J. M. HANSEN.

DIES FOR FORGING RAILROAD AXLES.

APPLICATION FILED NOV. 25, 1911.

1,041,998.

Patented Oct. 22, 1912.

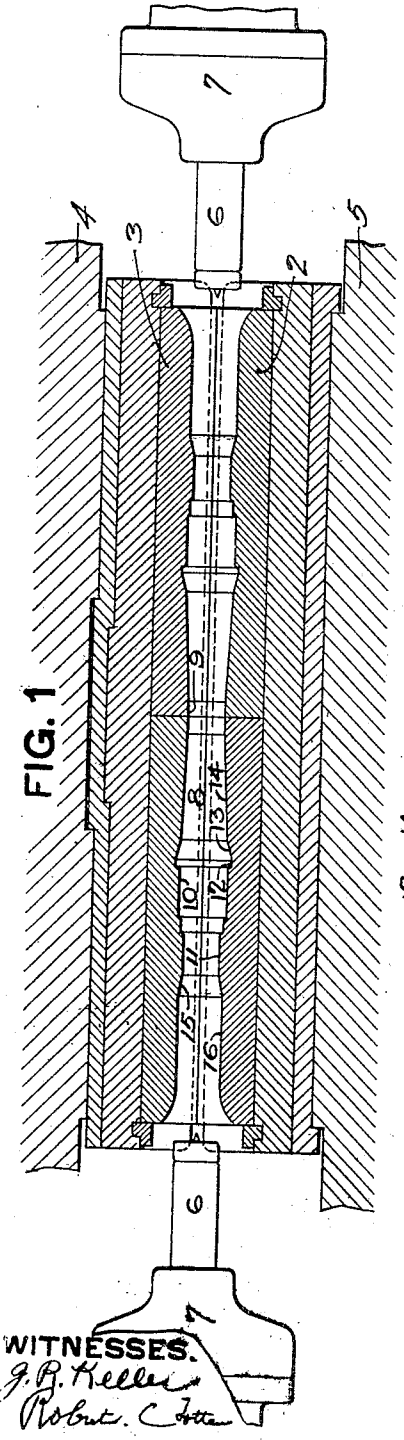

FIG. 1

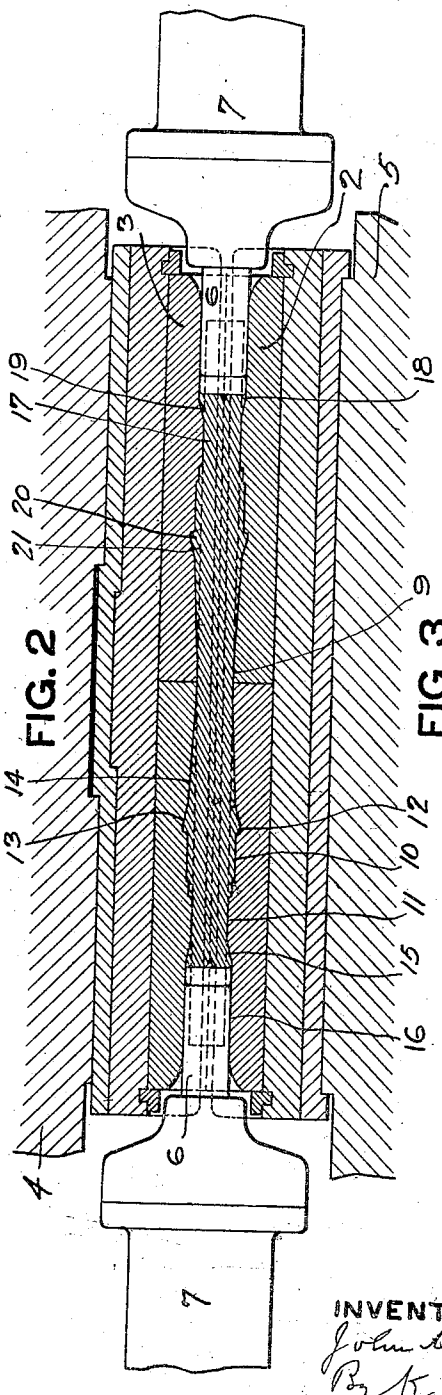

FIG. 2

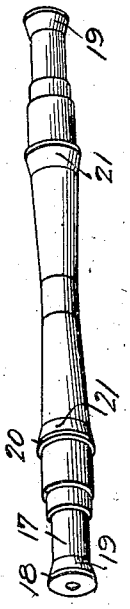

FIG. 3

WITNESSES.

J. B. Keller

Robert C. Potter

INVENTOR.

John M. Hansen

By Kay & Potter

Attorneys

UNITED STATES PATENT OFFICE.

