No. 680,724. Patented Aug. 20, 1901.

F. W. MUSSETTER, J. McCARTHY & W. W. HOLMES.

DUPLEX CENTERING MACHINE.

(Application filed Jan. 23, 1899.)

(No Model.) 2 Sheets—Sheet 1.

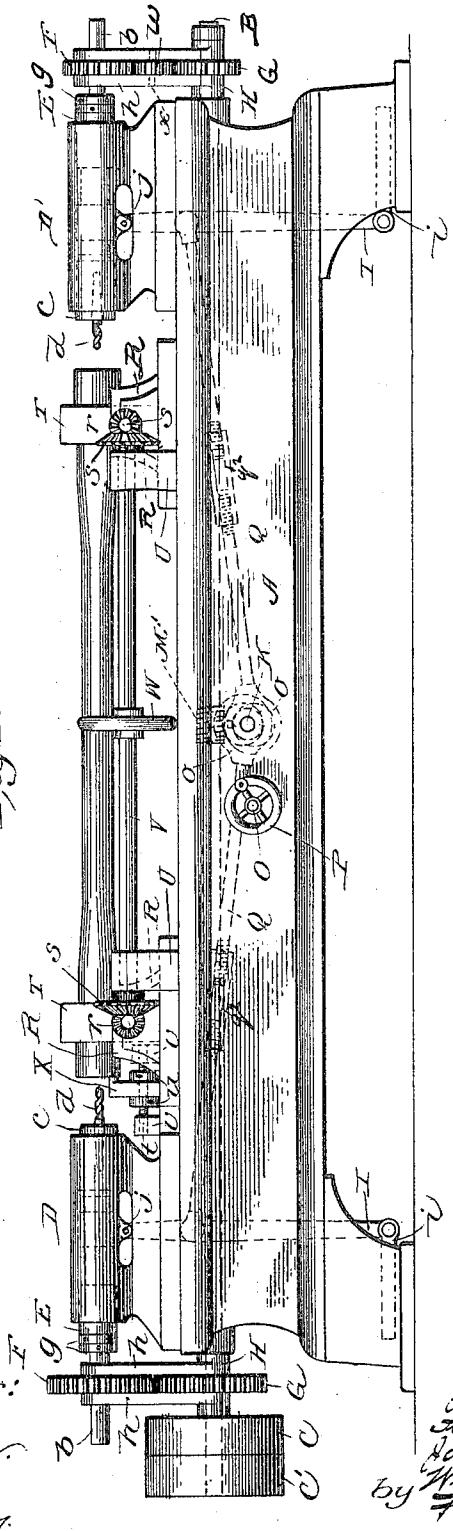


Fig. 1.

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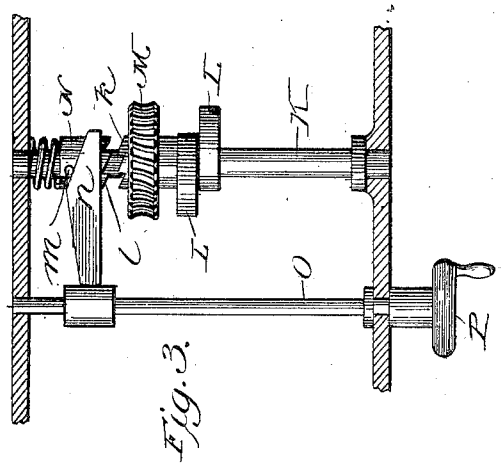


Fig. 3.

