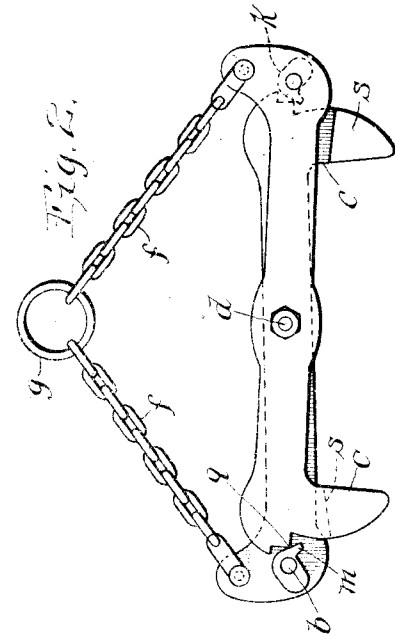
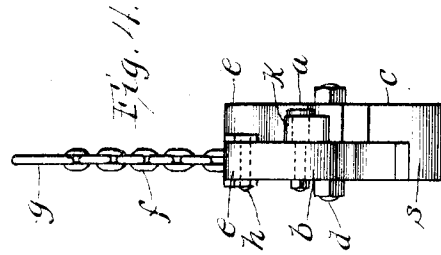
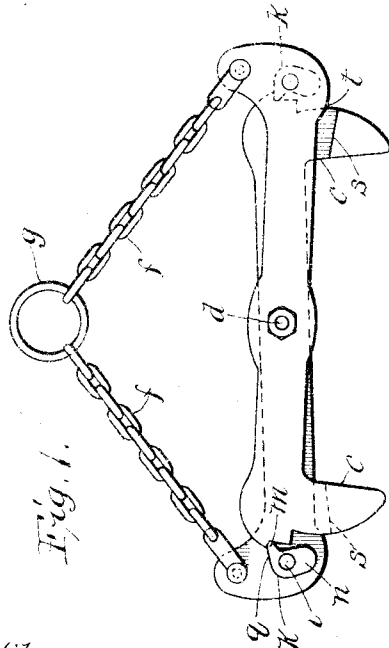
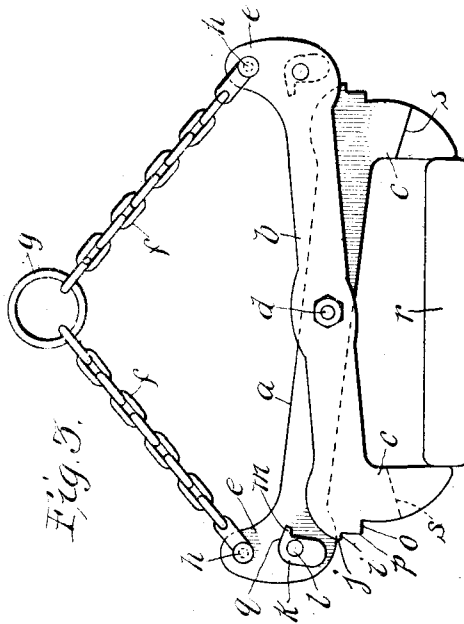


J. W. WATSON.
TONGS,
APPLICATION FILED APR. 30, 1913.

1,111,338.

Patented Sept. 22, 1914.



Witnesses:
Harry S. Gaither
Ernest C. Wam.

Inventor:
John W. Watson
by *Poole & Cromer*

Atty's

UNITED STATES PATENT OFFICE

JOHN W. WATSON, OF GARY, INDIANA.

TONGS.

1,111,338.

Specification of Letters Patent.

Patented Sept. 22, 1914.

Application filed April 30, 1913. Serial No. 764,473.

To all whom it may concern:

Be it known that I, JOHN W. WATSON, a citizen of the United States, and a resident of Gary, in the county of Lake and State of Indiana, have invented certain new and useful Improvements in Tongs; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to tongs of that type adapted for lifting heavy articles, such as ingots, slabs, billets, timber and the like.

The object of the invention is to improve the construction of tongs of the kind referred to in the several particulars as will hereinafter appear, and it also includes particular improvements in the construction of a means for locking or securing the tong arms together with the jaws thereof in open position, and to automatically unlock or release said tong arms so that the jaws will close upon the lifting of the tongs and grip therebetween the article or load to be handled or lifted by said tongs, without the necessity of the operator being within the reach of the tongs or the article to be lifted thereby.

The invention consists in the matters hereinafter described and more particularly pointed out in the appended claims.

In the accompanying drawings:—Figure 1 is a side elevation view of a pair of tongs constructed in accordance with my invention, the tongs being shown locked in open position; Fig. 2 is a similar view of the same parts shown in Fig. 1, the tongs being shown open but unlocked; Fig. 3 is a similar view of the same parts shown in Fig. 1, the tongs being shown unlocked and in clamping engagement with an article to be lifted or raised; and Fig. 4 is an end elevational view of the parts shown in Fig. 3.

