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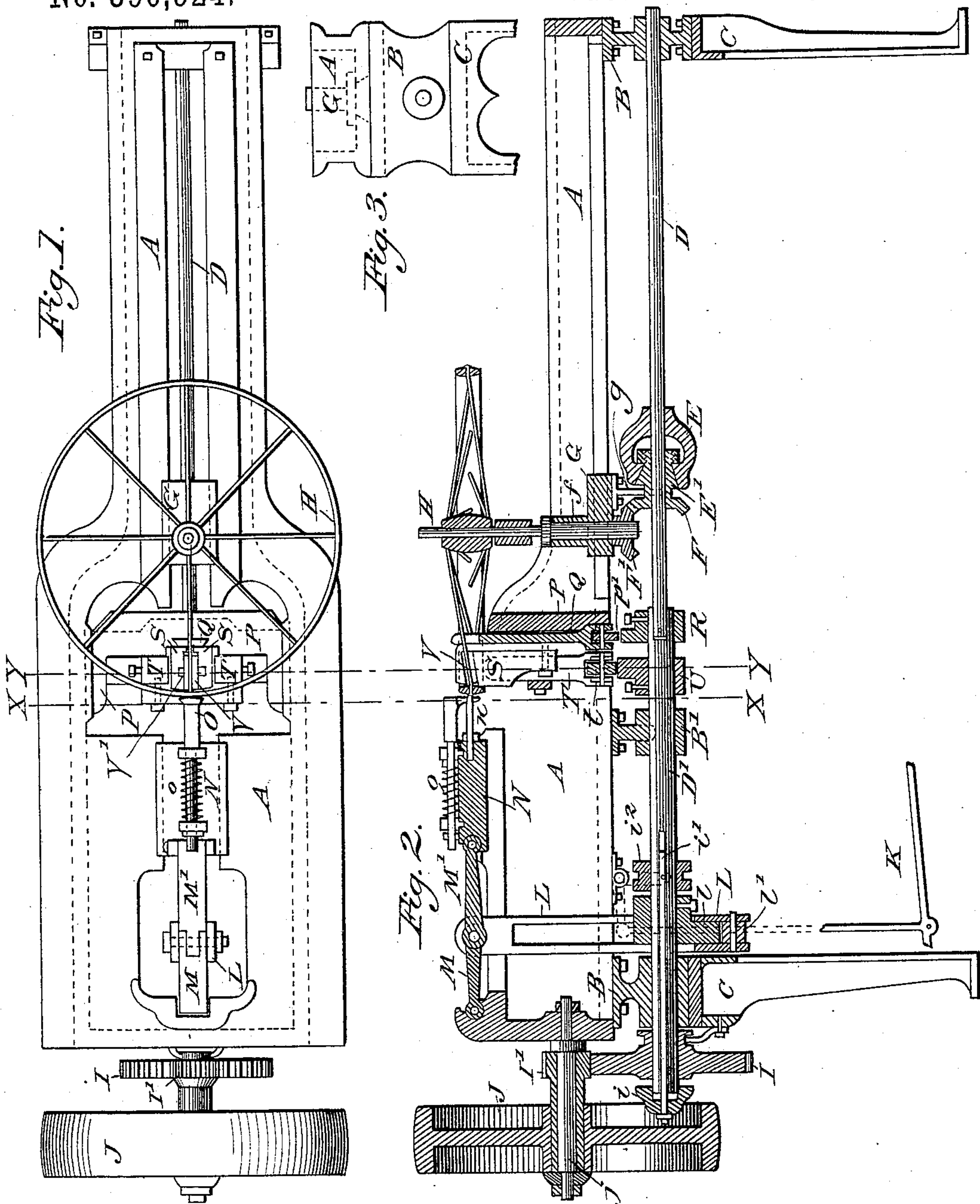
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D. WARNER.

WHEEL RIVETING MACHINE.

No. 390,924.

Patented Oct. 9, 1888.



Witnesses:

Thomas Russell.

Elmer Ross.

Inventor:

Daniel Warner,

By J. W. Clouse.

Att'y.