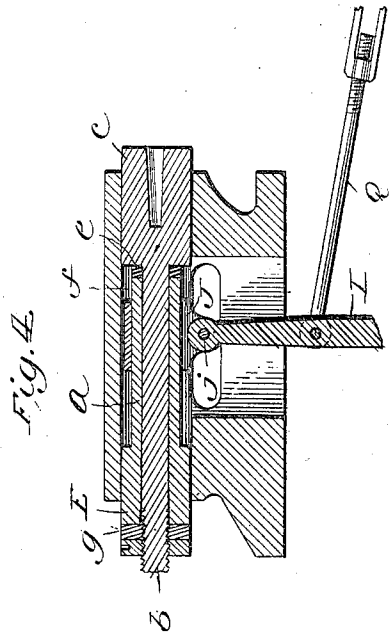


Fig. 4.

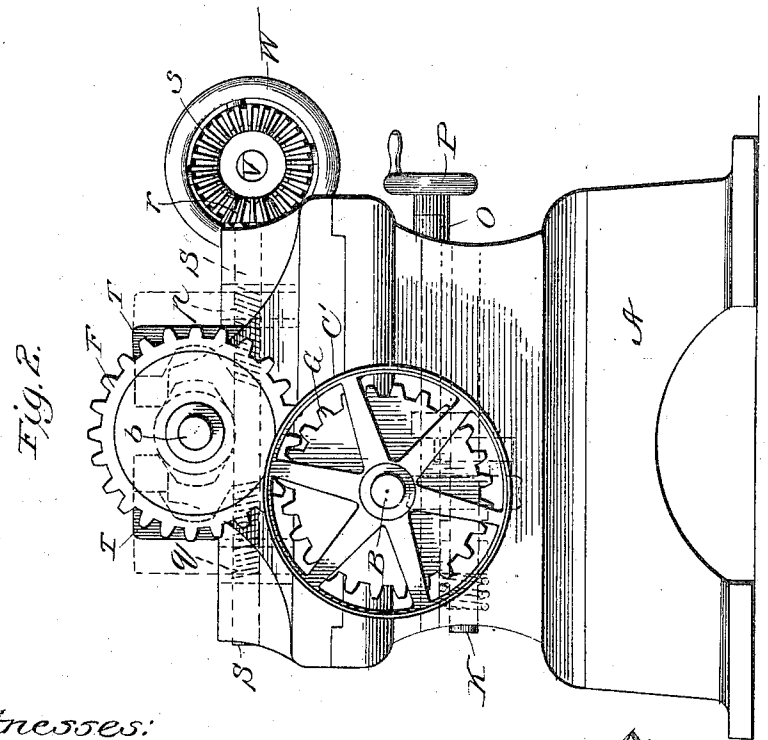


Fig. 2.

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UNITED STATES PATENT OFFICE.

FLEMING W. MUSSETTER AND JAMES McCARTHY, OF CHICAGO HEIGHTS, AND WILLIAM W. HOLMES, OF CHICAGO, ILLINOIS, ASSIGNORS TO THE Q. & C. COMPANY, OF CHICAGO, ILLINOIS.

DUPLEX CENTERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 680,724, dated August 20, 1901.

Application filed January 23, 1899. Serial No. 703,173. (No model.)

To all whom it may concern:

Be it known that we, FLEMING W. MUSSETTER and JAMES MCCARTHY, residing at Chicago Heights, and WILLIAM W. HOLMES, residing at Chicago, county of Cook, State of Illinois, citizens of the United States, have invented certain new and useful Improvements in Duplex Centering-Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description, such as will enable others skilled in the art to apply the invention.

This invention relates to boring and drilling appliances, having particular reference to machines for center-marking the ends of car-axle blanks or like articles, thus preparing them for introduction to a lathe, whereby the journal-bearings are turned and the blanks otherwise trued up for service.

As a further object the invention contemplates the construction of an automatic duplex machine capable of centering and drilling both ends of a blank simultaneously, and comprises, first, clutching or work-holding mechanism; secondly, feeding mechanism, and, thirdly, the drilling mechanism, all as will later and more fully appear.

The invention will be hereinafter particularly described, and pointed out by the claims following.

