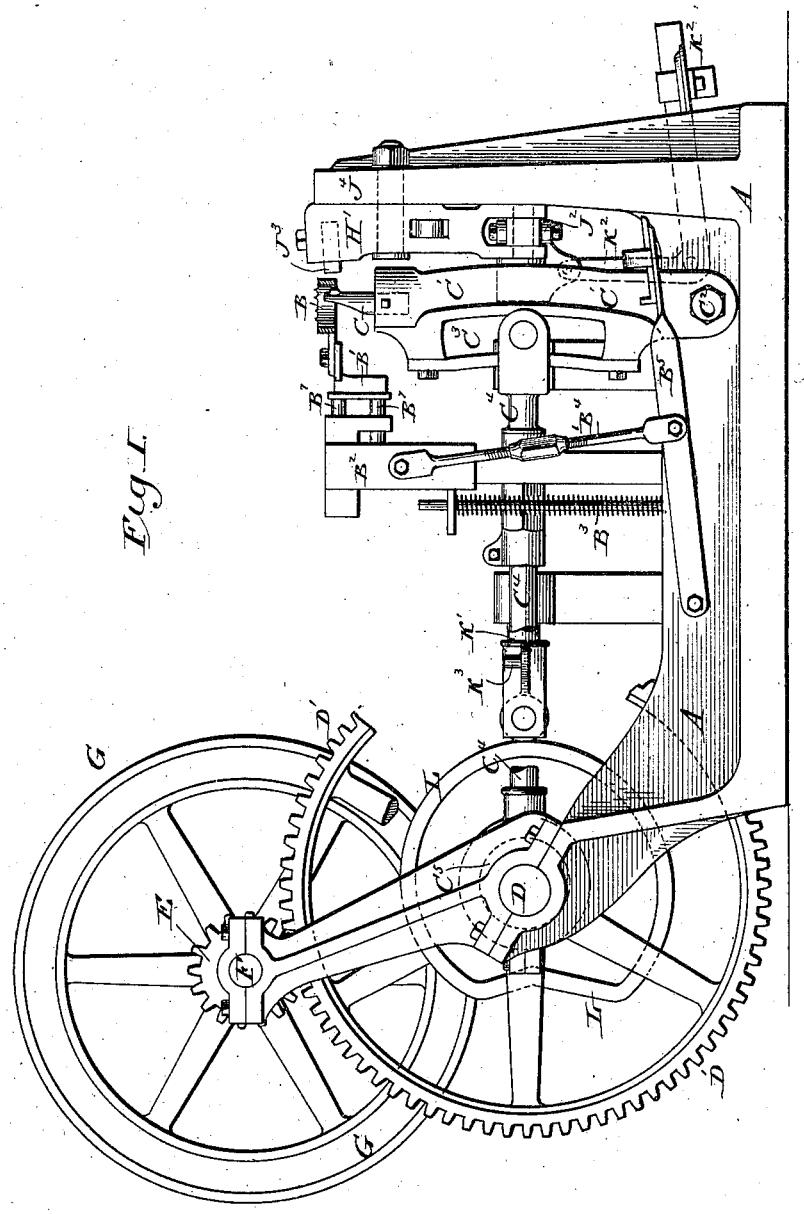
(No Model.) 3 Sheets—Sheet 1.

W. P. BETTENDORF.

MACHINE FOR SECURING SPOKES IN METAL WHEELS.

No. 384,604. Patented June 19, 1888.

Fig. 1.



Attest:

Sidney R. Hollingsworth.

W. R. Kennedy.

Inventor:

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By his Atty

Phil. T. Dodge.

(No Model.) 3 Sheets—Sheet 2.