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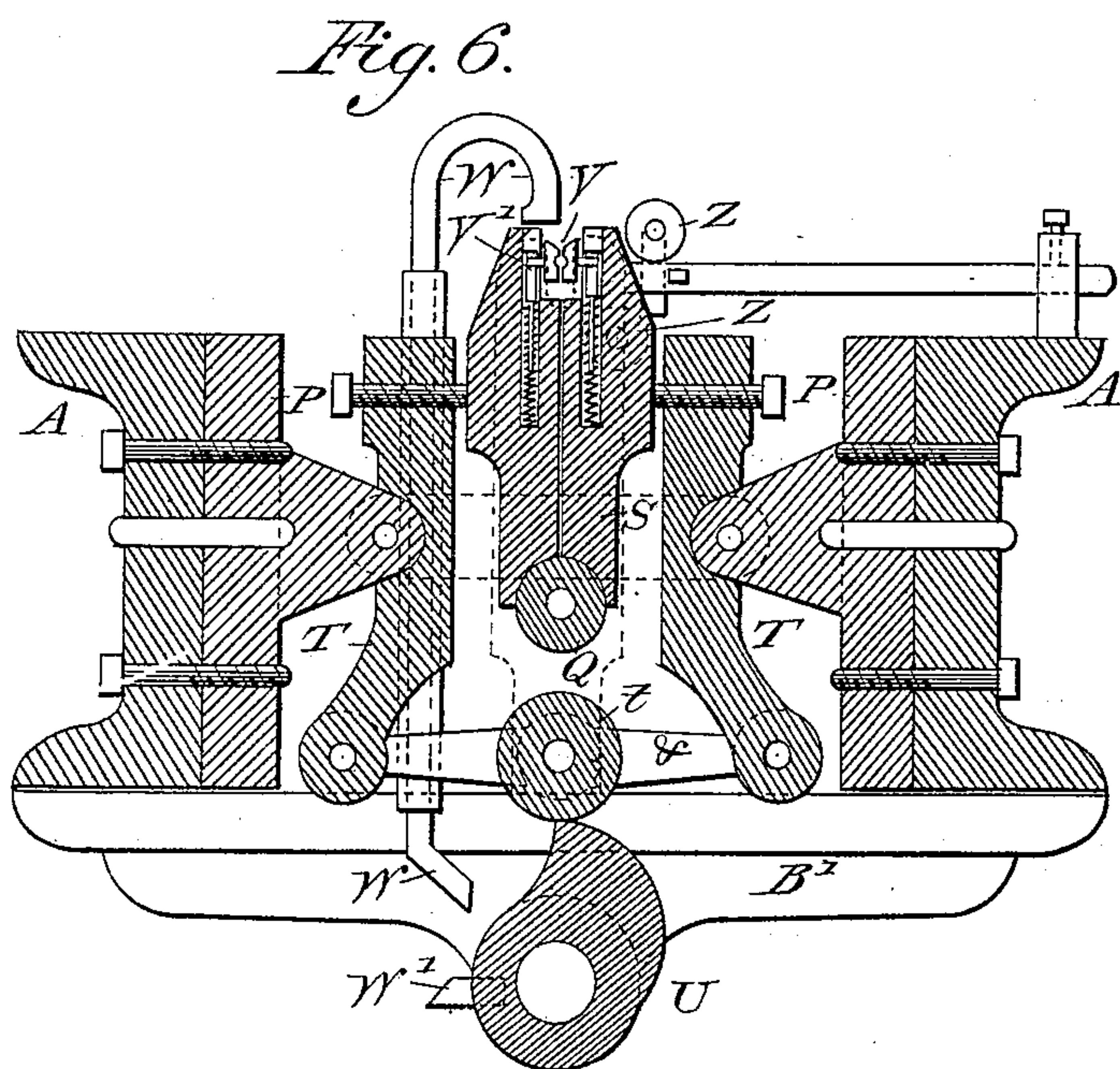