In the accompanying drawings, which form part of this specification, and whereon corresponding letters of reference indicate like parts in the several views, Figure 1 is a side elevation of the invention in its preferred arrangement and construction. Fig. 2 is an end view thereof. Fig. 3 is a fragmentary view of the machine, being a horizontal section showing part of the feeding mechanism. Fig. 4 is also a fragmentary view, being a longitudinal central section through one head-stock and within contained drilling mechanism.

Reference being had to the drawings and letters thereon, A indicates the bed or base of the machine, of ordinary construction, having journaled in opposite ends thereof a longitudinally-arranged driving-shaft B, with protruding ends, upon one of which are mounted fast and loose belt-pulleys C C′ as the means of driving said shaft from a source of power. (Not shown.) Surmounting base A at each end are hollow head-stocks D D′, identical one with the other both in construction and in function, each containing drilling mechanism also of identical construction, but of reverse action, so that a description of one stock and coacting parts will suffice for both.

Fitted in the outer end of stock D is a sleeve E, having a reduced inwardly-extending body *a*, through the entire length of which passes a rotatable drill-spindle *b* with an enlarged working head *c*, containing a removable drill *d*, said head abutting a suitable washer *e* at the inner end of the sleeve aforesaid, thus forming an annular chamber *f* around body *a* for purposes that will later appear. Upon the protruding end of spindle *b* and in screw-threaded relation therewith are nuts *g g*, which bear upon the adjacent end of sleeve E for the purpose of adjusting or taking up wear in the drill-spindle, particularly at its head *c*, by withdrawing said spindle and head into the stock D sufficiently to compensate for such wear.

Beyond the take-up nuts *g g* there is a driven gear-wheel F, splined upon spindle *b*, thus permitting a longitudinal or reciprocal movement of the latter and at same time imparting thereto a rapid rotary motion through the agency of a driving-gear G, keyed upon and moving with the main shaft B. As a means of keeping said driven and driving gears F G in alinement at all times a boss H is loosely mounted upon the shaft B, having upwardly-extending parallel arms *h h*, which embrace said gears, as shown, and are themselves retained in position above by the tail of spindle *b* passing through eyes therein.

I I represent vertical levers pivotally supported at their lowermost extremity upon base A or upon straps *i i*, projected therefrom, the same being pivotally connected at the opposite or upper end by set-bolt *j* to a split clamping-ring J. Ring J occupies a position in chambers *f f*, snugly surrounding body *a* of the sleeves E E, which latter accordingly may

be reciprocated freely under influence of said levers to advance and retract the drill-spindles and drills.

Journaled in opposite sides of base A is a cross-shaft K, having keyed thereto oppositely-projecting cams L L and having thereon also a worm-gear M, the latter being loosely mounted and provided with clutch-teeth *k*, normally engaged by corresponding teeth *l* upon a spring-pressed hub N. The hub N is splined upon said cross-shaft and bears upon its surface a stud or pin *m*, which aids in disengaging its teeth when occasion requires. In like manner a second stub-shaft O is secured in the sides of base A adjacent to and parallel with shaft K, but differing in that it is equipped at one end with a hand-wheel P and near its opposite end with a lever *n*, having an inclined or beveled outer end adapted to obstruct the path of pin *m* when shaft K is rotated for the purpose of advancing hub N, and thus disengaging the clutch. At such times the worm-gear M may revolve idly in mesh with and under influence of worm M′, located by preference near the center of main driving-shaft B, as shown.

Pivotally secured to levers I I are sectional pitman-rods Q Q, rendered adjustable as to length by means of turnbuckles q^3, and each pitman-rod terminates in a collar *o o*, surrounding the eccentric cams L L, rotating with shaft K, as aforesaid, thereby rocking said levers I I in reverse directions and through them effecting a corresponding advance and withdrawal of drills *d d*.

