(No Model.) 3 Sheets—Sheet 1.

C. W. BREWER.

MACHINE FOR FORMING LUBRICATOR GROOVES IN VEHICLE AXLES.

No. 477,638. Patented June 28, 1892.

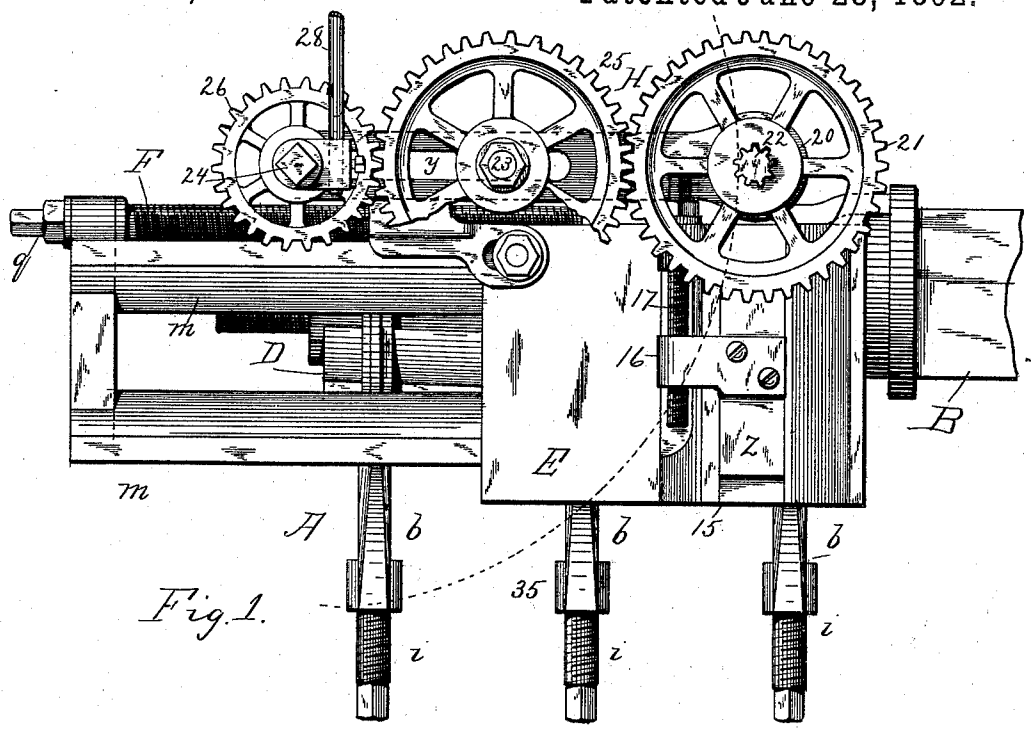

Fig. 1.

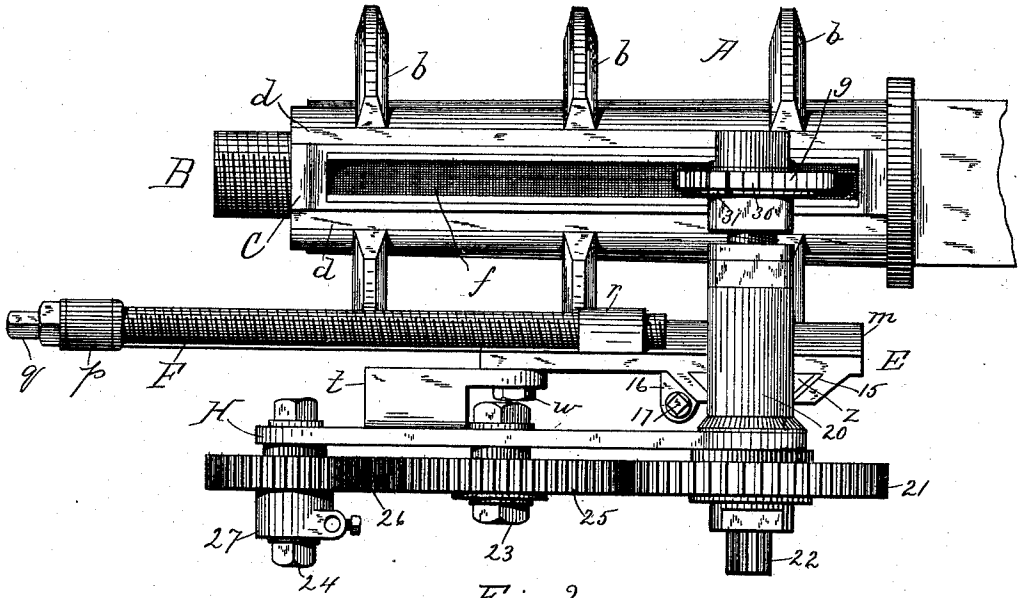

Fig. 2.

