

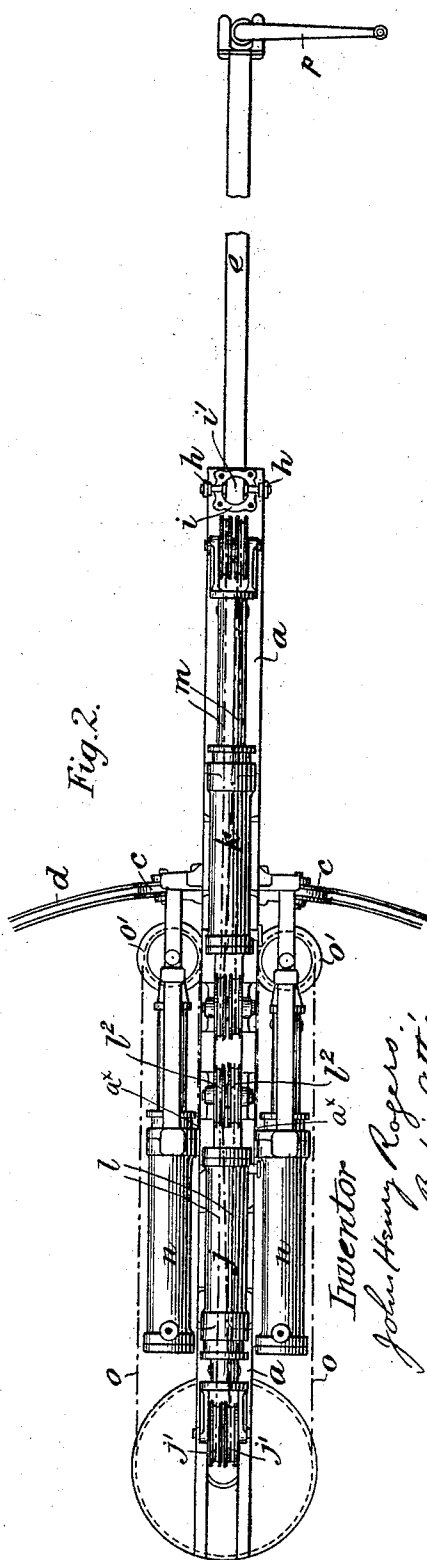
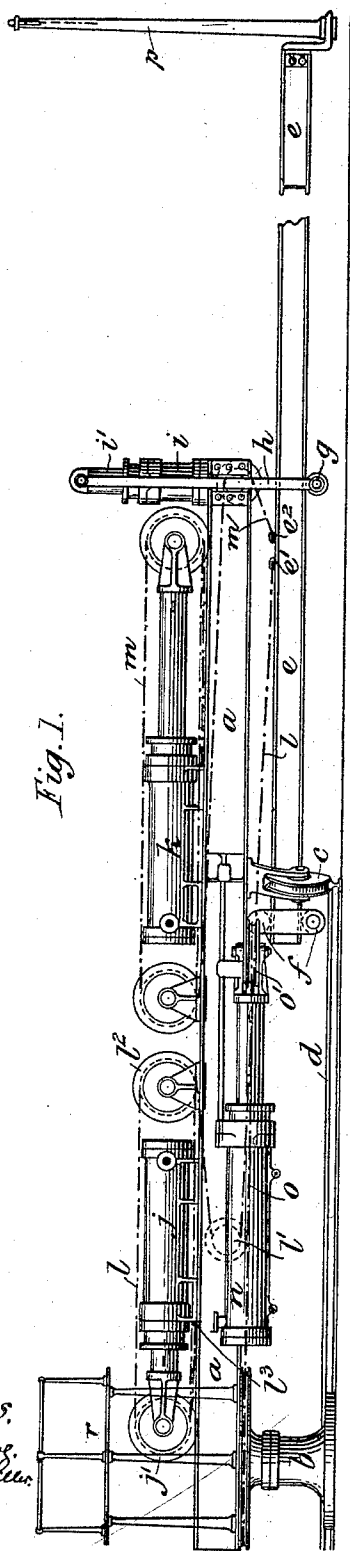
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5 Sheets—Sheet 1.

J. H. ROGERS.
HYDRAULIC CRANE.

No. 497,216.

Patented May 9, 1893.



Witnesses,
Balthus DeLong,
Attestation Miller.