JOHN M. HANSEN, OF PITTSBURGH, PENNSYLVANIA.

DIES FOR FORGING RAILROAD-AXLES.

1,041,998. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed November 25, 1911. Serial No. 662,308.

To all whom it may concern:

Be it known that I, JOHN M. HANSEN, a citizen of the United States, and resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Dies for Forging Railroad-Axles; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to dies for forming railroad axles and similar articles.

It is particularly though not exclusively applicable to dies for the practice of the method described in a companion application filed by me of even date herewith, Serial No. 662,309 providing for the manufacture of such axles from the ordinary angular bars of commerce of the same section throughout their length by the heating of the bar, clamping it within the dies and upsetting it to bring it to cylindrical form and forming enlargements thereon.

The object of the invention is to provide for the easy flow of the metal under the endwise pressure of the upsetting operation so as to insure the filling of the entire die cavity whatever may be the shape of the enlargement thereon.

It consists, generally stated, in axle forging dies having the inner die faces of all enlargements of the matrix of the holding dies inclined toward the center of said matrix, so that such inclined faces will permit easy flow of the metal under the upsetting pressure toward the center of the axle without providing any obstruction which might hold back the metal as it is expanded under the upsetting pressure.

In the accompanying drawings Figure 1 is a longitudinal section of the dies; Fig. 2 is a like section indicating by dotted lines the position of the bar therein before upsetting, and in full lines the completed axle therein; and Fig. 3 is a view of the finished axle.

The dies embodying the invention as illustrated have the clamping or holding dies 2, 3, mounted in any suitable press 4, the die 2 resting on the bed 5 of the press and the upsetting plungers 6 being operated by suitable power, being shown as connected to the rams 7, such as where they are operated by hydraulic pressure.

The dies are illustrated with the matrix cavity 8, the plungers 6 entering the ends of said cavity and operating upon the blank to upset the same and expand it to fill the die cavity.

The die has the central clamping faces 9, the faces 10 for forming the wheel seats, and the faces 11 for forming the journal bearings. It is also provided with the enlargements 12 for forming the collars back of the wheel seats, and between said collars and the clamping faces 9 it will be seen that the dies have the inclined portions 13 and beyond the same the inclined portions 14, said inclined faces extending toward the center of the dies for forming the body of the finished axle tapering toward the mid portion thereof, the inclined faces 13 being at a more abrupt incline than the inclined faces 14. At the ends of the dies where the outer end collars of the journal bearing are to be formed I provide the inclined faces 15 and beyond the same the straight seats 16 of the same diameter throughout, said seats extending toward the ends of the matrix dies and being of a diameter corresponding thereto.

In the use of the dies the bar from which the axle is to be formed may be of any suitable section, rectangular, or hexagonal or cylindrical, as desired. It is properly heated and placed within the dies, as illustrated in dotted lines Fig. 2, the upper die 3 descending and clamping it within the matrix cavity, and the plungers 6 are then advanced to engage with the ends of the bar and upset it within the matrix cavity and under the upsetting pressure the bar will be enlarged or expanded and fill the die cavity, as illustrated in Fig. 2. Under this upsetting pressure where the metal is forced out against the walls of the die cavity to fill the same, it will be brought into contact with the inclined faces 13, 14, 15, and will flow over said inclined faces to properly fill the matrix cavity without liability of being held or retarded in its movement within the dies by abrupt shoulders, so that less pressure is required for expanding the metal to properly fill all of the enlarged portions of the matrix cavity. Thus under the continued pressure of the plungers there will be an easy and natural flow of the metal toward the center of the matrix cavity over parallel or inclined faces only and the metal will spread outwardly under the final pressure of the plungers to fill out against the shoulders at the outer faces of any enlargements in the matrix cavity and insure the proper formation of all such shoulders and the

complete filling of such portions of the die cavity. After the forging of the axle from the bar in case it is required that enlargements with abrupt inner faces shall be formed in the axle as completed ready for use, for example in connection with the journal bearing 17 and the outer collar 18 thereof, in the subsequent turning of the axle the metal on the inner face of such collar, as at 19, can be turned off at practically no expense over the usual turning of such bearing. In like manner if required the metal at the inner side of the collar 20 forming the shoulder against which the wheel is seated, can be turned off to form the completed shoulder as at 21. The same general principle can be applied to the upsetting of any similar articles.

What I claim is:

In dies for the forging of railroad axles and similar articles, the combination with upsetting plungers, of holding dies having a matrix provided with enlargements and having all the inner die faces of such enlargements inclined toward the center of the matrix.

In testimony whereof, I the said JOHN M. HANSEN, have hereunto set my hand.

JOHN M. HANSEN.

Witnesses:

ROBERT C. TOTTEN,

J. R. KELLER.