

W. FRECH.
COUNTERSHAFTS.

No. 170,667.

Patented Dec. 7, 1875.

Fig. 2.

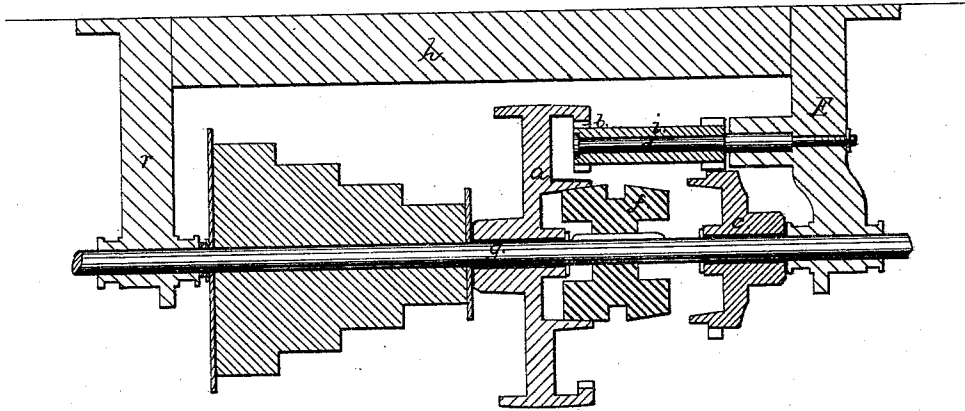


Fig. 1.

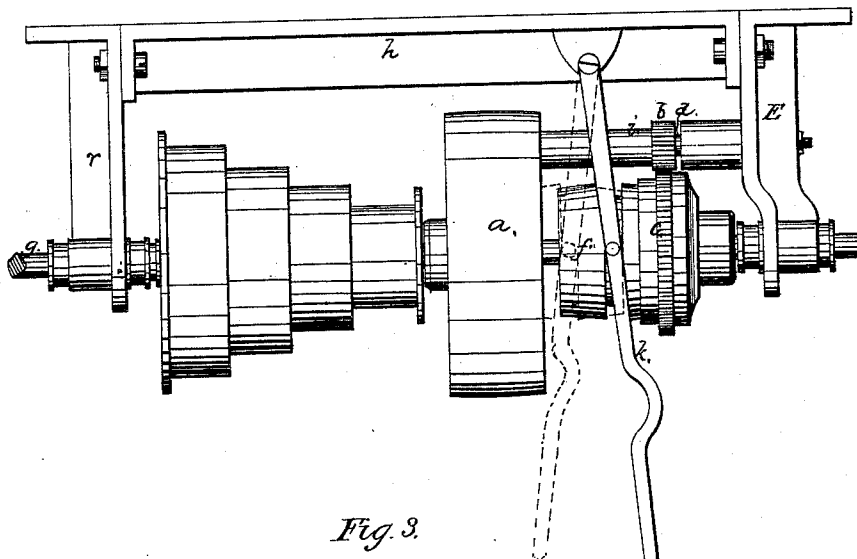
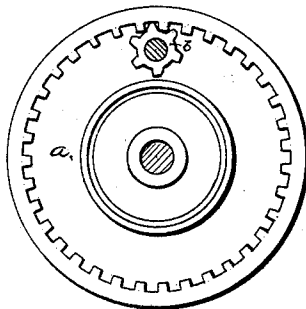


Fig. 3.



Witnesses:
M. J. Johnson
Ernest Becker

Inventor:
William Frech
J. W. Perkins, Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM FRECH, OF CINCINNATI, OHIO.

IMPROVEMENT IN COUNTER-SHAFTS.

Specification forming part of Letters Patent No. **170,667**, dated December 7, 1875; application filed July 19, 1875.

To all whom it may concern:

Be it known that I, WILLIAM FRECH, of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Counter-Shafts; and I do hereby declare that the following is a full, clear, and exact description thereof, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The same letters and figures of reference are used to indicate the corresponding parts.

After describing the invention, its nature and extent will be shown in the claims.

The object of my invention is to cause a backward and forward motion, and to make a more substantial arrangement, by connecting the two hangers. This will render it an easy matter to place it in proper position, even by inexperienced workmen.

Figure 1 is a perspective view of my invention. Fig. 2 is a vertical sectional view taken lengthwise. Fig. 3 is an end view of the driving-wheel *a*.

a is the driving-wheel, fitted to work loose on the main shaft *g*. Also fitted loose to shaft *g* is the cog-wheel *c*. The gear on the inner side of the perimeter of the driving-wheel *a* is connected with cog-wheel *c* by means of the two pinions *b b*. These pinions are both fastened to the sleeve *i*, which works loose on the mandrel *d*. The mandrel *d* is held firmly to the hanger *E* by a nut, as shown in the drawings. The space between the driving-wheel and the cog-wheel *c* is taken up by clutch *f*, which slides on shaft *g* like clutches in common use. The clutch is made stationary on the shaft by a key let half-way into the shaft *g*. It has a groove in the center, and is operated by the shifter *k*, in the usual manner. The clutch is turned taper on both ends, thus forming two male cones. The left cone is the smaller. These two cones are fitted to the female cones formed on the driving-wheel *a* and cog-wheel *c*. Thus they grasp either

the driving-wheel *a* or the cog-wheel *c* as the shifter *k* is moved to the one side or to the other, and the shortest possible motion is required to engage or disengage either of the two cones.

Obviously, if the clutch *f* is engaged with the driving-wheel *a* the shaft *g* will turn in a forward direction, and if engaged with cog-wheel *c* the shaft will turn in the opposite direction. When disengaged on both sides the shaft *g* will stand still, although the cog-wheels *b, b*, and *c* will still revolve, being connected with the pulley which carries the belt. To connect the hangers *E* and *r*, I use a cast-iron cross-bar, *h*, which is strengthened by a rib in the center, and fitted between the two hangers to keep them square. The cross-bar is fastened to the hangers by two bolts on either end. This makes the whole counter-shaft solid and compact, and not liable to get out of order.

The careful and accurate workmanship required to fix two hangers perfectly in line—that is, exactly level and plumb—is superseded by my invention.

With my invention a common laborer can put up a counter-shaft properly without the least trouble.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a counter-shaft, the gearing herein described, for the purpose of regulating the backward and forward motion by the use of one belt, substantially as described, and for the purposes set forth.
2. The combination, with the hangers and cross-bar, of the clutch, provided with two male cones, one on either end, substantially as described, and for the purposes set forth.
3. The driving-wheel *a*, shaft *g*, gear *c*, hangers *E* and *r*, pinions *b b*, and shaft *h*, in combination with the clutch *f*, substantially as described, and for the purposes set forth.

WILLIAM FRECH.

Witnesses:

M. POHLMANN,
ERNEST BECKER.