Inventor
John Henry Rogers.
By his attys.
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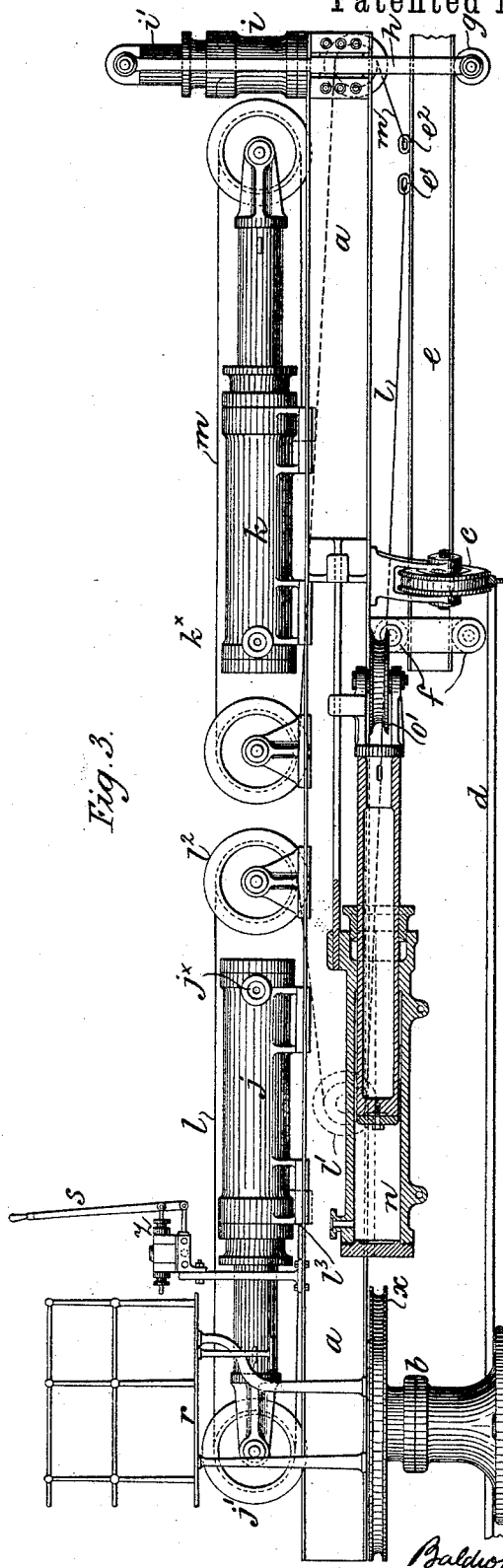
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5 Sheets—Sheet 2.

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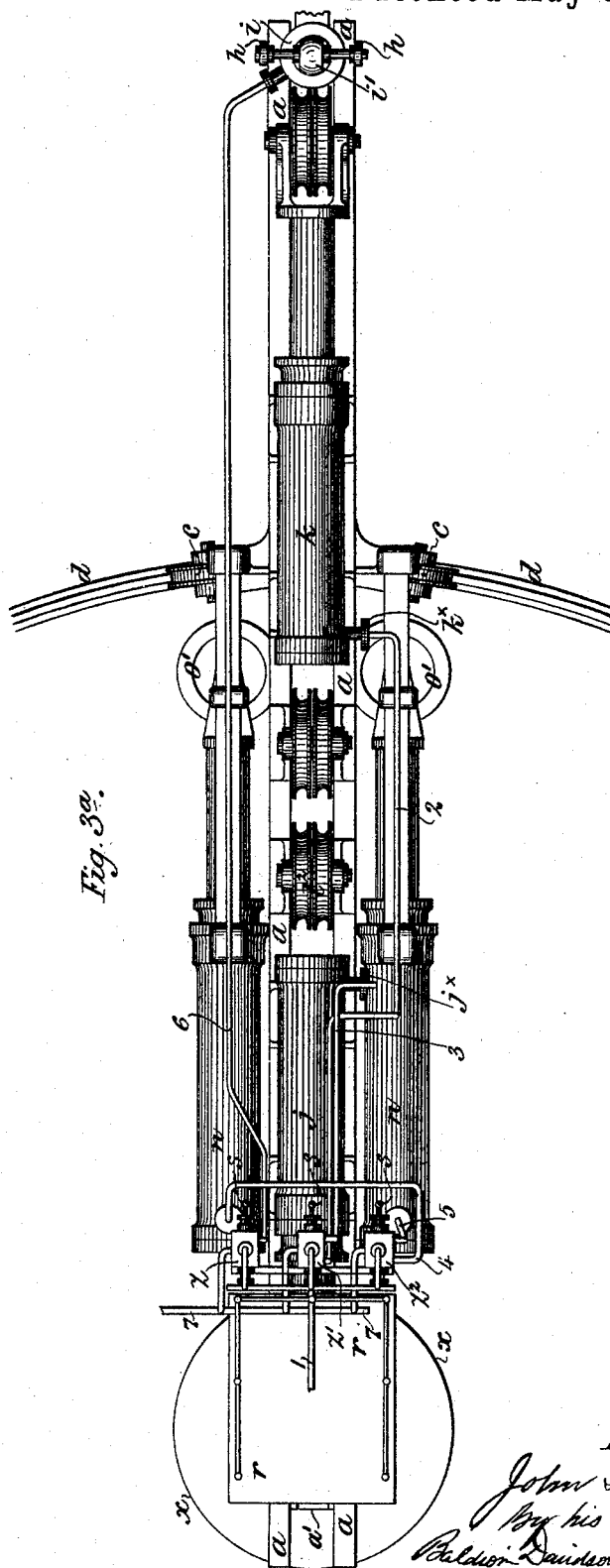
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(No Model.)