Referring to the drawings, illustrating in detail a pair of tongs constructed in accordance with my invention, the same comprise two mating tong arms or members *a, b*, of equal length, crossed at the center of their lengths and pivoted or hinged together at their intersection by means of a pivot bolt *d*. Each tong arm is provided at one end with a depending jaw *c*, said tong arms being arranged with the jaws *c, c* oppositely disposed and adapted to grasp

therebetween an article or load to be lifted by said tongs. The end of each tong arm opposite its jaw *c*, is provided with an upwardly projecting, integral end portion *e, e*. Said end portions *e, e* are oppositely disposed and form the diverging ends of said tongs. As shown, said diverging end portions *e, e* are on opposite sides of and are equidistant from the pivotal axis of the tong arms. To the diverging ends *e, e* of the tong arms are attached the lower ends of lifting chains *f, f* by means of pins *h, h*. The chains *f, f* are equal in length and are connected at their upper ends with a suspension ring *g* which is adapted to be attached to a cable or trolley depending from the end of the swinging boom of a derrick or from an overhead crane. Each tong arm *a, b* is provided in its end face at the jawed end thereof with a laterally opening recess *i, i* forming a downwardly facing shoulder *j, j* against the under surface of which is adapted to contact and bear upwardly thereagainst the toothed end *m* of a pawl *k* pivotally mounted by means of a pivot pin *l* upon the side face of and at the adjacent end of the mating tong arm. When the pawls *k, k* at each end of the tong arms *a, b* have their toothed ends *m, m* projecting into the recesses *i, i* and engaging the downwardly facing shoulders *j, j*, said tong arms are locked or held with the jaws in open position. (Fig. 1.) As illustrated, the body portion *q, q* of each pawl *k, k* is above the pivotal axis of the pawl and is provided with a lateral projection forming the toothed end *m* above referred to. The pawls *k, k* are yieldingly held in locked positions, namely, with the upper edge or surface of the toothed ends *m, m* in contact with the associated downwardly facing shoulders *j, j* by the end portions *n, n* of said pawls below the pivot pins *l, l* being weighted. The weighted end portions *n, n* serve as counter-weights for the pawls and act to swing the pawls about the pivot pins *l, l* and maintain said pawls with the ends *m, m* thereof substantially horizontally disposed. The recessed ends of the tong arms *a, b* are further provided with laterally facing recesses *o, o* located below the recesses *i, i*, the said recesses *o, o* forming downwardly facing shoulders, the outer ends *p, p* of which are nearer to the pivot bolt *d* than the similar end of the shoulders *j, j* and form trip-projections, the purpose of which

will presently be described. In order to limit the downward movement of the diverging ends *e, e* of the tong arms *a, b*, and prevent said ends of the tong arms from moving past the jaws *c, c*, in swinging the tong arms into open position, said jaws *c, c* are each provided with a lateral projection *s, s* in the path of the downward movement of the diverging ends *e, e* of the mating tong arms and against the upwardly facing shoulders formed by such projections *s, s*; the under surfaces *t, t* of the diverging ends of the adjacent or mating tong arms are adapted to come into contact. Said projections *s, s* also serve to reinforce and strengthen the jaws *c, c*.

The tongs herein described and shown operate as follows: When the tong arms *a, b* are in the position shown in Fig. 1, the jaws *c, c* of said tong arms are open and adapted to receive therebetween the load or article to be lifted or handled by the tongs. Said tong arms *a, b* are locked with the jaws open, and the swinging of the tong arms in a direction to effect the closing of the jaws is prevented by the pawls *k, k* having their ends *m, m* projecting into the recesses *i, i* and in contact with the downwardly facing shoulders *j, j*. The pawls *k, k* being weighted, as above described, the ends *m, m* are yieldingly held in contact with the shoulders *j, j* and accidental swinging of the pawls out of engagement with the shoulders *j, j* in the jarring of the tongs, is prevented. As shown in Fig. 1, the under surfaces *t, t* of the diverging ends *e, e* are, when the tong arms are locked in open position, above and out of contact with the upwardly facing shoulders formed by the lateral projections *s, s*. The tong arms *a, b* when locked in open position, as shown in Fig. 1, are placed over the load or article to be lifted or handled with the article in position to be interposed between the jaws *c, c*. The tongs are then lowered by allowing the chains *f, f* and ring *g* to descend until the ends of the jaws *c, c* come into contact with or strike the floor or base upon which the load or article rests at the sides of said article, that is in case the width of the articles to be lifted is less than the distance between the open jaws *c, c*. If the article to be handled or lifted is as wide as the distance between the jaws *c, c* when open, the tongs are lowered until the inner faces of the jaws engage the sides of the interposed load. After the jaws *c, c* contact with the base upon which the article rests, or with the sides of the article as the case may be, the descent of the chains *f, f* and suspension ring *g* is continued, thereby permitting the diverging ends *e, e* to move downwardly relatively to the jaws *c, c* (which are at this time held from further downward movement by being in contact

