latter are free to swing to and from one another and is bolted,

beaded or riveted over at its ends so that it is held against displacement relatively to the apertures 12 and 13 in the intermediate parts of the tong-members. The jaw 10 is formed integrally with the intermediate part 9 of the tong-member 4 and faces the jaw 7 so that when the tong-members are swung together it is brought into gripping relation with the article to be lifted by the tongs. The handle part 11 of the tong-member 4 is formed integrally with the intermediate part 9 and is substantially aligned with the jaw 10. The extreme upper end of the handle part 11 is shaped to form a hand-grip 14 whereby the tongs may be manually shifted into place. The handle parts 8 and 14, as shown in Figure 2 of the drawing, are connected to their representative intermediate parts by offset portions so that they lie in substantially the same plane.

In addition to the tong-members 3 and 4, the tongs comprise a ring 15 and a pair of toggle links 16 and 17. The ring 15 overlies the tong-members 3 and 4 and is adapted to be connected by a cable or chain 18 to the hoisting block of the crane or hoist with which the tongs are associated. The toggle link 16 is elongated and extends between the ring 15 and the handle part 8 of the tong-member 3. One end of the toggle link 16 is looped around one side of the ring 15. The other end of the link 16 extends around the handle part 8 and is slidable between an inner shoulder 19 and an outer shoulder 20 on a concave guide surface 21 along the outer side edge of the handle part of the tong-member 3. The inner shoulder 19 extends transversely with respect to the handle part 8. It is located adjacent the intermediate part 6 of the tong-member 3 and limits downward movement of the toggle link 16 relatively to the handle part 8. The upper shoulder 20 is formed on a lug 22 at the extreme upper end of the handle part 8 and limits upward movement of the toggle link relatively to the handle part of the tong-member 3. The lug 22 is formed integrally with the handle part 8 and is rounded so that it does not present any sharp edge. The toggle link 17 corresponds in shape to the toggle link 16 and extends between the ring 15 and the handle part 11 of the tong-member 4. The upper end of the link 17 extends around one side of the ring 15 and the other end of the link extends around the handle part 11 and slides between an inner shoulder 23 and an outer shoulder 24 on a concave guide surface 25. The inner shoulder 23 is located at the same distance from the pivot pin 5 as the inner shoulder 19 on the handle part of the tong-member 3 and limits downward movement of the toggle ring 17 relatively to the handle part 11. The outer shoulder 24 limits upward movement of the toggle ring 17 relatively to the handle part 11 and is formed as a part of the hand grip 14. A web 26 extends between the shoulders 23 and 24 and is formed integrally with the inner portion of the handle part 11 and the hand-grip 14. It closes the space defined by the shoulders 23 and 24 and the guide surface 25 and prevents the toggle links 17 from being disconnected from the handle part 11. The guide surfaces 21 and 25 form sliding connections between the toggle links and the handle parts of the tong-members and are arranged and shaped so that when the ring 15 is raised to swing together the tong-members, the toggle links slide upwardly relatively to the handle parts of the tong-members and remain at all times in a position wherein they extend substantially at right angles to the handle parts. An advantage and

characteristic of employing sliding connections of this character between the handle parts of the tong-members and the toggle links 16 and 17 is that the gripping action of the jaws of the tong-members is substantially uniform regardless of the extent to which they are opened, and consequently the tongs may be used to grip thin articles as well as thick ones. Another advantage and characteristic of utilizing sliding connections between the toggle links and the handle parts of the tong-members is that the range of opening of the jaws 7 and 10 of the tong-members is a maximum.