5 Sheets—Sheet 4.

J. H. ROGERS.
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Fig. 4.

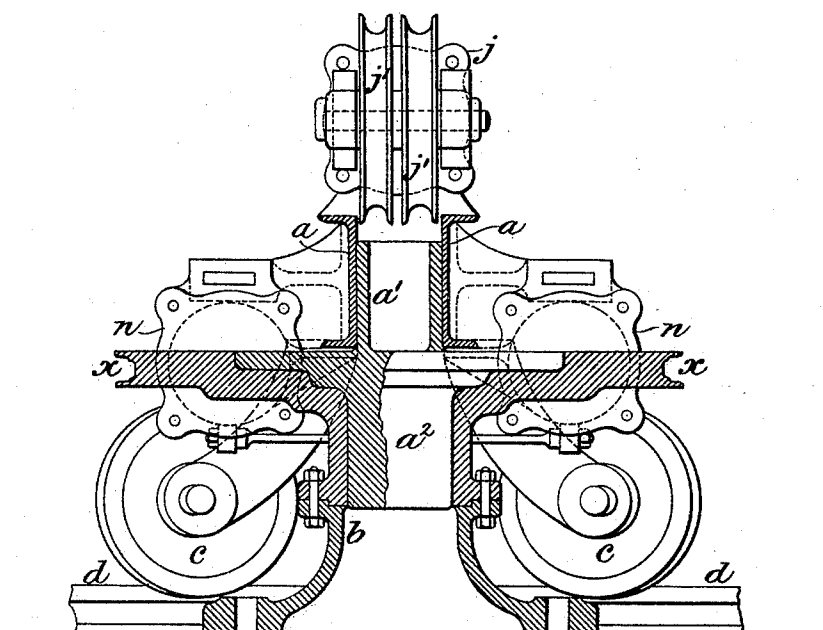
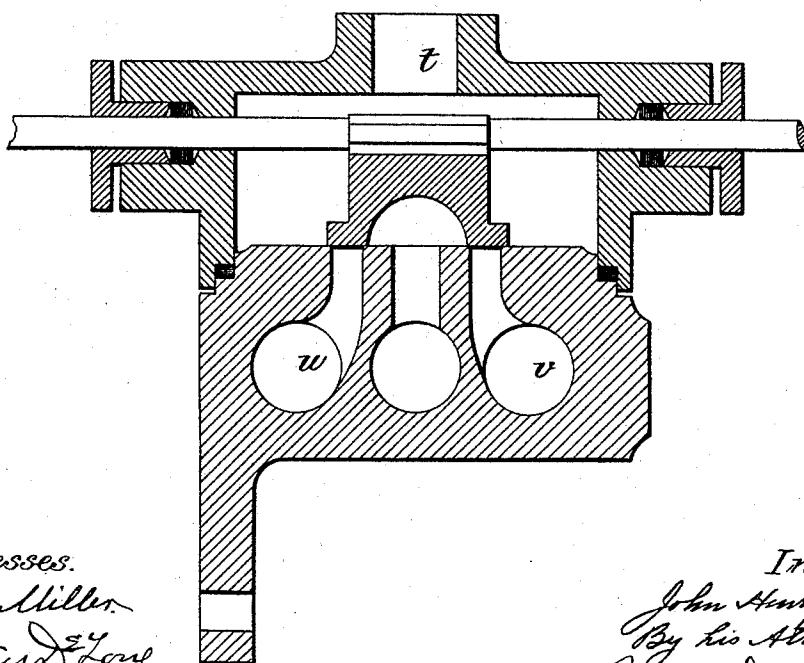