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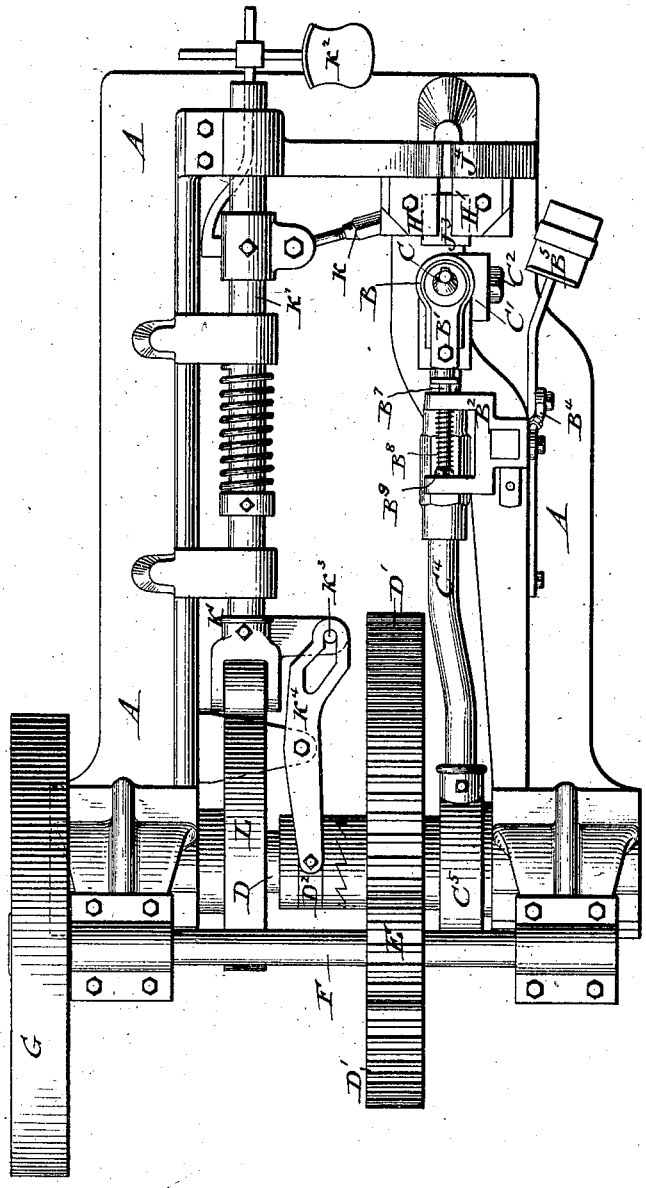
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

W. P. BETTENDORF.

MACHINE FOR SECURING SPOKES IN METAL WHEELS.

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Fig. 3.

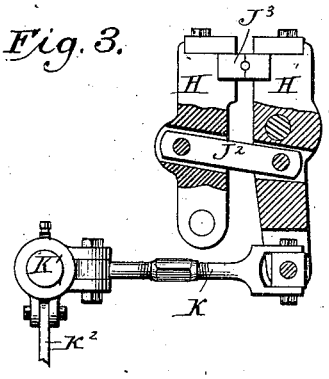


Fig. 4.

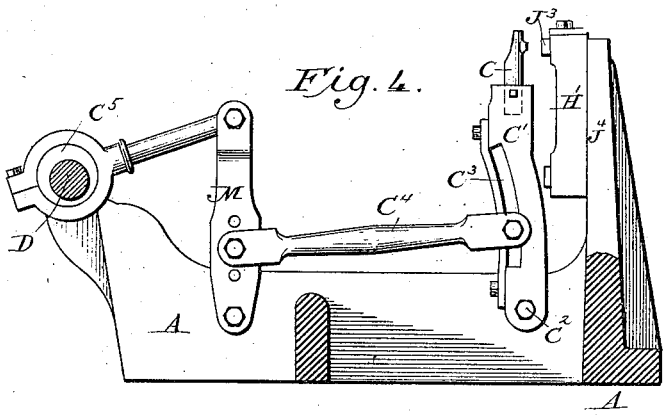


Fig. 5.

