R. CRAIG.

PORTABLE CRANE.

APPLICATION FILED FEB. 8, 1919.

1,380,779.

Patented June 7, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

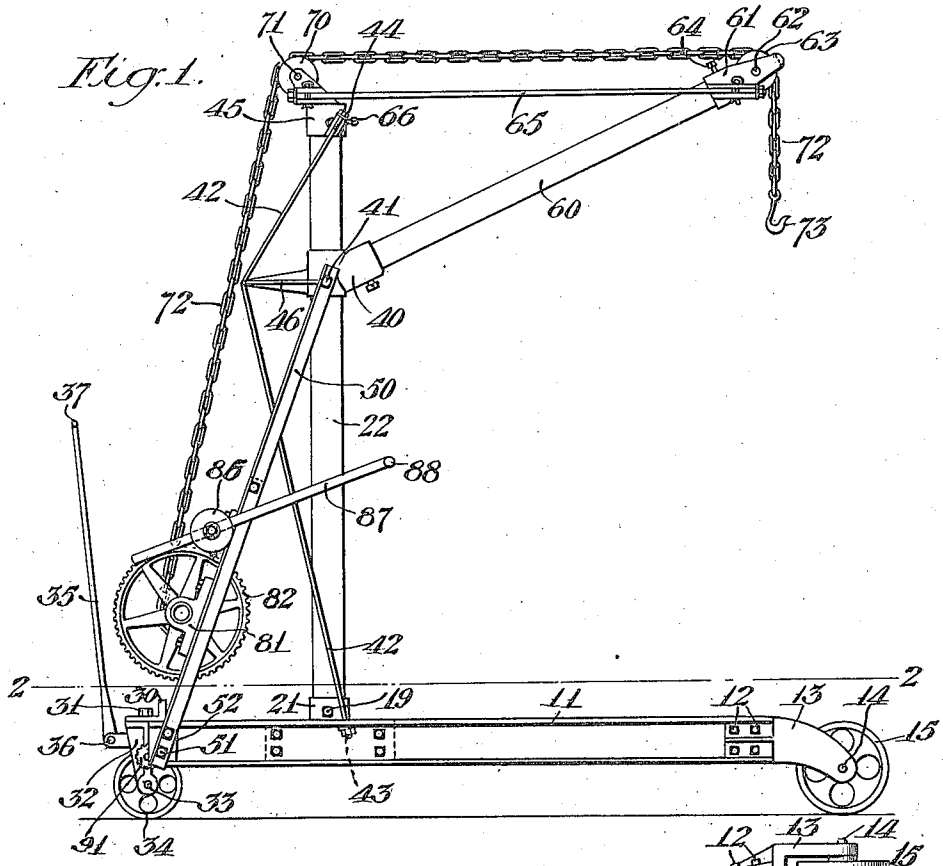
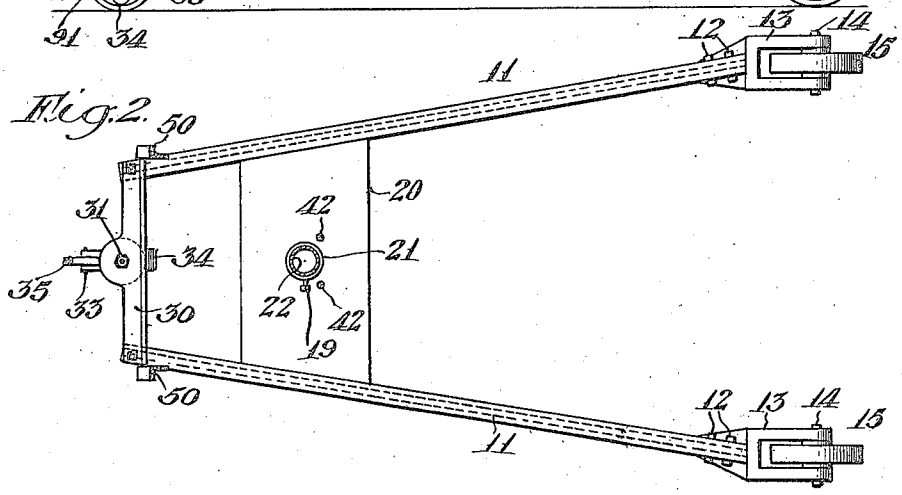


