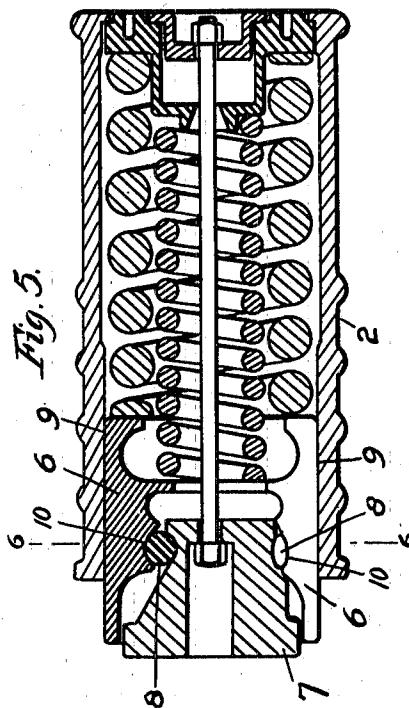
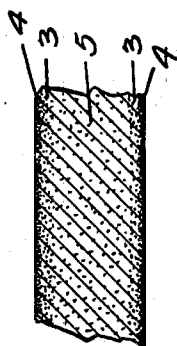
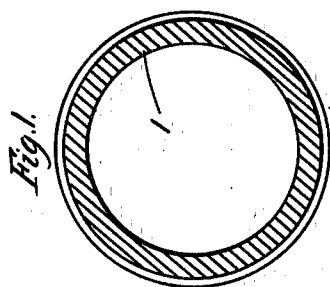
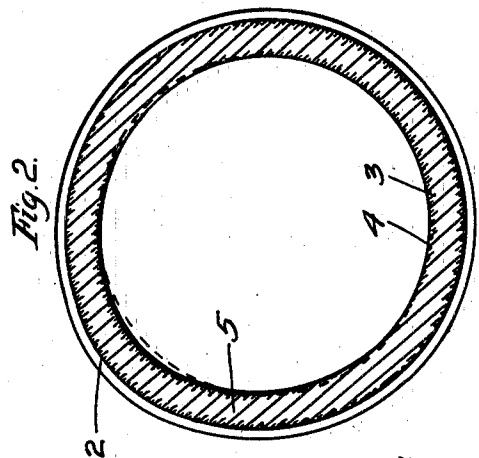
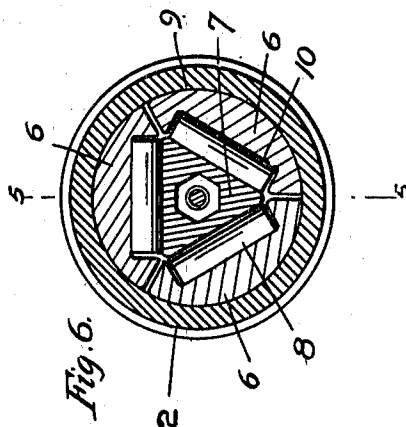
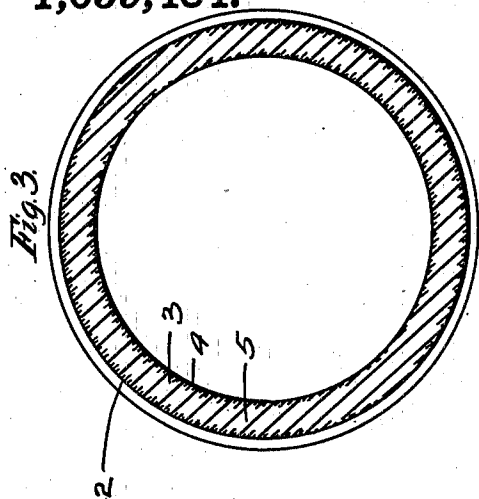


J. F. O'CONNOR.
METHOD OR PROCESS OF MANUFACTURING MALLEABLE IRON FRICTION CYLINDERS OR
SHELLS FOR DRAFT GEAR.
APPLICATION FILED DEC. 28, 1910.

1,059,484.

Patented Apr. 22, 1913.



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UNITED STATES PATENT OFFICE.

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METHOD OR PROCESS OF MANUFACTURING MALLEABLE-IRON FRICTION CYLINDERS OR SHELLS FOR DRAFT-GEAR.

1,059,484.

Specification of Letters Patent.

Patented Apr. 22, 1913.

Application filed December 28, 1910. Serial No. 599,755.

To all whom it may concern:

Be it known that I, JOHN F. O'CONNOR, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Methods or Processes of Manufacturing Malleable-Iron Friction Cylinders or Shells for Draft-Gear, of which the following is a specification.

My invention relates to improvements in the manufacture of malleable iron friction members, cylinders or shells for friction draft rigging of railway cars.

Heretofore in the manufacture of malleable iron friction shells or cylinders for friction draft gear, it has been customary after the white iron castings have been made and annealed in the usual manner packed in iron, steel or metallic chips or scale, to finish and true up by grinding the interior surface of the cylinder to correct such irregularities or deviations from true cylindrical form as ordinarily occur in making malleable iron castings, and thus bring it to a true cylindrical shape and give it a bright, metallic friction face or cylindrical surface. In practical use, however, difficulty is experienced with such malleable iron friction shells when combined with steel friction shoes having hardened, smooth friction faces from variation or lack of uniformity in amount of frictional resistance developed under varying conditions of practical use, such, for example, as rusting of the bright metallic friction face of the shell or other causes; and also difficulty sometimes from tendency to cut or to excessive wear of the friction face of the cylinder when sliding against the friction shoes under the enormously heavy pressure occasioned in practical use of the draft rigging in cushioning buffing or pulling shocks of heavy trains.

