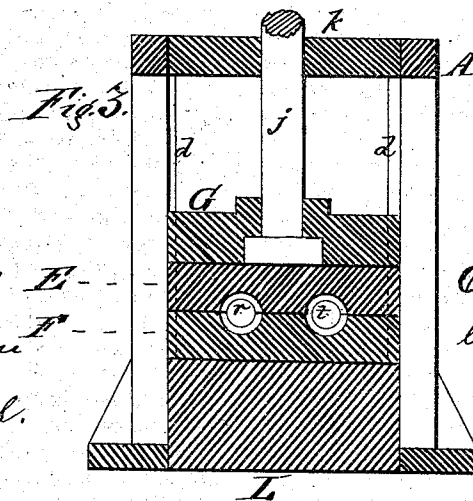
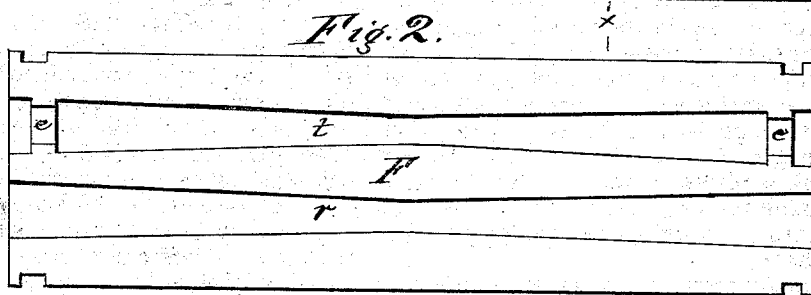
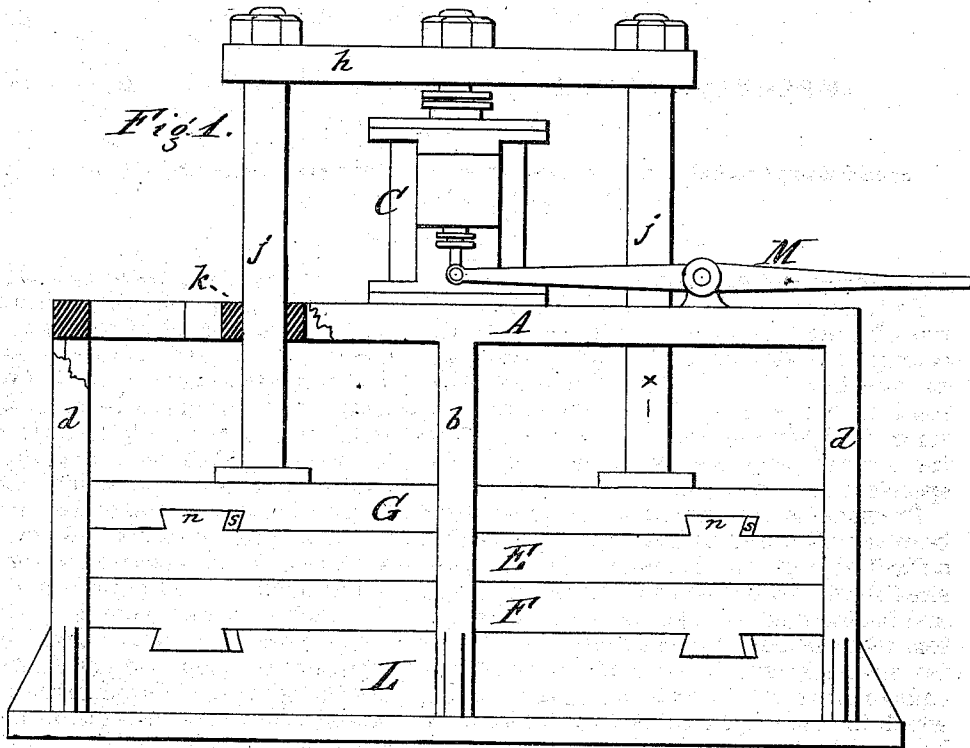


E. KERR.

Dies for Manufacturing Car Axles.

No. 156,295.

Patented Oct. 27, 1874.



Witnesses E--
 H. L. Bennett F--
 W. H. Isaac.

Inventor
 Edward Kerr
 by his Atty
 C. L. Fenwick

UNITED STATES PATENT OFFICE.

EDWARD KERR, OF NEW YORK, N. Y.

IMPROVEMENT IN DIES FOR MANUFACTURING CAR-AXLES.

Specification forming part of Letters Patent No. **156,295**, dated October 27, 1874; application filed August 31, 1874.

To all whom it may concern:

Be it known that I, EDWARD KERR, a native of Great Britain, now residing in the city, county, and State of New York, have made an invention of a new and useful Improvement in the Means of Manufacturing Car-Axles for Railroad-Cars; and that the following is a full, clear, and exact description and specification of the same.