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

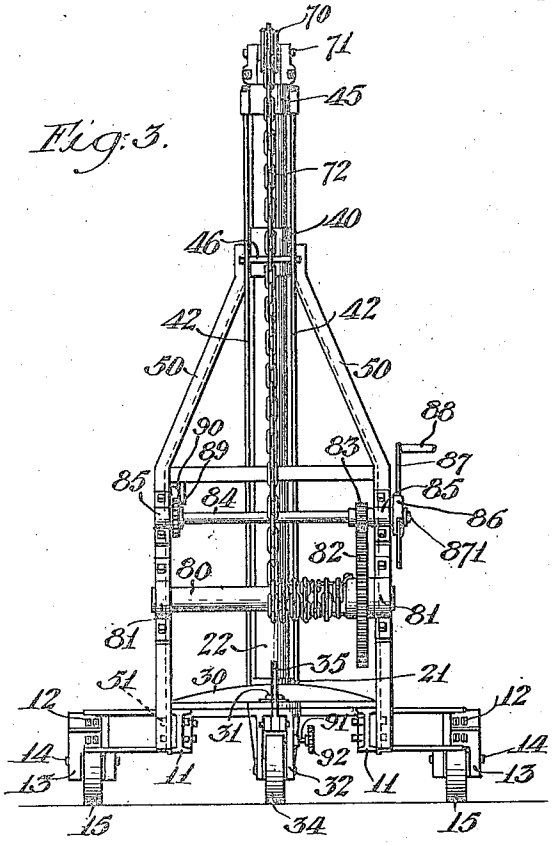


Fig. 4.

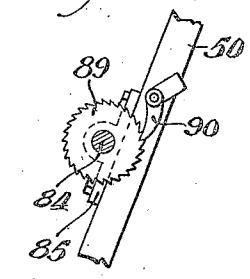


Fig. 6.

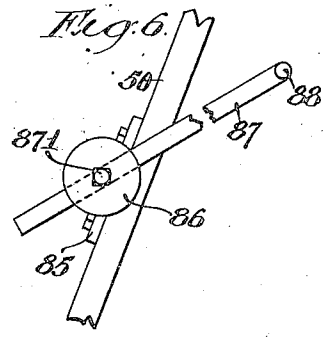
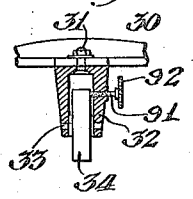


Fig. 5.



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UNITED STATES PATENT OFFICE.

ROBERT CRAIG, OF BERKELEY, CALIFORNIA.

PORTABLE CRANE.

1,380,779. Specification of Letters Patent. Patented June 7, 1921.

Application filed February 8, 1919. Serial No. 275,906.

To all whom it may concern:

Be it known that I, ROBERT CRAIG, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented a new and useful Portable Crane, of which the following is a specification.

My invention relates to a certain well known form of portable crane which is used principally in machine shops, garages and automobile repair shops, being mounted on wheels so that it can be readily transported from place to place.

The object of my invention is to provide such a crane in which standard structural steel forms or rods are used as tension members and in which cast iron parts are used in compression, this combination producing a very strong construction at a low cost.

A further object of the invention is to provide a portable crane which will be comparatively light in weight and which will have a very long over hang.

A still further and important object of the invention is to provide a crane which is so constructed that certain of the structural steel members will deflect noticeably long before any of the parts approach their breaking stresses, thus providing a crane having some elasticity so that the danger of total failure under load is very remote.

Other objects and advantages will be evident hereinafter.

Referring to the drawings, which are for illustrative purposes only,

Figure 1 is a side elevation of one form of my invention.

Fig. 2 is a section on a plane represented by the line 2—2 of Fig. 1.

Fig. 3 is an end elevation.

Fig. 4 is a side elevation on an enlarged scale showing the ratchet and pawl mechanism.

Fig. 5 is a section through the locking screw on the front wheel.