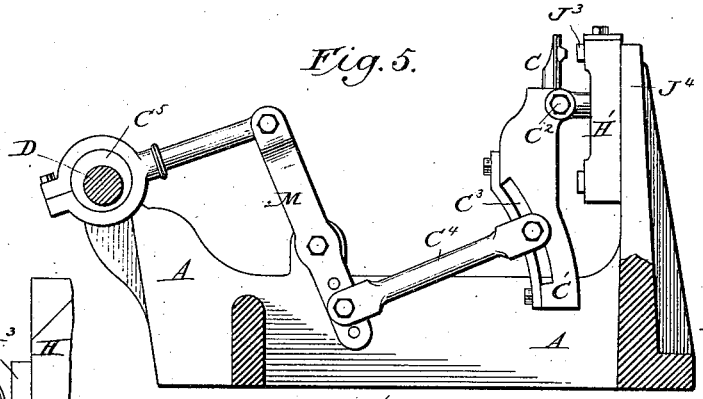


Fig. 7.

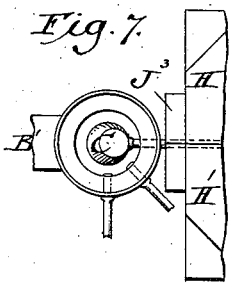


Fig. 8.

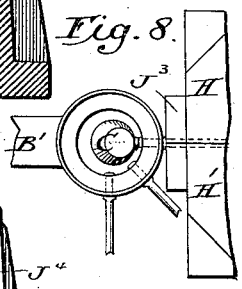
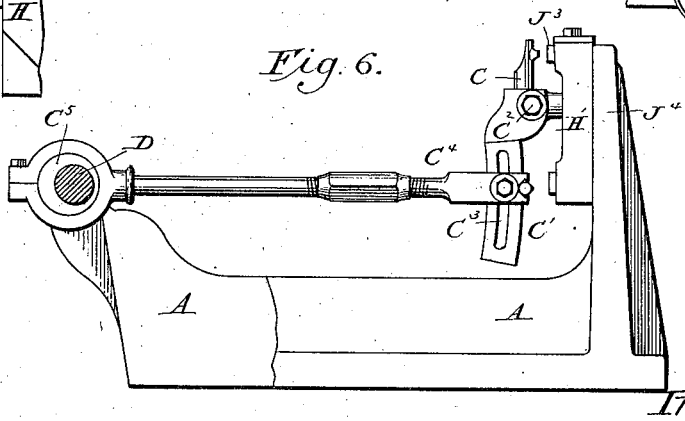


Fig. 6.



Attest

Sidney P. Hollingsworth

A. R. Kennedy.

Inventor:

W. P. Bettendorf.

By his Atty

Phil. T. Dodge.

UNITED STATES PATENT OFFICE.

WILLIAM P. BETTENDORF, OF DAVENPORT, IOWA.

MACHINE FOR SECURING SPOKES IN METAL WHEELS.

SPECIFICATION forming part of Letters Patent No. 384,604, dated June 19, 1888.

Application filed February 17, 1888. Serial No. 264,426. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. BETTENDORF, of Davenport, in the county of Scott and State of Iowa, have invented certain Improvements in Machines for Securing Spokes in Wheel-Hubs, of which the following is a specification.

There is now known in the art a class of metal wheels in which the spokes are secured by inserting their inner ends through mortises into the central opening of a hub, and then upsetting them to head their inner ends and also form collars or enlargements at the outer surface of the hub.

My machine is intended to perform this upsetting operation rapidly and with uniform results.

In the accompanying drawings, Figure 1 is a side elevation of the machine with a portion of the main gear-wheel and header-driving rod broken away to expose other parts to view. Fig. 2 is a top plan view of the same. Fig. 3 is an elevation of the spoke-clamping devices. Figs. 4, 5, and 6 are elevations showing modifications in the header-driving devices. Figs. 7 and 8 are detail views.