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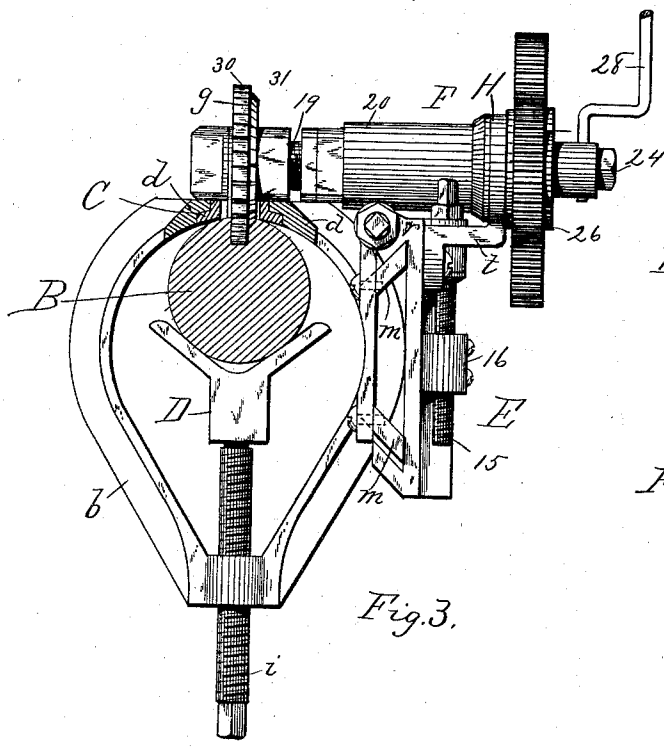

Fig. 3.

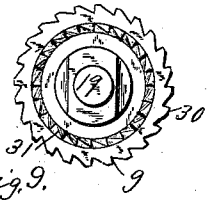

Fig. 9.

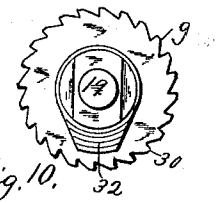

Fig. 10.

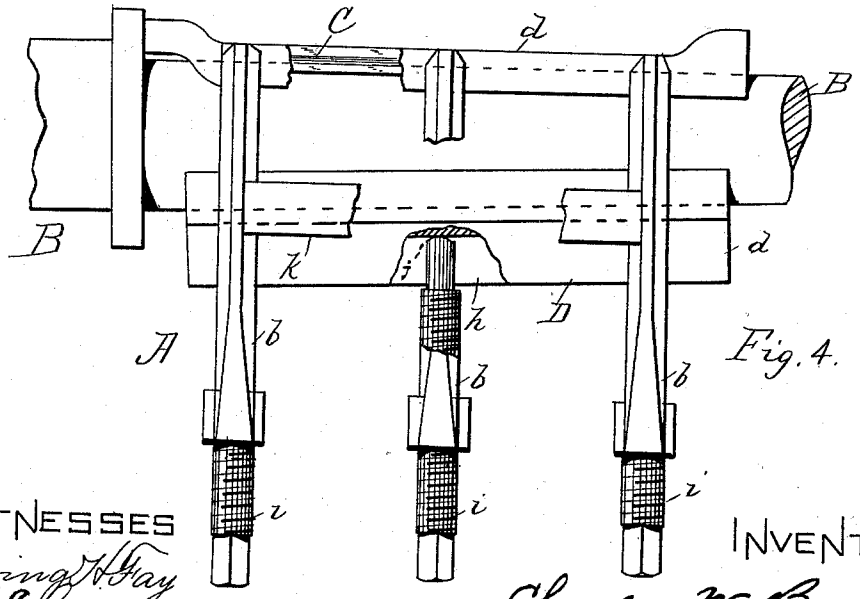

Fig. 4.

WITNESSES

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MACHINE FOR FORMING LUBRICATOR GROOVES IN VEHICLE AXLES.

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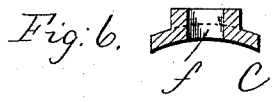

Fig. 6.

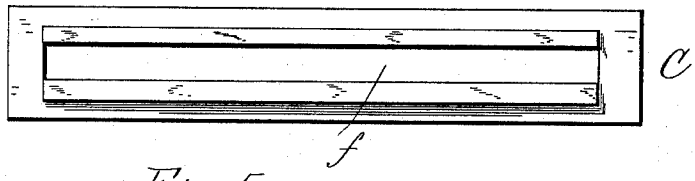

Fig. 5.