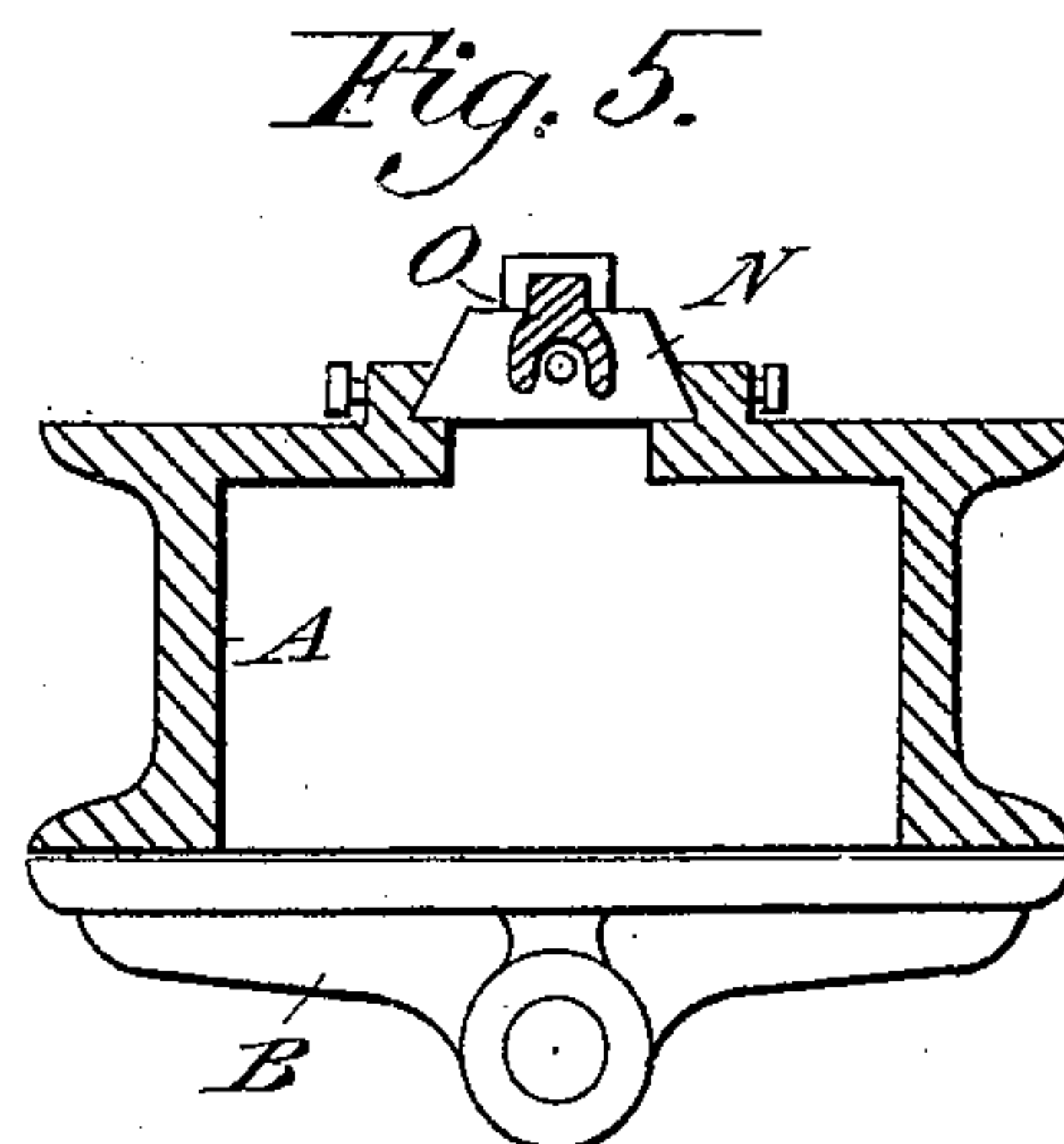
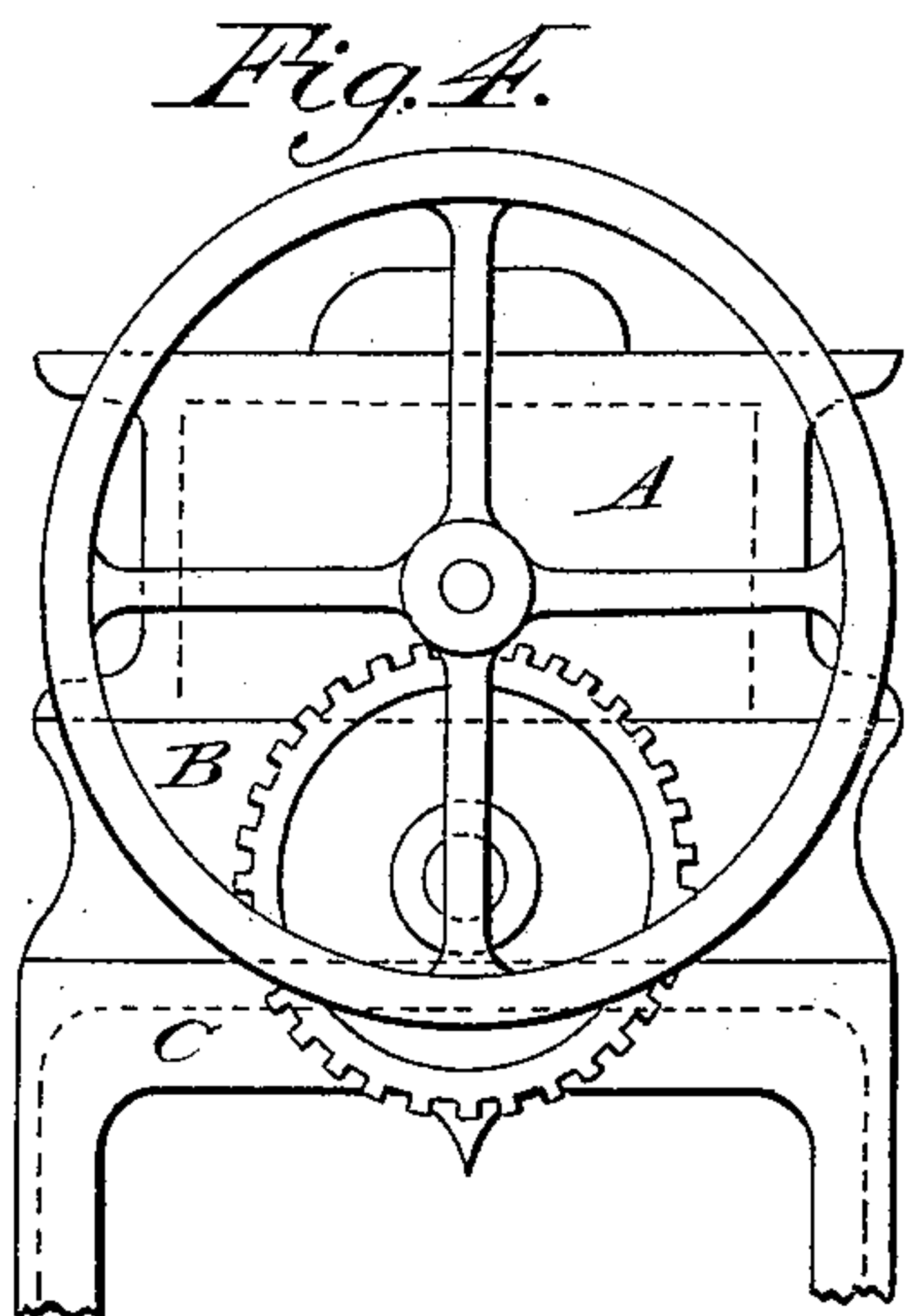
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Atty.