with the floor or article) and carrying with them the pawls *k, k*. The pawls *k, k* are thus moved downward and out of engagement with the downwardly facing shoulders *j, j*, and the downward movement of the diverging ends *e, e* is continued until the ends *m, m* of the pawls pass the teeth or projections *p, p* below the shoulders *j, j*. The pawls, by reason of the weighted parts *n, n*, will swing on their pivots in a direction to cause the ends *m, m* to project into the lower recesses *o, o* with the projections *p, p* engaging the upper faces of the body portions *q, q* of the pawls at a point between the pivot pins *l, l* and the pointed ends *m, m* of said pawls, as shown in Fig. 2. Further downward movement of the parts is prevented by the diverging ends *e, e* coming into contact with the projections *s, s*. The pawls being weighted, the same are yieldingly maintained in contact with the projections *p, p*, with the ends *m, m* of said pawls pointing obliquely downward. As shown in Fig. 2, the points of engagement between the projections *p, p* and the pawls *k, k* are below the level of the pivot pins *h, h*. When the pawls *k, k* are in the position just referred to and as shown in Fig. 2, the tong arms are unlocked, and an upward pull on the same exerted through the suspension ring *g* acts through the chains *f, f* and pulls the diverging ends *e, e* of the tong arms upwardly and toward each other and the jaws *c, c* toward each other to grip the interposed load or article, indicated by *x* in Fig. 3, at the same time lifting the tongs and the load. The body portions *q, q* of the pawls *k, k* are of sufficient length to engage said projections *p, p* when the pivot pins *h, h* are moved above the level of said projections *p, p* in the upward movement of the diverging ends *e, e* of said tong arms, as just described, and, by reason of this fact, the pawls *k, k* are rotated or turned with the weighted ends *n, n* swung outwardly and the toothed ends *m, m* pointing downward in the movement of the pawl ends *m, m* past the projections *p, p*. As a consequence, the pawl ends *m, m* will slip past the upper shoulders *j, j* without coming into contact therewith, as the diverging ends *e, e* of said tong arms are raised and the jaws *c, c* moved toward each other into gripping engagement with the interposed load or article to be lifted. After the load is clamped between the jaws *c, c* the tongs are raised, thereby raising the load and the same transported to the desired place, which of course is within the territory covered by the derrick or crane from which the tongs are suspended. The position that the parts occupy at this time is shown in Fig. 3, and it will be noted that the pawls *k, k* occupy positions with the ends *m, m* thereof substantially horizontally disposed. After the des-

5 tination is reached the tongs and load *r* are lowered and the load *r* placed on the supporting base. In order to release the jaws *c, c* from gripping engagement with the interposed load or article *r*, after the same rests on the supporting base or floor, and permit the tongs to be raised from the load with the jaws *c, c* locked in open position, the tongs are lowered by allowing the ring *g* and chains *f, f* to descend, thereby permitting the diverging ends *e, e* of the tong arms to move apart and descend, carrying therewith the pawls *k, k*, which before the descent of the diverging ends were above the shoulders *j, j*, as shown in Fig. 3. The descent of the diverging ends of the tong arms causes the swinging of the same in a direction to effect the opening of the jaws *c, c* and release the tongs from engagement with the load *r*. The descent of the diverging ends of the tong arms is continued until the ends *m, m* of the pawls *k, k* pass by the shoulders *j, j* and swing into the recesses *z, z*, whereupon the diverging ends of the tong arms are raised and the pawls brought into engagement with the downwardly facing shoulders *j, j* and lock the tong arms with the jaws in open position, as shown in Fig. 1, and the tongs may be raised in open position away from the load which has just been handled.

30 When another load is to be handled or lifted, the tong arms are lowered in open position over the load or article to be handled, with the article between the jaws *c, c*, and the operations set forth above repeated.

35 The tongs are thus adapted to be automatically opened and closed without the operator manually swinging the pawls *k, k* or coming so close to the articles to be lifted by said tongs as to be affected by the heat, in case such articles to be handled are to be handled while in a heated state. The opening and closing of the tongs to release and grip an article may be effected or accomplished with facility and the tongs used in an efficient manner without the necessity of the operator actually touching or manually handling or manipulating the tongs or any of the parts thereof.

