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1,664,904

E. J. STANEK

APPARATUS FOR STRAIGHTENING TUBULAR CASTINGS

Filed Jan. 4, 1926

2 Sheets-Sheet 1

Fig. 1.

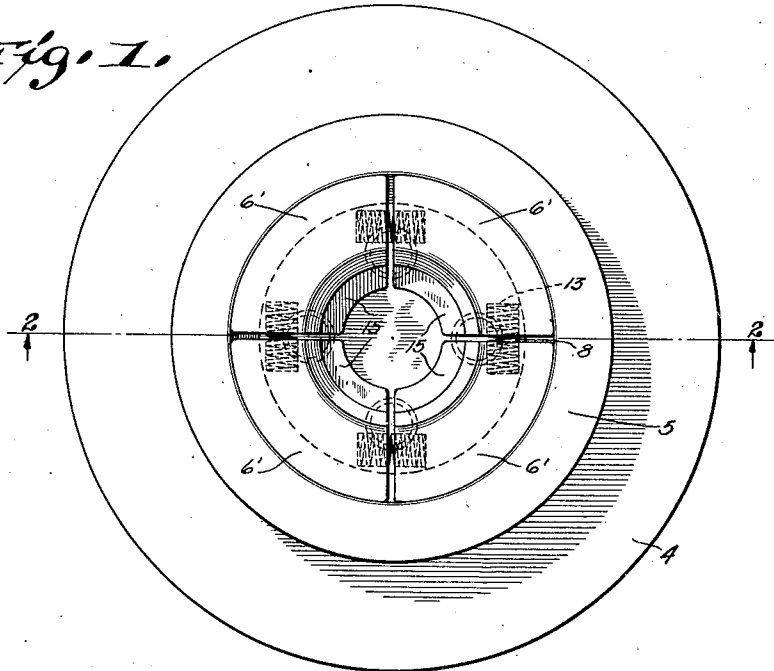


Fig. 2.

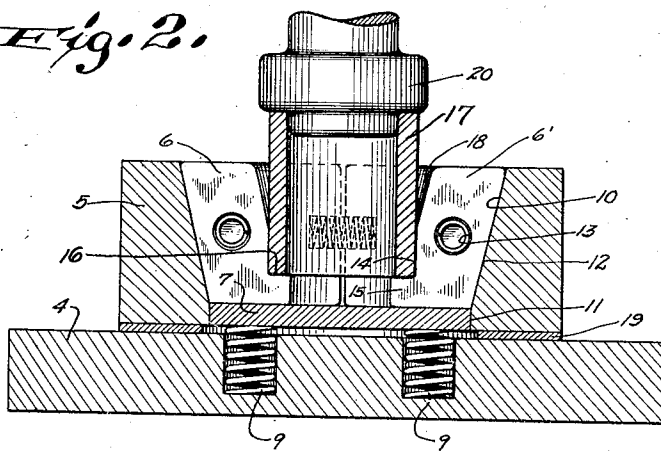
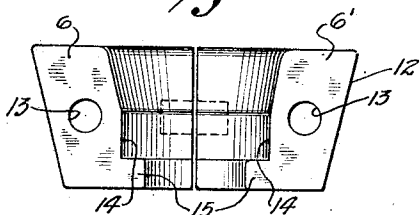


Fig. 3.



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Fig. 4.

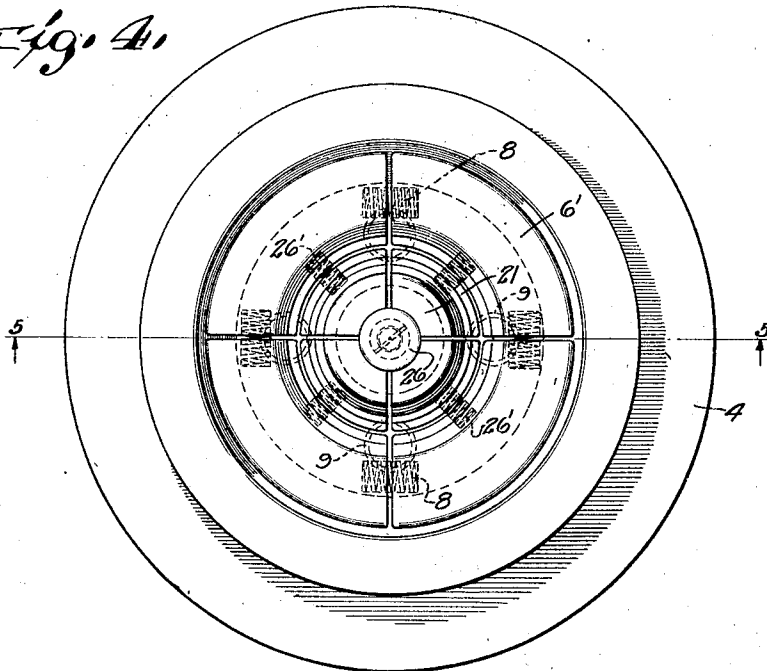


Fig. 5.