The object of my invention is to provide an improved process or method of manufacturing malleable iron friction shells by which the cost of manufacture may be materially reduced and a much better product produced, one that will be far more durable than those heretofore in use, and which will develop a substantially uniform frictional resistance under different conditions of practical use or service, and be entirely free from all liability to cut or unduly wear when sliding against the hardened steel

friction shoes under the heaviest pressure incident to buffing and pulling shocks of trains. To practically accomplish this important object or result, I clean from sand, finish up and grind to the extent necessary to finish or smooth from sprues or protuberances, the hard, white iron casting (from which the malleable iron friction cylinder or shell is to be formed) before it is annealed; I then anneal the cleaned and smoothed or finished hard, white iron casting, in a closed, sealed or muffled annealing oven, without packing, enveloping or embracing the casting either inside or outside in any iron or steel chips or scale or other packing, so that during the annealing process, air and gases having access to the casting there will be produced on the casting an inner, external friction face layer or skin, to the depth or thickness of about one sixteenth of an inch, of relatively dense, relatively hard, relatively fine grained and short fibered, and relatively brittle or friable metal of a comparatively white color and having a permanent exterior oxidized coating of a reddish color, while the interior or body portion is relatively soft, relatively strong, relatively tough, relatively tenacious and relatively long fibered, and of the customary black or dark malleable iron color; and then after the malleable iron shell thus produced has been slowly cooled in the customary annealing way, it is, if out of true cylindrical shape, subjected to internal pressure of an expansible shaping device to bring its internal friction face to true cylindrical shape or other shape required to properly and truly fit the friction shoes with which it is to coact, without grinding away, injuring or removing the hard, dense friction face or skin or the oxidized exterior or coating thereof with which it has been provided in the annealing step of my process.

Malleable iron friction draft gear shells produced by my process have, (as I have discovered and demonstrated by my experiments, and also by practical use,) the important and valuable qualities or characteristics of developing a high degree of frictional resistance when sliding under heavy pressure against friction shoes having smooth, polished, hardened steel friction faces; of producing a substantially constant

amount of frictional resistance under varying conditions of practical use, that is to say, of maintaining a substantially constant coefficient of friction; and of being extremely durable and entirely preventing and overcoming all tendency to cut or unduly wear. And by my process, my malleable iron friction shells or cylinders may be manufactured at a materially less cost than by the processes or methods heretofore employed.

In the drawing, to enable my invention to be more fully and clearly understood by those skilled in the art, I have represented at Figure 1 a cross section of a hard, white iron casting, such as I employ in manufacturing my malleable iron friction shells by my process. Fig. 2 is a similar view enlarged, showing the same after being subjected to the annealing step and indicating the integral friction face layer or skin of relatively hard, tough, brittle metal as compared with that of the interior body portion of the malleable iron casting, in this view the friction shell being represented as somewhat out of circular form in cross section, as such castings may frequently be when originally formed. Fig. 3 is a view similar to Fig. 2, but showing the friction shell after it has been, by internal pressure shaped to true circular form without disturbing or removing any portion of the friction face-layer or skin. Fig. 4 is a detail, enlarged, sectional view of the finished cylindrical friction shell. Fig. 5 is a longitudinal, diametrical section of the friction shell showing the same with the shock absorbing mechanism assembled therein, and taken substantially on the line 5—5 of Fig. 6, and Fig. 6 is a transverse, sectional view, taken substantially on the line 6—6 of Fig. 5.

In the drawing, 1 represents the hard, white iron casting, 2 the malleable iron friction shell formed therefrom, 3 the friction face layer or skin on the inner external surface of the shell and 4 the oxidized coating or outermost portion of the friction face layer or skin.

5 represents the interior soft, strong, tough body portion of the malleable iron friction shell.

In Figs. 5 and 6, 6 represents the friction shoes, 7 the wedge and 8 anti-friction rollers which are interposed between the friction shoes and wedge of the friction draft gear.

The friction shoes are preferably of steel with case hardened smooth polished friction faces 9 and with case hardened wedge faces 10 for engagement with the anti-friction roller, which is preferably of hardened tool steel, the wedge being preferably of cast steel with case hardened wedge faces 11 for engagement with the anti-friction rollers.

As in my invention, the white iron casting in the annealing step is not embraced or enveloped by any packing material, the inner friction face layer or skin of the shell, especially at the outermost portion thereof becomes highly oxidized to an appreciable depth and is thus rendered refractory and heat resisting in character, and also of a character to effectually resist any tendency to weld, fuse or metallically unite with the bright metal of the friction shoes when sliding under enormously heavy pressure. This oxidized refractory outer portion of the friction face layer of the shell thus effectually prevents the interengaging faces of the shell and shoes from approaching a condition or state in which cutting, grooving or excessive wear can take place.

I claim:—

1. The method or process of manufacturing malleable iron friction draft gear shells consisting in first making a hard, white iron casting, then smoothing or finishing the same by removal of protuberances, then annealing the same and simultaneously providing the annealed shell with an interior friction face layer or skin of relatively hard, dense, brittle and friable metal, substantially as specified.

2. The method or process of manufacturing malleable iron friction draft gear shells consisting in first making a hard, white iron casting, then smoothing or finishing the same by removal of protuberances, then annealing the same and simultaneously providing the annealed shell with an interior friction layer or skin of relatively hard, dense, brittle and friable metal, and then truing the shell without disturbing or removing said friction face layer or skin by subjecting the malleable iron shell to internal shaping pressure, substantially as specified.

JOHN F. O'CONNOR.

Witnesses:

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