Rotatably mounted in suitable brackets R R, rising from opposite sides of bed A in close proximity to the head-stocks D D′, are transverse shafts S S, each having cut thereon right and left screw-threads *p q*, respectively, of corresponding pitch and each having a beveled gear *r* affixed to its projecting end. In threaded connection with said screws *p q*, and consequently under control of shafts S S, are oppositely-moving chucks or vise-clutches T T for centering and firmly retaining all work presented to the machine for action of its drills.

At one side of base A, also rising from its surface, are journaled boxes U U, affording a support for the opposite ends of a longitudinal clutch-controlling shaft V, the latter having keyed thereon a hand-wheel W, whereby it is rotated in either direction, and terminating in beveled driving-gears *s s*, mating with the gears *r r* aforesaid, and thus serving to open or close both sets of clutches T T simultaneously through the agency of their respective screw connections with the transverse shafts S S.

Located between one head-stock, preferably that indicated by the reference-letter D, and one chuck or work-holding clutch T is an adjustable stop or gage X, loosely mounted upon a horizontal adjusting-screw *t*, and flanked upon each side by lock-nuts *u u* for retaining said gage in a given position. Screw *t* is swiveled in fixed lugs *v v*, supported upon the surface of base A, and by this arrangement gage X may be set to abut the end of an axle, shaft, or other article being operated upon, and thus maintain it in proper working position with relation to both drills *d*.

As above described, it will be apparent that the machine is automatic and duplex in its construction, there being two head-stocks, duplicate drilling and drill-feeding mechanisms, and two corresponding chucks or work-holding clamps. The drill-spindles and drills, however, are driven in reverse directions by power from the common driving-shaft B, there being a small gear *w* interposed between the driven and driving gears F G, respectively, to cause such change in the direction of rotation, said gear *w* being loosely mounted upon a stub-shaft *x*, connecting parallel arms *h h*, rising from the boss H at that end of the machine bearing the head-stock D′.

The foregoing being a description of our invention in its preferred form of construction, its operation, briefly stated, is as follows: Presuming, for purposes of illustration, that a car-axle or like article has been introduced into the open jaws of chucks or clutches T T with one end abutting the adjustable gage X, as shown by Fig. 1, hand-wheel W is then employed to rotate shaft V and simultaneously therewith both transverse shafts S S, through the agency of interposed beveled gears *r s*, right and left threads *p q* upon said shafts S S, thus advancing the jaws of chucks T T toward a common center. An axle-blank or like article now being firmly held in position, the main driving-belt (not shown) is shifted to driving-pulley C and the operation of automatically drilling or producing lathe-centering depressions in the end of such axle-blank is effected as follows: Shaft B operates through driving and driven gears F G to rotate drill-spindles *b b* and drills *d d* in opposite directions, the worm M′ at same time driving worm-gear M normally in clutch with hub N, the latter being splined upon cross-shaft O, which it accordingly drives, and with it the cams L L. These cams then operating through collars *o o* throw pitman-rods Q Q in opposite directions with each rotation of shaft O a distance equal to the eccentricity of said cams, at same time imparting to vertical levers I I a corresponding movement upon their supporting-straps *i i* as a center. Simultaneously with the aforesaid operation sleeves E E in the grasp of split ring J at end of levers I I are advanced longitudinally in head-stocks D D′, taking with them drill-spindles *b b* and sinking the revolving drills into both ends of an axle-blank or other like article as said drills approach each other. Continued rotation of cams L L thereupon reversing the action of parts last described automatically withdraws drills *d d*, and the work is removed after being released from clutches T T by a reverse movement of

hand-wheel W and coacting parts. During such removal and replacing of an axle or other blank it is important that the feed of the drilling apparatus be interrupted or suspended. To this end wheel P is utilized to rock its supporting-shaft O and project the beveled outer end of lever *n* into the path of stud *m* on hub N as it revolves. This effected, said stud and hub are advanced upon shaft K a sufficient distance to disengage clutch-teeth *k l*, whereupon the worm-gear M revolves loosely upon said shaft K, the latter, with its affixed eccentric cams L L, remaining stationary and for the time being of no effect upon balance of parts.