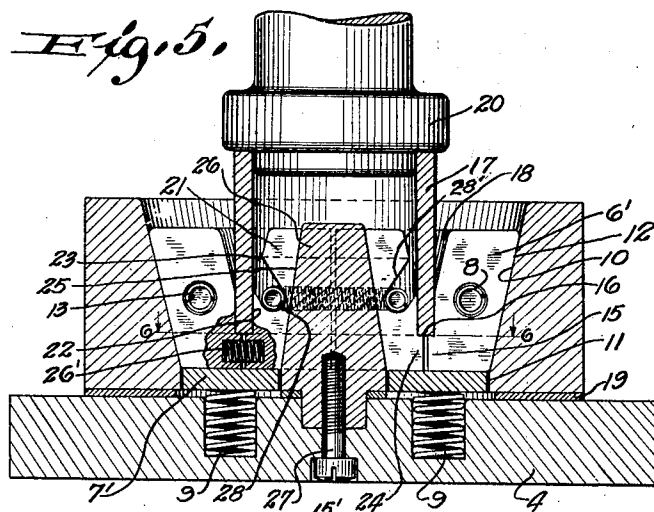
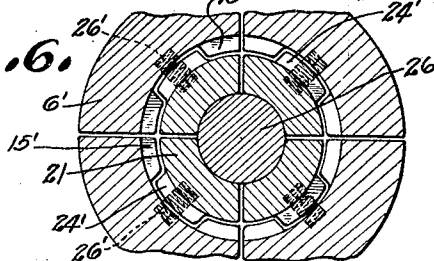


Fig. 6.



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APPARATUS FOR STRAIGHTENING TUBULAR CASTINGS.

Application filed January 4, 1926. Serial No. 79,276.

The invention relates to devices for straightening and truing up castings.

Castings as they come from the molds often vary to a considerable extent from the true dimensions because of the shifting of the cores or the failure to center them properly, and because of the inaccuracies occurring during casting or distortions occasioned by annealing cannot be readily chucked for machining to their finished dimensions. The object of this invention is to provide an apparatus for straightening or truing up castings, such as malleable iron castings, whereby a chucking surface is provided which will enable the castings to be readily and accurately machined without previous hand work, and more particularly to provide an apparatus for truing up castings having tubular ends.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings, Fig. 1 is a plan view of an apparatus embodying the invention;

Fig. 2 is a detail sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a detail view of the straightening dies;

Fig. 4 is a plan view of another apparatus embodying the invention;

Fig. 5 is a detail sectional view taken on the line 5—5 of Fig. 4; and

Fig. 6 is a detail sectional view taken on the line 6—6 of Fig. 5, showing certain modifications.

In the drawings the numeral 4 designates a base member, 5 a casing and die guide, 6 the straightening dies, 7 a stripper-plate, 9 springs associated with the plate 7, and 8 springs associated with the dies.

The casing 5 has a wedge-shaped surface or surfaces, and in the case of a tubular casting the surface 10 is of conical form, meeting at its lower end a cylindrical surface 11 forming a bore for the cylindrical stripper-plate 7. The straightening die is made up of die sections 6' having wedge-shaped outer surfaces 12 which are in the form of segments of a conical surface to cooperate with the conical surface 10, and are normally separated by the springs 8 seating in bores 13 in the adjacent sections or parts of the straightening die. The inner walls 14 of each of the die sections 6' are shaped to con-

form to the trued up shape of the article to be straightened, and in the case of a cylindrical tube, is in the form of a segment of a cylindrical surface, it being understood that this surface may be plain where plain tubular castings are being treated, or be recessed at such points as may be necessary to accommodate lugs on the castings. Adjacent the inner walls 14 each die section has an inwardly extending stop portion 15, here shown as a flange, the flanges of adjacent sections being designed to form a stop surface against which the end 16 of the casting 17 to be straightened abuts. The die sections adjacent the walls 14 may be relieved above this portion by tapering wall portions 18 to permit ready insertion of the end of the casting to be straightened within the cavity formed by the dies.

One or more shims 19 may be interposed between the base member 4 and the casing member 5 so that the sleeve or casing member 5 in which the dies 6' are mounted may be raised or lowered to adjust the dies for different lengths of travel relative to said casing and hence accommodate castings of varying external diameters.

With this construction, the end of the article to be straightened is inserted into the die cavity when the die members are spread apart by the springs 8 so that its edge portion abuts against the stop portions 15 of the die members, after which a plunger or ram 20 of a suitable press engages the opposite end of the casting and exerts pressure thereon which is transmitted through the casting to the stop portions 15 of the dies, causing said dies to move relative to the fixed casing along the wedging surfaces so that the dies are contracted about the article being straightened until the finished dimensions for the outer surfaces of such article engaged by the dies have been reached, the wedging action between the dies and the casting 5 producing a powerful squeezing or pressing of the outer surfaces of the casting to the desired size and truing up the dimensions of these outer surfaces so that the same may readily be chucked. Thereafter the release of pressure from the plunger allows the springs 9 to act on the stripper-plate 7 and push the dies 6 upwardly and loosen them from wedging engagement with the member 5, and as soon as said sections are free they are pushed outwardly or apart by the springs

8 acting upon them and thus the casting is freed from the die.