Fig. 6 is an elevation on an enlarged scale showing the method of securing the crank bar.

In the form of my invention illustrated in these figures, two structural base members 11 are provided, these members being preferably of I beam form as shown. Secured by means of bolts 12 to the rear end of each of these members are rear axle castings 13 which carry rear axles 14 on each of which one of two rear wheels 15 is free to revolve. Secured between the members 11, intermediate of the ends thereof, is a table casting 20 which is provided with a socket 21 in which a mast 22 is seated. The mast 22 is preferably formed of steel pipe and is restrained from turning in the socket 21 by a set screw or bolt 19.

Secured to the front ends of the structural base members 11 is a front casting 30 in which a pivot pin 31 is secured. Turning about the pivot pin 31 and supporting the front casting 30 is a caster 32 which carries a front axle 33 on which a front wheel 34 is free to turn. A handle 35 is pivoted on a pin 36 carried in the caster 32, the handle being provided with a cross bar 37. The handle 35 is used to drag the crane about from place to place on the wheels 15 and 34 and is also used to turn the front wheel 15 into any desired position, the caster 32 turning about the pivot pin 31.

Secured about the mast 22 is a boom casting 40, this casting being held in place against any up or down movement on the mast 22 partly by means of a bolt 41 and partly by two truss rods 42 which are secured at the bottom in the table 20 by means of nuts 43 and which are secured at the top by means of nuts 44 in an open slot in a cap 45 which is seated on the top of the mast 22. A projection 46 forming a part of the casting 40 extends outwardly at right angles to the mast 22, being forked to receive the truss rods 42 which are bent as shown, the mast 22, the projection 46 and the truss rods 42 forming a truss especially suited to take a load exerted on the casting 40 as will hereinafter be evident. Secured to the bolt 41 on each side of the casting 40 is one of two angle iron braces 50, each of these angle iron braces being secured by means of bolts 51 to filler pieces 52 secured to the outside of the members 11.

Socketed in the casting 40 is a boom 60 which carries at its outer end a rear sheave casting 61 which carries a pin 62 on which a rear sheave 63 turns. The casting 61 is prevented from turning on the boom 60 by means of a set screw 64. The casting 61 is slotted to receive the rear end of two tension rods 65, the other ends of which are seated in open slots in the side of the cap 45. The cap 45 is prevented from turning by means of a set screw 66. A front sheave pin 71 is secured in the cap 45 and a front sheave 70 turns freely thereon. A chain

or cable 72 provided with a hook 73 passes over the rear sheave 63 and the front sheave 70, passing downwardly therefrom to a long drum 80, this drum being turned down to form journals at either end which turn freely in bearings 81 secured to the angle iron members 50.

The drum 80 is provided with a spur gear 82, the chain or cable 70 being fastened to this gear at or near the hub thereof. The gear 82 meshes with a pinion 83 carried on a pinion shaft 84 which turns in bearings 85 carried on the members 50. A crank hub 86 is secured to the extreme end of the shaft 84 outside one of the bearings 85. The hub 86 has an opening formed therein in which a crank bar 87 is free to slide radially, this crank bar being locked in any position by a set screw 871. A crank handle 88 is secured to the end of the bar 87.

Located on the shaft 84 between the bearings 85 is a ratchet wheel 89 which is engaged by a pawl 90 for the purpose of holding the load at any point. For the purpose of locking the front wheel 34 a screw 91 is provided, this screw having a star wheel 92 at its outer end and being threaded in the caster 32. The purpose of the star wheel is to allow the screw 92 to be set up by the foot of the operator.

The method of operation of the invention is as follows:

The screw 91 being out of engagement with the wheel 34 the crane may be hauled about from place to place by means of the handle 35, the front wheel being turned in any direction by that handle. The crane may be backed up to the work wherever it may be, the wheels 15 passing at each side of the work if it is resting on the floor or passing under the work if it is raised from the floor as is the case where parts are to be removed from an automobile or where the load is to be lifted from a lathe or planer bed or the like. The hook 73 is hooked to the load to be lifted and the drum 80 is rotated by means of the handle 88, the pinion 83 and the gear 82 and their associated parts. The load can be held at any point by dropping the pawl 90 into engagement with the ratchet wheel 89.