Fig. 7.



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(No Model.)

5 Sheets—Sheet 5.

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Fig. 5.

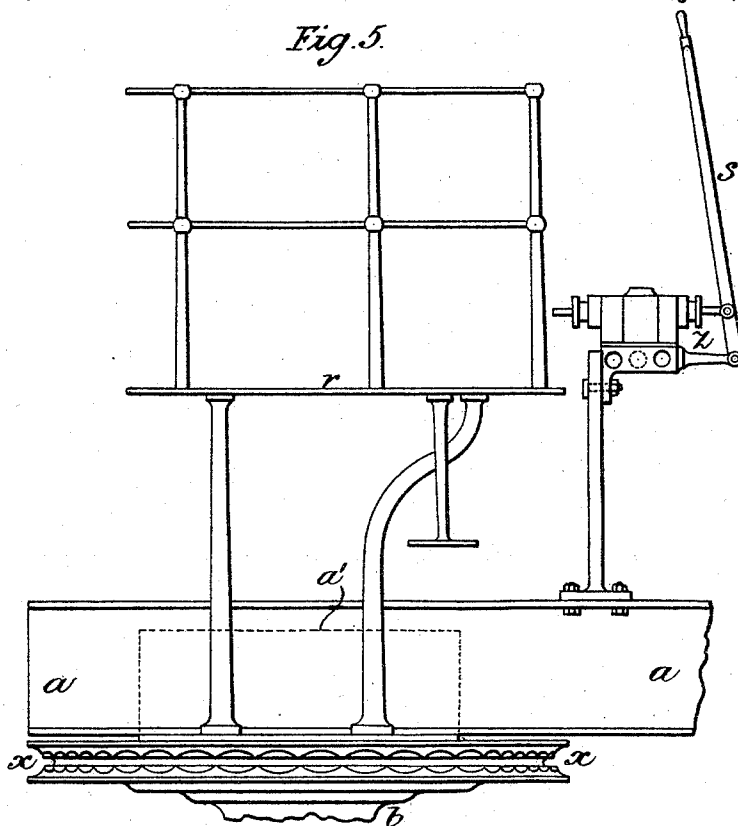
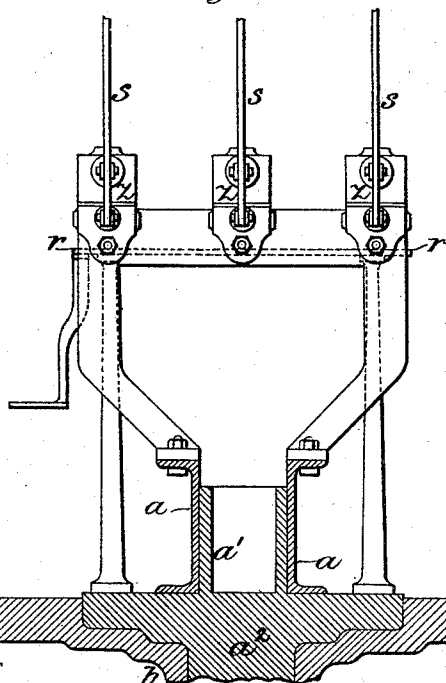


Fig. 6.



Witnesses

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Inventor:

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UNITED STATES PATENT OFFICE.

JOHN HENRY ROGERS, OF GLYNCOED, ENGLAND.

HYDRAULIC CRANE.

SPECIFICATION forming part of Letters Patent No. 497,216, dated May 9, 1893.