The machine embraces as its principal parts a device to sustain and adjust the hub, a vibratory header acting within the hub to enlarge the inner end of the spoke, and a clamp by which the spoke is grasped outside of the hub.

A represents a rigid main frame, which may be of any form adapted to sustain the operative parts.

B is an annular hub-support adjustably secured to a slide, B′, mounted on a guide, B^2. The slide is sustained by a lifting-spring, B^3, and connected by a pitman, B^4, to a foot-lever, B^5, by which it may be depressed at the will of the attendant in order to lower the support B and the hub therein in proper relation to the heading devices.

I connect the support B to the slide by horizontal sliding rods B^7, one of which is provided with a spring, B^8, urging it backward, and with a stop-nut, B^9, to limit said motion. This yielding sliding connection permits the hub-support and the hub to move forward under the influence of the heading device.

C is the heading-tool, rising within the hub-support and detachably secured to the upper end of the vibrating arm C′, connected at its lower end to the main frame by pivot C^2. The arm has an upright slotted portion or yoke, C^3, connected to the end of an operating-rod, C^4, the opposite end of which encircles an eccentric, C^5, on the main shaft D, mounted horizontally in fixed bearings on the main frame. Loose on the main shaft is a large gear-wheel, D′, which receives motion from a pinion, E, on a second shaft, F, also mounted in bearings on the frame and provided with a fly-wheel, G, to receive the driving-belt, or the belt may pass around a pulley on the shaft. A sliding clutch, D^2, splined to the shaft and provided with teeth to engage the hub of the wheel D′, imparts motion thereto and to the main shaft when demanded. The foregoing parts cause the heading-tool C to move to and fro horizontally within the hub and against the end of the spoke held by the clamps, now to be described.

The clamp consists, as shown in Figs. 1, 2, and 3, of two upright jaws or arms, H H′, mounted on horizontal pivots and connected by link J^2, so as to move to and from each other. At the upper ends they are provided with detachable face-plates J^3, grooved horizontally in their proximate faces to receive the spokes.

The clamp stands in suitable position to grasp each spoke outside of and at a slight distance from the hub, and they are seated, as shown in Fig. 1, against the inner face of an arm, J^4, rising rigidly from the main frame, so that they are firmly supported against the pressure exerted on the spoke by the heading-tool. The jaw H is jointed at its lower end to and receives motion from a pitman, K, jointed in turn to a collar carried by a rod, K′, sliding in guides on the main frame. The rod slides in a path at right angles to that of the jaws and is urged forward by an encircling spring, so that the pitman stands normally in an oblique position, holding the clamp open.

When the rod K′ moves rearward, it causes the pitman to approximate a position at right angles thereto, and in so doing to close the clamp. The rearward movement of the rod to close the jaws is initiated by an angular foot-lever, K^2, pivoted to the frame and jointed to the collar which carries the pitman, as shown in Fig. 3. The action is completed, however, and the jaws forcibly closed by a cam-wheel, L, fixed on the main shaft and acting on a roller in the end of rod K′. A pin, K^3, on the rod K′ enters an opening in the rear end of a lever, K^4, pivoted on the frame and connected with the driving-clutch D^2 to throw the same out of action. The opening has its forward side oblique to the axis of the rod K′, so that when the rod is moved by the foot-lever to close the spoke-clamp the pin actuates the lever and engages the clutch, thus bringing into action the cam to hold the clamp and also the eccentric to operate the header. The opening is of such size as to allow considerable play of the pin therein and at the rear side its edge is inclined laterally that it may actuate the lever and disengage the clutch at the proper time.