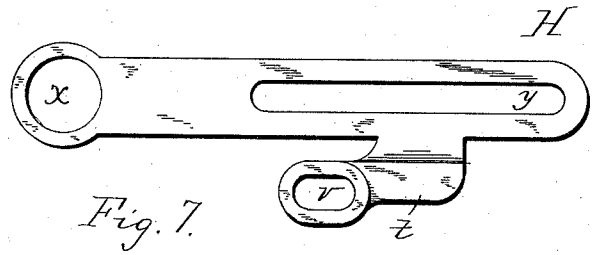

Fig. 7.

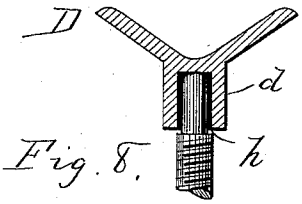

Fig. 8.

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UNITED STATES PATENT OFFICE.

CHARLES W. BREWER, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE BREWER LONGITUDINAL AXLE LUBRICATOR COMPANY, OF PORTLAND, MAINE.

MACHINE FOR FORMING LUBRICATOR-GROOVES IN VEHICLE-AXLES.

SPECIFICATION forming part of Letters Patent No. 477,638, dated June 28, 1892.

Application filed April 14, 1891. Serial No. 388,887. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. BREWER, of Cambridge, in the county of Middlesex, State of Massachusetts, have invented certain new and useful Improvements in Machines for Forming Lubricator-Grooves in Vehicle-Axles, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved grooving-machine represented as in use; Fig. 2, a top plan view of the same; Fig. 3, an end elevation, the axle being shown in cross-section; Fig. 4, an elevation of the side opposite that shown in Fig. 1; Fig. 5, a plan view of the cutter-guide detached; Fig. 6, a cross-section of the same; Fig. 7, a face view of the shaft-bracket; Fig. 8, a sectional view of the axle-cradle, showing details of construction; Fig. 9, a side elevation of the cutter, and Fig. 10 a like view of the face opposite that shown in Fig. 9.

Like letters and numerals of reference indicate corresponding parts in the different figures of the drawings.

My invention relates especially to a portable apparatus for removing the case-hardening and forming lubricator-grooves in axle-journals of the character shown and described in my application for Letters Patent filed August 25, 1890, Serial No. 362,956, for new and useful improvements in axle-lubricators.

The nature and operation of the apparatus will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the body of the machine, and B the axle. The body A comprises a series of caliper-shaped loops or brackets *b*, arranged in parallelism and connected by horizontal bars *d*. The inner edges of said bars are grooved longitudinally (see Fig. 3) to receive the cutter-guide C, tongued to enter said grooves. Said guide (see Fig. 5) is slotted longitudinally at *f* to admit the rotary cutter *g*, hereinafter described, and is adapted to rest on the top of the axle-journal when the machine is in position.

A cradle D, Y-shaped in cross-section, (see Fig. 8,) has its under side grooved longitudinally at *h*. Screws *i* are turned through the lower end of the loops *b* and have smooth points *j*, which engage in the groove *h*, whereby said cradle is supported. The ends of the groove *h* are closed (see Fig. 3) to prevent the cradle slipping from off the screws longitudinally. The cradle, loops, and screws form a clamp for securing the device to the axle. The loops *b* are connected at one side by a brace *k*, Fig. 4, and at the opposite side by horizontal flaring tracks or ways *m*, on which a carriage E is fitted to slide.

A horizontally-arranged worm F is fitted to rotate in a bearing *p* on the upper track *m*, and is provided with a crank or wrench-head *q*. An interiorly-threaded lug *r* on the carriage E is fitted to travel on said worm, whereby the carriage may be actuated on its ways as the worm is rotated.

The bracket H (shown in Fig. 7) is provided with a lug *t*, having an opening *v*, through which a bolt *w* passes, securing said bracket to the carriage E. One end of the bracket is provided with a circular opening *x*, and its body is slotted longitudinally at *y*.

A beveled plate *z* is fitted to slide vertically in undercut grooves 15 on the outer face of the carriage E. Said plate is provided with a laterally-projecting interiorly-threaded lug 16, which works on a screw 17, fitted to rotate on the face of said carriage. The cutter-shaft 19 is mounted in a bearing 20, secured in the opening *x* of the bracket H, said shaft bearing a gear 21 and pinion 22 on its outer end. Stub-shafts 23 and 24 are mounted in the slot *y* of the bracket H and bear gears 25 and 26, connecting with the gear 21. The shaft 24 is provided with a sleeve 27, in which a crank 28 may be secured. On the opposite end of the shaft 19 the cutter-wheel *g* is mounted in position to work in the slot *f* of the guide C.