UNITED STATES PATENT OFFICE.

DANIEL WARNER, OF TOLEDO, OHIO, ASSIGNOR TO GEORGE W. HEARTLEY,
OF SAME PLACE.

WHEEL-RIVETING MACHINE.

SPECIFICATION forming part of Letters Patent No. 390,924, dated October 9, 1888.

Application filed October 29, 1887. Serial No. 253,799. (No model.)

To all whom it may concern:

Be it known that I, DANIEL WARNER, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have
5 invented new and useful Improvements in Wheel-Riveting Machines, of which the following is a specification.

My invention relates to that class of wheel-riveting machines called "automatic" machines, and is particularly adapted to wheels made of steel or iron, with steel or iron wire spokes drawn to a tension and riveted in the rim, and to that class of wheels known as "suspension" wheels, in which the hub is suspended in the rim by wire spokes strained up tight and riveted in the rim; and the objects of my improvements are to provide a machine that will retain the hub central to the rim, retain the rim laterally straight and central to
15 hub, give the proper tension to each spoke and rivet it in the rim, performing the operation of grasping, riveting, and releasing each spoke in succession until the whole wheel is riveted, the operator having only to put the
25 wheel in the machine properly and set it in motion and stop it and take out the wheel when done, the machine also being made adjustable in its various parts to suit any desired size of wheel or any thickness of wire in the
30 spokes. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top or plan view of the machine. Fig. 2 is a longitudinal vertical section cut on the center of the machine. Fig. 3 is a rear end view with the leg portions broken off. Fig. 4 is a view of the head end of the machine with the leg portions broken off. Fig. 5 is a cross-section through the machine on the line X X, Figs. 1 and 2. Fig. 6 is an enlarged cross-section through the machine on the line Y Y, Figs. 1 and 2.

In all the views like letters refer to like parts.

45 The bed-frame A is irregular and peculiar in its shape and construction to receive the other parts of the machine. This frame A is supported on cross-girths or pillow-blocks B B, which are secured to legs C C. Between these
50 girths B B is suspended a hanger-girth, B'. A line-shaft consisting of a smaller section, D,

and a larger section, D', is coupled together and provided with bearings in the three cross-girths B B B'. This shaft is provided at its larger outer end with a gear driver-wheel, I, 55 which turns loosely on the shaft, and is held to its work by a clutch-coupling, i, on a feather in the shaft D', and a rod, i', and sleeve i'', which are operated by a crank-arm, connecting-rod, and a treadle, K, suitably arranged for
60 convenience. The gear I is driven by a pinion, I', attached by a sleeve to a balance-pulley, J, which revolves on a stud, j.

To the shaft D' is secured an eccentric, l, which acts upon a roller, l', in the bottom of a cage-connection, L, which is attached to and operates two jointed arms, M M', one of which arms, M', is connected to a sliding cross-head, N, which carries an adjustable punch, n, and a pressure-foot, O, arranged with a coiled
70 spring to increase and decrease its pressure, as desired.

At the rear of the machine the smaller section, D, of the line-shaft is provided with a seat or feather nearly the whole length of it. 75

E is an internal friction-cone, which matches the external friction-cone, E'. The internal cone, E, revolves with the shaft D by a key in the seat in the shaft, which also allows it to be shifted to any point on the shaft D. The
80 external cone, E', is attached to a miter gear-wheel, F, and turns loose with it on the shaft.

A sliding head or block, G, is provided with ways or slides on the inside of the bed-frame A. This head G is arranged with an upwardly-
85 extending hub, through which a vertical shaft or post, f, extends, and is supported upon a collar on the same. The upper end of this shaft forms a spindle with an adjustable support, upon which the wheel H is placed to be
90 riveted. The lower end has secured to it a miter gear-wheel, F', which matches the miter gear-wheel F, the two being held in gear by a yoke, g, on the head block G, working in a groove between the external friction cone, E',
95 and the miter gear-wheel F. By this means this whole combination of parts that holds the wheel to be riveted and turns it and allows it to be stopped at the riveting of each spoke is made to move together, so as to put in any
100 sized wheel to rivet it.

The automatic combination of parts which

performs the operation of stopping the wheel and grasping the spoke, holding it while it is being riveted and releasing it again to receive the next one, consists of a lifting cam or eccentric, R, secured on the shaft D', which acts on a roller, p', on the lifting-bar Q, to which the vise grip-jaws S S are pivoted. This lifting-bar Q slides in a dovetail groove in the cross-girth P, which is secured to the bed-frame A, and the top end of this lifting-bar is forked, so as to straddle the wire spoke of the wheel. A second cam or eccentric, U, which is also secured to the shaft D', acts on a roller, t, and lifts two jointed arms, & &. At their intersecting joint the outer ends of these arms are pivoted to the longer ends of two compression-arms, T T. These compression-arms are pivoted to projecting lugs on the cross-girth P, and the upper ends of these arms are provided with adjusting pressure-screws, which force together the grip-jaws S S. These grip-jaws are provided with loose jaws or dies V V, which are adapted to the size of the wire in the spoke of the wheel. They are pivoted also, so as to adapt themselves to the angle of the spoke as they alternate from one end of the hub of the wheel to the other.