In Figs. 4 and 5 I have shown an apparatus including the parts previously described, and hence similarly referenced, and in addition have shown mechanism for truing up the interior of the casting 16. This mechanism includes a plurality of straightening dies or die sections 21 generally similar to the dies 6' and having casting-engaging surfaces 22, relief surfaces 23, flange portions 24 and conically-tapered surfaces 25. The conically-tapered surfaces 25 cooperate with a conical plug 26 secured by a screw 27 to the base 4, the stripper-plate 7' in this case being of annular form to accommodate the plug 26. A coiled tension spring 28, shown in Fig. 5, secured together at its ends, is mounted in a recess 28' in said dies, to normally tend to draw the die sections together.

As shown in Figs. 4 and 5, the stop flange portions 15 and 24 project part way across the end 16 of the casting, but instead of this arrangement the dies 6' may have spaced projections 15' extending across the full thickness of the tube, and the dies 21 have similar projections 24' interposed between the projections 15', as shown in Fig. 6, so that each set of stops on the dies has a full bearing on the end of said casting.

With this construction the dies 6' function as previously described and at the same time the movement of the dies 21 by their engagement with the lower end of the casting and the conical plug 26 cause said dies to move out against the inner portion of the tube simultaneously with the contraction of the dies 6' about the outer side of the tube during the downward movement of said tube by the plunger 20. When the pressure is released the springs 9 act to move the plate 7' upwardly, thereby freeing the dies 6' from the tube and the dies 21 from the plug 26, whereupon the springs 8 spread the dies 6' apart and the springs 28 pull the dies 21 together, thereby releasing the casting.

It will, of course, be understood that the dies 21 and their associated parts may be used without using the dies 6' to secure straightened surfaces on the inner end of the tube, permitting the use of a suitable chuck or mandrel for subsequent machining of the casting.

As the tube engages the die sections near their lower ends, the tendency of the die sections to be pushed away from the tube is prevented and the pressure is efficiently applied so that the dies grip the tube harder and harder as they move along the conical surfaces of the member 5 toward the stripper-plate.

In addition to, or instead of, the springs 8 and 28, springs 26' may be disposed in a bore in the flanges 24 or 24' and 15 or 15',

as shown in Figs. 4 to 6, inclusive, so as to act on both sets of dies to spread them apart or away from the casting when the pressure from the plunger 20 is relieved.

By the term "tubular casting" it will be understood that such term includes hollow members of circular or polygonal form.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are expressed in the claims at the conclusion hereof.

What I claim as my invention is:

1. In an apparatus of the character described, the combination of a die casing, a sectional contractible die engageable with a casting to be straightened mounted in said casing and having wedging surfaces cooperating with the wedge surfaces of the casing to cause a contraction of the sections of the die upon their movement in the casing, means on the die forming a stop for the casting to be straightened, said sections having surfaces conforming to the general form of the casting to be straightened, and means for putting pressure upon the casting to cause it and the dies to move relative to the casing to straighten the casting.

2. The combination with a casing and straightening dies disposed therein for engagement with a tubular article, of cooperative surfaces on the dies and casing to cause the dies to contract about the tubular article to be straightened, means for moving the entire article during straightening and means for moving the dies by pressure transmitted from the article being straightened.

3. In an apparatus of the character described, the combination of a relatively fixed casing having tapered surfaces, a plurality of straightening dies adapted to engage the material and having tapered surfaces engaging with the tapered surfaces of the casing member, said dies being provided with laterally extending stops engaged by the article to be straightened, of means for exerting pressure upon the article to be straightened and thus exert pressure through the material on the dies, springs normally tending to separate the dies, and means for normally tending to move the dies upwardly relative to the casing.

4. In an apparatus for truing up castings having tubular portions, the combination of a casing member having a conical bore, a plurality of dies adapted to receive the tubular portion within them and having conically tapered faces engaging the bore of said casing member and laterally extending projections engageable with the casting to be straightened, of means engaging the article to be straightened to cause the same to move the dies to perform their straightening operation, and means for releasing the dies from the straightened casting.

5 5. In a device of the character described, the combination of a plurality of dies having surfaces engageable with a casting, for truing it up, and projections engaged by an end of the casting to move the dies lengthwise therewith during the truing-up operation, and means for guiding the dies and causing their straightening engagement with the casting during its movement with said dies.

the combination of a sectional, contractible die engageable with the outer wall of a hollow casting to be straightened, a sectional, expansible die engageable with the inner wall of said casting, and means for guiding said dies and moving them lengthwise with the casting to cause their straightening engagement therewith.

In testimony whereof, I affix my signature.

EDWARD J. STANEK.

10 6. In a device of the character described,