The cutter-wheel *g* is provided with peripheral teeth 30 and on one face with beveled teeth 31. On the opposite face on the hub of said cutter a gage 32 (shown in Fig. 10) is ad-

justably secured, said gage determining the depth of groove to be cut in the axle-journal. The said gage consists of an eccentrically-shaped disk mounted on the hub of the cutter, its lower edge adapted to come in contact with the periphery of the axle when the groove has been cut deep enough, and thus prevent the cutter from penetrating the axle farther.

In the use of my improvement a guide-plate C, provided with a slot *f* of suitable width, is adjusted in its grooves in the body-loops *b* and the device hung on the axle-journal, said axle projecting through the loops, as shown in Fig. 3. The cradle D is then clamped against the journal by means of the screws *i*, securely holding the device in position. To remove the case-hardening from the journal, a large gear 35 (represented by a dotted arc line in Fig. 1) is secured on the crank-shaft 24 and meshes with the pinion 22 on the cutter-shaft 19. By rotating said gear the cutter-wheel *g* is driven at a high rate of speed necessary to penetrate the outer surface or hardening of the axle-journal. By means of the screw F the carriage E is moved on its ways to adjust the cutter longitudinally of the axle. The screw 17, actuating the plate *z*, feeds said cutter vertically by adjusting the bracket H. The gage 32 on the cutter-hub engages the surface of the axle-journal and prevents said cutter from penetrating too far. Face-teeth 31 bevel one wall of the groove at its mouth, as best shown in Fig. 3, forming the oil-duct. After the case-hardening has been penetrated the large gear 35 is detached and the gears 21, 25, and 26 employed to actuate the cutter. The guides C are constructed interchangeably to afford proper bearing on axle-journals of different sizes. By means of my device the lubricating-groove may be formed in the axle while on the vehicle. It will be seen that by the use of the cradle D, actuated by screws, as described, it may be made to engage axle-journals varying greatly in taper and clamp the body securely therein. I do not confine myself to employing the ribs or loops *b* and cradle or the clamping-body in the form described, as any suitable device for attaching the machine to the axle-journal and which will overcome variations in the taper thereof may be used.

Having thus explained my invention, what I claim is—

1. In a device for forming lubricating-grooves in vehicle-axles, the combination of a clamp adapted to be secured to an axle, a carriage longitudinally adjustable thereon, a frame mounted in vertical ways on said carriage and carrying a rotary cutter, and driving mechanism for actuating said cutter, the said frame, cutter, and driving mechanism being vertically adjustable on the carriage, substantially as described.

2. In a device of the character described, a body attachable to the axle-journal, in combination with a carriage adjustable longitudinally on said body, a horizontally-arranged rotary shaft vertically adjustable on said carriage and bearing a cutter-wheel and pinion, crank-actuated gears for driving said shaft, and a large gear detachably mounted on the crank-shaft and meshing with said pinion for speeding the cutter-shaft, substantially as specified.

3. In a device of the character described, a body comprising a series of loops for encircling the axle-journal, a screw-actuated cradle for clamping said journal to said loop, a screw-actuated carriage fitted to travel longitudinally in ways on said loops, a shaft-bracket adjustable vertically on said carriage, a crank cutter-shaft mounted in said bracket, and a rotary cutter-wheel on said shaft, all being combined and arranged to operate substantially as described.

4. In a device for forming lubricating-grooves in vehicle-axles, the combination, with the cutter-wheel, of a gage comprising an eccentrically-shaped disk adjustably mounted on the hub of said wheel, substantially as described.

5. In a device of the character described, the clamping-body A and detachable guide-plate C, in combination with the carriage E and actuating mechanism, the rotary cutter-shaft vertically adjustable on said carriage, and actuating mechanism for said shaft, substantially as described.

6. In a device of the character described, the body A, comprising the loops *b* and screw-actuated clamping-cradle D, in combination with the detachable slotted guide-plate C, arranged substantially as set forth.

7. In a device of the character described, the clamping-body and detachable guide-plate, in combination with the screw-actuated carriage fitted to slide on said body, the screw-actuated plate *z*, fitted to slide vertically on said carriage, the bracket H, mounted on said carriage and bearing intermeshing gears, the rotary shaft 19, journaled in bearings secured to said bracket, and the rotary cutter *g*, mounted on said shaft, substantially as described.

CHARLES W. BREWER.

Witnesses:
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K. DURFEE.