The posts v', to which the dies V are pivoted, are supported on very sensitive coiled springs, which yield to the slightest pressure, which allows them to yield and conform to any variation or irregularity in the position of the spokes of a wheel.

In Fig. 6 the enlarged cross-section W is a stop which is raised by a stud, w', and drops down and stops the wheel in position for the grip-jaws to rise and grasp the spoke; also, Z Z are adjustable guide-rollers, between which the tire passes to hold it central on the riveting-punch and to make the wheel straight laterally.

All of these various operations or movements are performed to rivet a spoke while the line-shaft D' makes one revolution, each part being timed to work in its order.

Having described the parts of my machine and their working relation to each other, the manner of operating it is as follows: Place the wheel H on the stud and adjust the collar, so as to bring the center of the tire on center of the punch n, the grip being released and the grip-jaws dropped down. The operator places his foot on the treadle and starts the machine by the action of the clutch i, which is thrown into position with the clutch on the hub of the wheel I, which is running idle on the shaft D'. The friction-cones E and E' first bring a spoke of the wheel against the stop W. The cam R then raises the grip-jaws S S and the spoke takes its position in the dies V V. Then the cam U lifts the jointed arms & &, which operate the compression-arms T T and cause the jaws S S to grip the spoke. The cam l then brings down the two jointed arms M M' and causes the sliding cross-head N to move forward, which brings first the pressure-foot O against the tire and forces it up solid against

the grip-jaws S S, which give the spoke a tension, while the punch n follows with a dead heavy pressure and rivets the end of the spoke. The cam l then releases the pressure of the punch. Then the cam U releases the grip of the dies, and the cam R turns and allows the grip-jaws to drop and raises the stop W, and the friction-cones turn the wheel again until the next spoke strikes the stop W. Thus the operation is repeated until all of the spokes in the wheel are riveted. Then the operator removes his foot from the treadle K and the machine stops, and the wheel may be taken out and another put in and the operation repeated.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an automatic riveting-machine for wheels, a bed-frame, A, arranged with a head and foot, higher and lower section supported on cross-girths B B, and legs C C, and adapted to receive the other working parts, substantially as described and set forth.

2. In an automatic riveting-machine for wheels, a line-shaft, D D', with the cross-girths B, B, and B', and the clutch i, rod i', and sleeve i'', in combination with the gear-wheel I, pinion and sleeve I', balance-pulley J, and stud j, all substantially as described and specified.

3. In an automatic riveting-machine for wheels, a line-shaft, D, carrying a sliding internal conical friction-clutch, E, and an external friction-clutch, and gear E' and F, in combination with a gear, F', and post f, and yoke g, supported in a sliding head, G, and arranged to work substantially as described.

4. In an automatic riveting-machine for wheels, a line-shaft, D', with its cam l, roller l', and cage-connection L, in combination with the jointed arms M M', sliding cross-head N, and adjustable punch n, substantially as set forth and described.

5. In an automatic riveting-machine for wheels, a line-shaft, D', with its cam l, roller l', and cage-connection L, in combination with the jointed arms M M', sliding cross-head N, and adjustable pressure-foot O, substantially as set forth and described.

6. In an automatic riveting-machine for wheels, a line-shaft, D', with its cam R, in combination with the roller p', lifting-bar Q, grip-jaws S S, and cross-girth P, substantially as described and specified.

7. In an automatic riveting-machine for wheels, a line-shaft, D', with its cam U, in combination with the roller t, jointed arms & &, compression-arms T T, grip-jaws S S, and cross-girth P, all substantially as described and shown.

8. In an automatic riveting-machine for wheels, a lifting-bar, Q, and grip-jaws S S, in combination with the dies V V, posts V' V', and springs, all substantially as described and specified.

9. In an automatic riveting-machine for wheels, a stop, W, arranged in a sleeve in the compression-arm T, and operated by a stud,

w', on the cam U, substantially as shown and described.

10. In an automatic riveting-machine for wheels, the adjustable guide-rollers Z Z, arranged in connection with the bed-frame A or the cross-girth P, and the grip-jaws S S, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

DANIEL WARNER.

Witnesses:

T. B. TUCKER,

WILLIAM H. TUCKER.