Application filed August 11, 1891. Serial No. 402,377. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY ROGERS, tin-plate manufacturer, a subject of the Queen of Great Britain, residing at Glyncoed, Llanelli, England, have invented certain new and useful Improvements in Hydraulic Cranes, of which the following is a specification.

The object of my invention is mainly to expedite the placing of pots filled with plates that are to be annealed into or the taking them out of annealing furnaces. The annealing furnaces used are arranged in the arc of a circle and formed with openings on their inner sides through which they can be filled and emptied. At the center of the circle I place the crane. The crane I form with a horizontal radial arm which can be swiveled around a central post to bring its outer end to any point in the circle. The arm carries parallel with it a bar which can be run outward or inward on roller supports away from or toward the crane post. The bar is moved to and fro by chains attached to it and led, one over a guide pulley at the outer end of the arm and the other over a guide pulley near the inner end of the arm. Hydraulic cylinders carried by the arm and rams are used for giving movement to the chains. The roller which supports the outer end of the bar can also be raised and lowered by the ram of another hydraulic cylinder carried by the arm so as to raise or lower the outer end of the bar. For turning the arm around the post a chain wheel is fixed concentrically to the post, a chain is passed around half the circumference of the wheel and the rams of hydraulic cylinders are used to pull at either one or other of the ends of the chain which pass from opposite sides of the chain wheel so as to turn the arm in either direction desired.

Figure 1 of the drawings annexed is a side elevation and Fig. 2 a plan of the crane. Fig. 3 is a side elevation partly in section of part of the same on a larger scale. Fig. 3^a is a plan view of Fig. 3, with some parts removed but showing the pipe connections between the valves and cylinders. Fig. 4 is an end view partly in section on a still larger scale and with some of the parts removed. Fig. 5 is a side elevation of part of the post and crane arm showing the position of the valves for controlling the admission of water to and its escape from the hydraulic cylinders and

also the platform on which a man stands to work the valves. Fig. 6 is an end view partly in section of the parts shown in Fig. 5. Fig. 7 is a longitudinal section of one of the crane valves.

a is the horizontal crane arm formed of two parallel iron girders. These at one end are secured to opposite sides of a block *a'* which has a descending pivot *a²* on its under side. This pivot fits into a corresponding socket in the top of the post *b*. The other end of the arm is supported on rollers *c* which run upon a rail *d* that is concentric with the post.

e is a bar carried below the arm *a* and parallel with it. The end of the bar *e* which is toward the post is supported between rollers *f* which are carried by the arm. The outer end of the bar *e* is supported on a roller *g* carried by links *h* which are attached to the ram *i* of a hydraulic cylinder *i*. This cylinder is secured to the outer end of the arm *a*.

Mounted upon the top of the arm are also two horizontal hydraulic cylinders *j k*. One of these *k* is for running the bar *e* outward away from the post and the other *j* for running the bar inward toward the post. The bar *e* has fixed to it two eyes *e' e²*. From *e'* a chain *l* is led around a guide pulley *l'* then around a guide pulley *l²* around a pulley *j'* on the ram of the hydraulic cylinder *j* then around another guide pulley *l²* and another pulley *j'* on the ram and then attached to the arm *a* say at *l³*. When the ram is thrust outward from the cylinder the bar *e* will therefore be drawn inward toward the post. A chain *m* attached to the eye *e²* and similarly led around guide pulleys and pulleys on the ram of the hydraulic cylinder *k* serves to move the bar *e* outward away from the post *b* whenever the ram is thrust outward from the cylinder. Upon the arm *a* are also two horizontal hydraulic cylinders *n n*. A chain *o* attached at each end at *a^x a^x* to the arm *a* is led around a pulley *o'* on the ram of each cylinder and then around half the circumference of a chain wheel *x* which is fixed to the post *b*. In this way when the ram of one cylinder is moved outward and the other inward the arm will be turned in one direction around the post and with the reverse movement the arm will be turned around the post in the opposite

direction. The outer end of the bar *e* is cranked downward as shown so that its lower end may be passed below a pot to lift it. The outer end is also forked.

5 *p* is a light jib at the end of the arm *e*. The jib has a socket at its lower end which fits onto the prongs at the end of the arm so that it can readily be removed when pots are to be charged or drawn. A Weston pulley
10 block and lifting chain can be hung onto the jib for lifting the boxes off the pots. The boxes while hanging on the chain can be transferred to any desired position or at once placed over plates about to be annealed.