Previous to my invention car-axles have been manufactured by heating first one end of a fagot of bars, and hammering it to the desired form, and by then heating the other end and hammering it in like manner. This system requires much time and labor, as at least two heatings have to be made to finish the ends or arms of the axle, and the place at which the second journal is to be formed must be carefully measured by the hammer-smith.

My improvement in the means of manufacturing car-axles consists of a peculiar hammer having double-tapered hammer-faces or dies, which are the counterpart of the finished axle, and are guided so as to match each other for the length of a car-axle, so that when an axle-blank is placed therein it may be hammered simultaneously from end to end, and formed with the journals at the proper distance apart.

In order that my invention may be fully understood, I have represented in the accompanying drawing a steam-hammer embodying my improvement in the best form at present devised by me, and I will proceed to describe the same, and the mode in which I manufacture car-axles by means of it.

Figure 1 represents a side view of the said hammer. Fig. 2 represents a lower face or anvil die. Fig. 3 represents a transverse section of the same at the line *xx* of Fig. 1.

The hammer thus represented has a strong frame, *A*, whose central standards *b* are connected by a bridge-beam, upon which the steam-cylinder *C* is supported, and whose lateral standards *d* act as guides for maintaining the hammer-face or upper die *E* in its proper position, relatively to the lower face or die *F*. The hammer-head *G* is long and narrow, so as to sustain the upper face or die *E*, which is as long as a car-axle. This hammer-head is combined with the piston of the steam-cylinder *C*,

by means of the cross-head *h* and the links *jj*, which last are passed through guide-bearings in the cross-beams *k* of the frame. The anvil-block *L* is long and narrow, so as to support the long under face or die *F* throughout its length. The steam-cylinder is supplied with steam by means of a slide-valve worked by a hand-lever, *M*, and the valve should be balanced so as to work easily. The hammer-face or die *E* is secured to the hammer-head *G* by dovetailed snugs *nn* and keys *ss*, and the anvil face or die is secured to the anvil-block in like manner. Each die *E* and *F* contains two double-tapered grooves, *rt*, the one, *r*, for the purpose of reducing the axle-blank to the requisite diameter and double-tapered form, and the other, *t*, for forming the journals simultaneously at the requisite distance apart, so that all measurement on the part of the hammer-smith is dispensed with. In order that the journal-groove *t* may form the journals, as stated, its ends *ee* are reduced in size to the dimensions of the journals, so that the journal-groove of each die at these parts is the counterpart of half the finished double-tapered car-axle, but is open at the ends, to permit any excess of metal to elongate.

In manufacturing car-axles according to my invention, I prefer to employ a fagot of square bars prepared in the ordinary way, but, as the waste by heating is less when manufacturing by my system than by that heretofore used, a lighter fagot may be employed. The fagot is heated to a welding-heat in a reverberatory furnace, and is welded and reduced to a rough rounded blank of a little greater diameter than the finished axle, either by means of a steam-hammer or by passing it through rolls having a series of grooves adapted to reduce the fagot. As, however, the construction and operation of an ordinary steam-hammer and of rolls are well understood, I do not deem it necessary to describe them minutely.

After the blank has been produced, it is heated from end to end in a reverberatory furnace, such as is employed for heating blooms and similar masses of iron or steel; then it is placed in the double-tapered body-groove *r*, and is hammered therein and turned between the blows of the hammer until it is reduced to the required diameter and double-tapered

form. As soon as this is accomplished, the blank is transferred to the journal-groove *t*, and is hammered therein and turned in like manner until the journals are formed. As the parts *e e* of the journal-groove, which give form to the journals, are rigidly connected together by the intervening part of the face or die, the journals are necessarily formed at the exact distance from each other determined by the hammer, and consequently the necessity of careful measurement on the part of the hammer-smith is dispensed with. Moreover, as the entire length of both arms of the car-axle blank is hammered at one operation, the successive heating of the two ends or arms is rendered unnecessary. The result of the improvements is, that about four times as many axles may be forged in a day as by the old system, with the same number of workmen. As the journal-groove *t* is used principally for forming the journals, the portion of the groove between the journal parts *e e* need not be of the precise form of the finished axle throughout its entire length, and if any sagging of the body of the axle occurs from

this variation of form, it may be corrected by transferring the axle to the body-groove *r* after the journals are forged, and by giving it a few lightblows so as to straighten it.

I prefer to make the body-groove and the journal-groove in the same hammer-face or die, as the labor of transferring the blank from one groove to the other is thereby reduced to the lowest amount; but, if deemed best, the body-groove may be made in one pair of dies, and the journal-groove may be made in another pair, operated by a separate steam-cylinder.

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

The combination, substantially as before set forth, of the two dies having double-tapered grooves, the steam-cylinder, and the guiding-frame.

Witness my hand this 17th day of August, A. D. 1874.

EDWARD KERR.

Witnesses:

WM. W. LYON,
GEORGE HILL.