40 It is to be understood that the mechanical construction of the tongs illustrated may be changed and variously modified without departing from the spirit and scope of my invention and I do not wish to be limited to the exact details of construction and arrangement shown except as pointed out in the appended claims.

45 I claim:

50 1. A device of the character described, comprising pivoted tong arms provided with gripping jaws, means for movably supporting said tong arms, a pawl pivotally mounted on one of said tong arms and adapted to have locking engagement with the other of

said tong arms, for holding the tong arms and jaws in open position, and a trip member on the other of said tong arms adapted in the movement of said tong arms relatively to each other to act on said pawl for moving the same out of locking engagement with said tong arms.

2. The combination of pivoted tong arms having diverging end portions provided with gripping jaws, a pawl-engaging shoulder upon a pivoted tong arm member, means for movably supporting the diverging end portions of the tong arms, a pivoted pawl mounted adjacent to and movable into and out of engagement with said pawl-engaging shoulder, for holding the jaws in open position and permitting the movement of the jaws to gripping position, and a pawl-operating member upon and movable with the shouldered tong arm member, for holding the pawl in releasing position in the upward movement of the pawl when the pawl is in position to engage said pawl-operating member.

3. In a device of the class described, the combination of pivoted tong arms having diverging end portions and provided with gripping jaws movable to extended and gripping positions, means for movably supporting the diverging end portions of the tong arms, a pawl pivotally mounted upon one of said tong arms and movable into and out of engagement with the other tong arm, and a pawl-operating shoulder upon the last mentioned tong arm and movable into and out of engagement with the pawl and adapted to rotate the pawl into downwardly extending releasing position during the upward movement of the pawl.

4. The combination of pivoted tong arms having diverging end portions provided with gripping jaws, a pawl-engaging shoulder upon at least one of the pivoted tong arm members, means for movably supporting the diverging end portions of the tong arms, and a pivoted pawl mounted adjacent to and having a free pointed end movable into and out of engagement with one of the tong arms, for holding the jaws in open position and permitting the movement of the jaws to gripping position, said pawl having a weighted arm portion adapted to yieldingly hold the pointed end of the pawl in position to engage the adjacent shouldered tong arm member.

5. The combination of pivoted tong arms having diverging end portions provided with gripping jaws, a pawl-operating shoulder upon at least one of the pivoted tong arm members, means for movably supporting the diverging end portions of the tong arms, a pivoted pawl mounted adjacent to and having a free pointed end movable into and out of engagement with one of the tong arms, for holding the jaws in open position

and permitting the movement of the jaws to gripping position, said pawl having a weighted arm portion adapted to yieldingly hold the pointed end of the pawl in position to engage the adjacent shouldered tong arm member, and a pawl-operating member upon and movable with the shouldered tong arm member, for holding the pawl in releasing position in the upward movement of the pawl when the pawl is in position to be engaged by said pawl-operating member.

6. In a device of the class described, the combination of pivoted tong arms having diverging end portions and provided with gripping jaws movable to extended and gripping positions, at least one of said tong arms having an upper pawl-engaging shoulder, means for movably supporting the diverging end portions of the tong arms, a pawl pivotally mounted upon one of said tong arms and movable into and out of engagement with the adjacent upper shoulder of the other tong arm, and a lower pawl-operating shoulder upon the shouldered tong arm, and adapted to engage and turn the pawl to releasing position in its upward movement when the pawl is in position to engage such lower shoulder.

7. In a device of the class described, the combination of pivoted tong arms having diverging end portions and provided with gripping jaws movable to extended and gripping positions, a flexible element connected with the diverging end portions of the tong arms for raising and lowering the same, pawls mounted upon the diverging end portions of the tong arms and each movable into and out of engagement with an adjacent tong arm, for holding the tong

arms in extended position, and pawl-operating shoulders extending into the path of movement of the pawls and adapted to cause the rotation of the pawls to downwardly extending released position in the upward movement of the pawls when the latter are in position to engage the pawl-operating shoulders.

8. In a device of the class described, the combination of pivoted tong arms having diverging end portions and provided with depending jaws movable to extended and gripping positions, a flexible element secured to the diverging end portions of the tong arms and comprising a plurality of flexibly mounted sections extending upward and inward at an incline from the points of connection with the diverging end portions of the arms, pawls pivotally mounted upon the diverging end portions of the arms and each comprising a pointed end portion adapted to engage the adjacent tong arm, each of said pawls having a counter-weight portion adapted to hold the pointed end portion of the pawl yieldingly in normal position, and a pawl-engaging shoulder upon the tong arm into and out of engagement with which the pointed end of the pawl is adapted to be moved for turning the pawl upon its axis to inoperative position.

In testimony, that I, claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 28th day of April A. D. 1913.

JOHN W. WATSON.

Witnesses:

CHARLES H. POOLE,
WALTER VICKROY.