After the load is raised and supported by the crane it can be transported from place to place by pulling the load and crane by the handle 35. If it is desired to hold the load at any point the crane can be locked by a suitable manipulation of the star wheel 92. The bar 87 can be moved along a radius through the hub 86 and locked in any place therein by means of the set screw 871 so that the effective radius of the handle 88 can be varied to suit the work to be lifted. If the load is small the handle 88 is set in close to the axis of the shaft 84 and relatively rapid lifting can be accomplished. If, on the other hand, it is desired to lift heavy loads the handle 88 is put at its extreme advance from the axis of the shaft 84, thus giving a long leverage.

By supporting the drum 80 on the braces 50 the winding mechanism is placed near the front end of the crane and it will be noted that the handle 88 does not pass into the space ahead of the mast 22 except when the handle 88 is considerably extended. It is thus possible to run the mast 22 close up against the bed of a lathe or up against the radiator of an automobile and yet have considerable room in which to manipulate the handle 88.

It should be noted that all of the parts which are in tension or in flexion are formed of wrought iron or structural steel which has considerable elasticity and flexibility, bending or otherwise distorting under a load before actually breaking. The crane is so proportioned that the cast iron members which are wholly in compression have an excess of strength so that the tension and flexion members will deflect before an actual breakage takes place in the compression members. As a result of this form of construction the crane will bend before breaking thus giving warning of an overload. This is very important as it is often necessary for men to work under the suspended load on the crane, and these men are liable to be caught by the load if anything gives way suddenly.

It should also be noted that the mast 22 and the boom 60 are seated in sockets at either end and that they are forced into these sockets by the load so that it is not necessary to provide any particular fastening to hold them in place, the set screws which press against the mast 22 and boom 60 being provided merely to prevent rotation of the various parts.

What I claim is:—

1. In a portable crane, a base; a three wheel support therefor; a mast socketed to said base intermediate said points of support of said wheels on said base; a boom casting secured to said mast intermediate of the ends thereof; an oblique brace connecting said boom casting to the forward end of said base; a strut integral with and projecting from said boom casting in the direction of the forward end of said truck; a truss rod secured at either end to said mast and passing over the outer end of said strut; a boom having its forward end secured in said boom casting; and a tension rod secured at one end to the upper end of said mast and at the other end to the end of said boom.

2. In a portable crane, a base; a three wheel support therefor; a mast socketed to said base intermediate said points of support of said wheels on said base; a boom

casting secured to said mast intermediate of the ends thereof; an oblique brace connecting said boom casting to the forward end of said base; a winch carried on said brace; a strut integral with and projecting from said boom casting in the direction of the forward end of said truck; a truss rod secured at either end to said mast and passing over the outer end of said strut; a boom having its forward end secured in said boom casting; and a tension rod secured at one end to the upper end of said mast and at the other end to the end of said boom.

3. In a portable crane, a base; a three wheel support therefor; a mast socketed to said base intermediate said points of support of said wheels on said base; a boom casting secured to said mast intermediate of the ends thereof; an oblique tension brace connecting said boom casting to the forward end of said base; a strut integral with and projecting from said boom casting in the direction of the forward end of said truck; a truss rod secured at either end to said mast and passing over the outer end of said strut; a boom having its forward end secured in said boom casting; and a tension rod secured at one end to the upper end of said mast and at the other end to the end of said boom.

4. In a portable crane, a base; a three wheel support therefor; a mast socketed to said base intermediate said points of support of said wheels on said base; a boom casting secured to said mast intermediate of the ends thereof; an oblique tension brace connecting said boom casting to the forward end of said base; a winch carried on said brace; a strut integral with and projecting from said boom casting in the direction of the forward end of said truck; a truss rod secured at either end to said mast and passing over the outer end of said strut; a boom having its forward end secured in said boom casting; and a tension rod secured at one end to the upper end of said mast and at the other end to the end of said boom.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 31st day of January, 1919.

ROBERT CRAIG.