15 Above the rear end of the arm *a* is supported a platform *r* on which stands the man who is to work the valve mechanism *z* used for controlling the admission of water to or its escape from the various cylinders. In
20 front of this platform are three levers *S* see Figs. 6 and 3^a one for working a valve *z'* for admitting water to either one or other of the cylinders *j k*, a second one *z''*, for working a valve for admitting water to either one or
25 other of the cylinders *n n* and allowing it to escape from the other and a third *z* for admitting water to or allowing it to escape from the cylinder *i*. The valves used are ordinary slide valves, and are all alike. One of them is
30 shown in Fig. 7. Water under pressure is supplied continuously through the supply pipe 1, see Fig. 3^a to the inlet passage *t* of each valve box.

When the valve is in its central position it
35 covers both of the outer ports *u v*. From the port *u* of the valve *z'*, a pipe *z* is led to an inlet *k^x* at the end of the cylinder *k* and from the port *v* a pipe 3 is led to an inlet *j^x* at the end of the cylinder *j*. From the port *u* of the
40 valve *z''*, a pipe 4 is led to the rear end of one cylinder *u* and from the port *v* a pipe 5 is led to the rear end of the other cylinder *n*. From the port *v* of the valve *z* a pipe 6 is led to the lower end of the cylinder *i*. The port *u* of
45 this valve is closed by a plug. An exhaust or waste pipe 7 is led away from the central port of each valve. By shifting any one or other of the valves endwise by one or other of the levers *s*, one of the ports *u v* of that
50 valve will be opened for water under pressure to pass through it while the other will be opened to the exhaust.

To take a box out of any one or other of the furnaces the crane arm is brought into a
55 line with the box. The bar at the outer end of the arm is then run forward and its extremity passed below the stand of the box. The outer end of the bar is then caused to rise and to lift the stand and box off from the
60 ground. The bar is then run back so that it will clear the inner wall of the furnaces and then the crane arm can be turned and

made to deposit the stand and box on any desired spot. In a similar manner the crane can be used for depositing boxes into any one 65 or other of the furnaces.

Cranes constructed in the above manner can also be used for inserting ingots into and withdrawing them from heating furnaces.

What I claim is—

70 1. The combination of the horizontal arm *a*, the pedestal *b*, to which the arm is attached and around which it turns, the extension bar *e* supported by the arm *a*, the chains *l* and *m*, hydraulic cylinders and rams *j* and *k* for pulling
75 on the chains, and a valve, for admitting water to one cylinder at the same time that it allows it to escape from the other.

2. The combination of the horizontal arm *a*, the pedestal *b*, to which the arm is attached 80 and around which it turns, the extension bar *e* mounted in hangers depending from the arm *a*, the hydraulic cylinders and rams *j* and *k* placed end to end for operating the chains, and a valve for admitting water to
85 one cylinder at the same time that it allows it to escape from the other.

3. The combination of the horizontal arm *a*, the pedestal *b* to which it is attached and around which it turns, the extension bar *e* 90 supported by the arm *a*, chains *l* and *m*, hydraulic cylinders and rams *j* and *k* placed end to end, a valve for admitting water to one cylinder at the same time that it allows it to escape from the other, the horizontal chain wheel
95 *x* fixed to the pedestal *b*, the chain *o*, passing around the wheel, two hydraulic cylinders and rams *n*, one to pull the chain on one side of the chain wheel, and the other, on the other side, and a valve for admitting water
100 under pressure to one cylinder at the same time that it allows it to escape from the other.

4. The combination of the horizontal arm *a*, the pedestal *b*, the extension bar *e*, chains *l* and *m*, hydraulic cylinders and rams *j* and *k*, 105 a valve for admitting water to one cylinder at the same time that it allows it to escape from the other, the horizontal chain wheel *x* fixed to the pedestal, the chain *o* passing around the wheel, two hydraulic cylinders
110 and rams *n*, one to pull the chain on one side of the chain wheel, and the other on the other side, a valve for admitting water under pressure to one cylinder at the same time that it allows it to escape from the other, and a hydraulic cylinder and ram *i* for supporting
115 the forward end of the bar *e*.

JOHN HENRY ROGERS.

Witnesses:

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E. FRANKLYN DAVIES,

Clerks to W. Howell, Solicitor and Notary Public, Llanellty.