The foregoing operation may of course be repeated indefinitely, and it will be particularly noted that a wide range of adjustment is provided in order that the machine may perform its functions to a nicety and meet all requirements. For instance, the throw of sleeves E E and within contained drill-spindles may be regulated by the relative position thereon of clamping-rings J J, and this reciprocal action may be newly adjusted, if desired, by lengthening the sectional pitman-rods Q Q.

The foregoing being the nature and general purposes of our invention, we now claim and desire to secure by Letters Patent—

1. In a centering-machine, the combination with oppositely-placed head-stocks each provided with a drill, of feed mechanism therefor, and a driving mechanism common to both drills and the feed mechanism thereof, substantially as and for the purposes specified.

2. In a centering-machine the combination with coöperating driving and feeding mechanisms, of a head-stock, a drill-spindle having an enlarged working head, and a spindle-carrying sleeve having a reduced body reciprocally mounted in the head-stock, substantially as described.

3. In a centering-machine the combination with coöperating driving and feeding mechanisms, of a head-stock, a drill-spindle, a spindle-carrying sleeve having a reduced body reciprocally mounted in the head-stock, and an adjustable clamping-ring for connecting said sleeve with the feeding mechanism, substantially as described.

4. In a duplex centering-machine, the combination with oppositely-arranged head-stocks and drill-spindles, of interposed chucks, driving mechanism common to both of said drills, feed mechanism common to both of said drills, and means for actuating the feed mechanism from the driving mechanism of the drills, substantially as and for the purposes specified.

5. In a duplex centering-machine the combination with driving mechanism, head-stocks and drill-spindles, of drill-feeding mechanism automatically coöperating with said driving mechanism and comprising oppositely-moving pitman-rods in communication with said drill-spindles for simultaneously reciprocating said spindles in opposite directions, substantially as described.

6. In a duplex centering-machine the combination with driving mechanism, head-stocks and drill-spindles, of drill-feeding mechanism automatically coöperating with said driving mechanism and comprising oppositely-arranged pitman-rods in communication with said spindles, and cams upon a common supporting-shaft for reciprocating said spindles and pitman-rods in reverse directions, substantially as described.

7. In a duplex centering-machine, the combination with oppositely-arranged head-stocks and drill-spindles, of driving mechanism which actuates both of said drill-spindles, feed mechanism for said drill-spindles, and a worm-and-gear mechanism which actuates the feed mechanism from the drill-driving mechanism, substantially as and for the purposes specified.

8. In a duplex centering-machine the combination with drill-spindles and driving mechanism therefor, of drill-feeding mechanism comprising oppositely-arranged pitman-rods in communication with said spindles, cams for simultaneously throwing said rods in reverse directions, a worm-gear for driving the cams, and a clutch for maintaining said cams and gear normally in operative relation, substantially as described.

9. In a duplex centering-machine the combination with drill-spindles and driving mechanism therefor, of drill-feeding mechanism comprising oppositely-arranged pitman-rods in communication with said spindles, cams for simultaneously throwing said rods in reverse directions, a worm-gear for driving the cams, a clutch for maintaining said cams and gear normally in operative relation, a lever for disengaging said clutch, and a rock-shaft for controlling said lever, substantially as described.

10. In a duplex centering-machine the combination with head-stocks and drill-spindles, of pivoted levers for actuating the drill-spindles, oppositely-moving adjustable pitman-rods, and means for simultaneously operating said pitman-rods, substantially as described.

In testimony whereof we affix our signatures, in presence of two witnesses, this 16th day of January, 1899.

FLEMING W. MUSSETTER.
JAMES McCARTHY.
WILLIAM W. HOLMES.

Witnesses:
B. C. WIEDERHOLD,
D. CONNOLLY.