When the tongs are used in connection with the lifting of a thick article, such as a steel shape or casting, the tongs are manually positioned by way of the hand grip 14 over the article and then the ring 15 is lowered relatively to the tong-members 3 and 4. During lowering of the ring, the toggle links 16 and 17 slide downwardly on the guide surfaces 21 and 25 respectively and permit the tong-members to swing apart into their open position. When the tong-members are opened to the necessary or desired extent, the jaws 7 and 10 are brought into proper position with respect to the article and then the ring 15 is raised so as to cause the tong-members to swing together and to bring the jaws into gripping relation with respect to the article. During upward movement of the ring 15, the toggle links slide upwardly on the guide surfaces until they are arrested as the result of the jaws engaging firmly the article. In their arrested position, the toggle links extend substantially at right angles to the handle members and thus the jaws grip the article to the fullest extent during raising of the article by a further upward movement of the ring 15. When the tongs are used to grip a comparatively thin article, the tong-members are opened, as previously pointed out, and the jaws are placed around the article. Thereafter, the ring 15 is raised so as to cause the tong-members to swing together for article-grasping purposes. During swinging together of the tong-members, the toggle links 16 and 17 ride upwardly on the guide surfaces 21 and 25 as shown by full and dotted lines in Figure 1 of the drawing, and result in the jaws 7 and 10 of the tong-members effectively gripping the article. It is to be noted that when the tongs are used to grip a thin article, the toggle links 16 and 17 do not extend exactly at right angles to the handle parts of the tong-members. This, however, is immaterial due to the fact that when the toggle links slide upwardly on the guide surfaces 21 and 25, greater leverage is effected because of the fact that they are at a greater distance from the pivot pin 5.

The tongs herein described may be manufactured at a small and reasonable cost due to the fact that they consist of a comparatively small number of parts. They are exceedingly efficient in operation due to the fact that the gripping action of the jaws remains the same regardless of the extent to which the jaws are opened.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

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

1. Tongs comprising a pair of upstanding, complementary tong-members pivotally connected together intermediate their ends so that they may

be swung to and from each other, and having oppositely facing jaws at the lower ends thereof and handle parts at their upper ends and a ring overlying said handle parts and adapted to be attached to hoisting mechanism, and a pair of independent toggle links extending between the ring and the handle parts of the tong-members and having the inner portions thereof looped around the bottom part of the ring and their outer portions looped around said handle parts, said toggle links being operative in response to upward movement of the ring relatively to the tong-members to swing the tong-members together for jaw-closing purposes and having sliding engagement with the handle parts of the tong-members whereby when the ring is raised, they are caused automatically to slide upwardly on the handles and to swing the tong-members together without substantial change in their angular position with respect to said handle parts.

2. Tongs comprising a pair of upstanding, complementary tong-members pivotally connected together intermediate their ends so that they may be swung to and from each other, and having at their lower ends oppositely facing jaws and at the upper ends thereof handle parts with longitudinal guide surfaces along their outer portions, a ring overlying the handle parts of the tong-members and adapted to be attached to hoisting mechanism, and a pair of independent toggle links extending between the ring and the handle parts of the tong-members and having sliding engagement with the inner portions thereof looped and extending loosely around the bottom part of the ring and their outer portions extending around said handle parts and engaging slidably the guide surfaces so that when the ring is raised relatively to the tong-members, the links are caused automatically to slide upwardly and to swing the tong-members together to close the jaws without substantial change in their angular position with respect to the handle parts.

3. Tongs comprising a pair of upstanding, complementary tong-members pivotally connected together intermediate their ends so that they

may be swung to and from each other, and having at their lower ends oppositely facing jaws and at the upper ends thereof handle parts with longitudinally extending, concave guide-surfaces along their outer portions, a ring between and overlying the handle parts of the tong-members and adapted to be attached to hoisting mechanism, and a pair of independent toggle links extending between the ring and the handle parts of the tong members and having the outer portions thereof looped and extending loosely around the bottom part of the ring and their outer portions extending around said handle parts and engaging slidably the guide surfaces so that when the ring is raised relatively to the tong-members, the links are caused automatically to slide upwardly and to swing the tong-members together to close the jaws without substantial change in their angular position with respect to the handle parts.

4. Tongs comprising a pair of upstanding, complementary tong-members pivotally connected together intermediate their ends so that they may be swung to and from each other, and having at their lower ends oppositely facing jaws and at the upper ends thereof handle parts with longitudinally extending, concave guide surfaces along their outer portions, a ring between and overlying the handle parts of the tong-members and adapted to be attached to hoisting mechanism, and a pair of independent toggle links connected to the ring and extending outwardly around the handle parts of the tong-members and having sliding engagement with the guide surfaces whereby when the ring is raised relatively to the tong-members, they are caused automatically to slide upwardly and to swing the tong-members together to close the jaws without substantial change in their angular position with respect to the handle parts, said handle parts of the tong-members having stop shoulders at the ends of the guide surfaces whereby sliding of the toggle links on the guide surfaces is limited.

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