The action of the machine is as follows: The clutch being disengaged, the clamp open, and the hub-support and heading-tool retracted, the hub is seated in an upright position in the support B. A spoke is then inserted at one end through the hole or mortise in the hub until its extremity extends into the central opening. The foot-lever B^5 is then actuated to lower the support and the hub until the spoke enters the clamp outside of the hub and presents its inner end opposite the header C, as shown in Fig. 7. The foot-lever K^2 is then actuated, closing the clamp and bringing into play the clamp-confining cam and the header-operating eccentric. While the clamp holds the spoke immovably in place, the header advances, first upsetting and enlarging the end within the hub and then carrying the hub forward toward the outer end of the spoke, so that the metal is upset and enlarged between the outer surface of the hub and the inner face of the clamp, as shown in Fig. 8. At the completion of the operation the header is retracted by the eccentric; but before it moves any considerable distance the cam, which is made of irregular form, releases the rod K and permits the spring to open the clamp, thus releasing the spoke, so that the header may not, when used in a hub with a small axle-hole, pull the hub from the end of the spoke. At the proper time the cam allows the rod to retreat until its pin throws the driving-clutch out of action.

When the machine is required to operate on very heavy spokes, I recommend the adoption of devices such as shown in Figs. 4, 5, and 6 to operate the heading-tool, as they are better adapted than those before described to withstand heavy strains. In Fig. 4 the eccentric-rod is connected to one end of a lever, M, which is pivoted at its opposite extremity to the frame and jointed at an intermediate point to a rod, C^4, connected, as in the first construction, to the arm which carries the header. A series of pivot-holes in the lever M admit of the point of connection to the eccentric-rod being changed to vary the length of movement and the power applied to the header.

In Fig. 5 the lever M is fulcrumed near its middle, connected at its upper end to the eccentric-rod, and connected at its lower end by an adjustable pivot to the rod which operates the header-arm. In this instance the header-carrying arm is fulcrumed near the heading-tool.

In Fig. 6 the lever M is fulcrumed, as in the previous example, near the heading-tool, and is jointed at its lower end adjustably to the eccentric-rod. In each case the header-arm is slotted to admit of the operating-arm being adjusted, in order to change the length of movement of the heading-tool. When operating on iron of large diameter, the tool requires a longer movement than when operating on smaller metal.

Having thus described my invention, what I claim is—

1. In a spoke-fastening machine, a spoke-holding clamp, in combination with the pivoted header-carrying arm, the eccentric, the rod connecting the eccentric and arm, and the yielding hub-support.

2. In a spoke-fastening mechanism, the pivoted arm provided with a heading-tool to enter a hub, in combination with an eccentric and a connecting-rod mounted at one end around the eccentric and pivoted at the other end to the header-carrying arm, as shown.

3. In a spoke-fastening machine, in combination with a heading-tool to enter the hub, the hub-sustaining device, in combination with a supporting-spring and a depressing-lever.

4. In combination with the vibratory heading-tool, the hub-support, the vertically-sliding head having a horizontal sliding connection with the support, the spring to retract the support, the spring to lift the head, and the lever to depress the same.

5. In combination with the connected clamp-levers, their operating-pitman, the reciprocating rod connected to the latter, its actuating-cam, and the retracting-spring.

6. In a spoke-fastening machine, the clamping-levers, their actuating-pitman, the reciprocating rod, the lever for starting said rod, its actuating-cam, the cam-driving clutch, and the clutch-controlling lever operated by the rod, as shown, whereby the initial closing of the jaws is caused to set the cam in motion.

7. In combination with the connected clamp-levers, their actuating-pitman, the reciprocating rod connected to the pitman and provided with a stud, the rod-retracting spring, the rod-operating cam, its driving-clutch, and the

clutch-operating lever provided with the opening having oblique edges, as described, to move the lever in both directions.

8. In a machine for seating metallic spokes, the combination of a heading-tool and its operating mechanism, a spoke-clamp, and a clamp-operating cam of irregular form timed to release the spoke as soon as the heading-tool completes its action.

In testimony whereof I hereunto set my hand, this 15th day of September, 1887, in the presence of two attesting witnesses.

WM. P. BETTENDORF.

Witnesses:
FRED M. DECKER,
INGLE BARKER.