

No. 775,170.

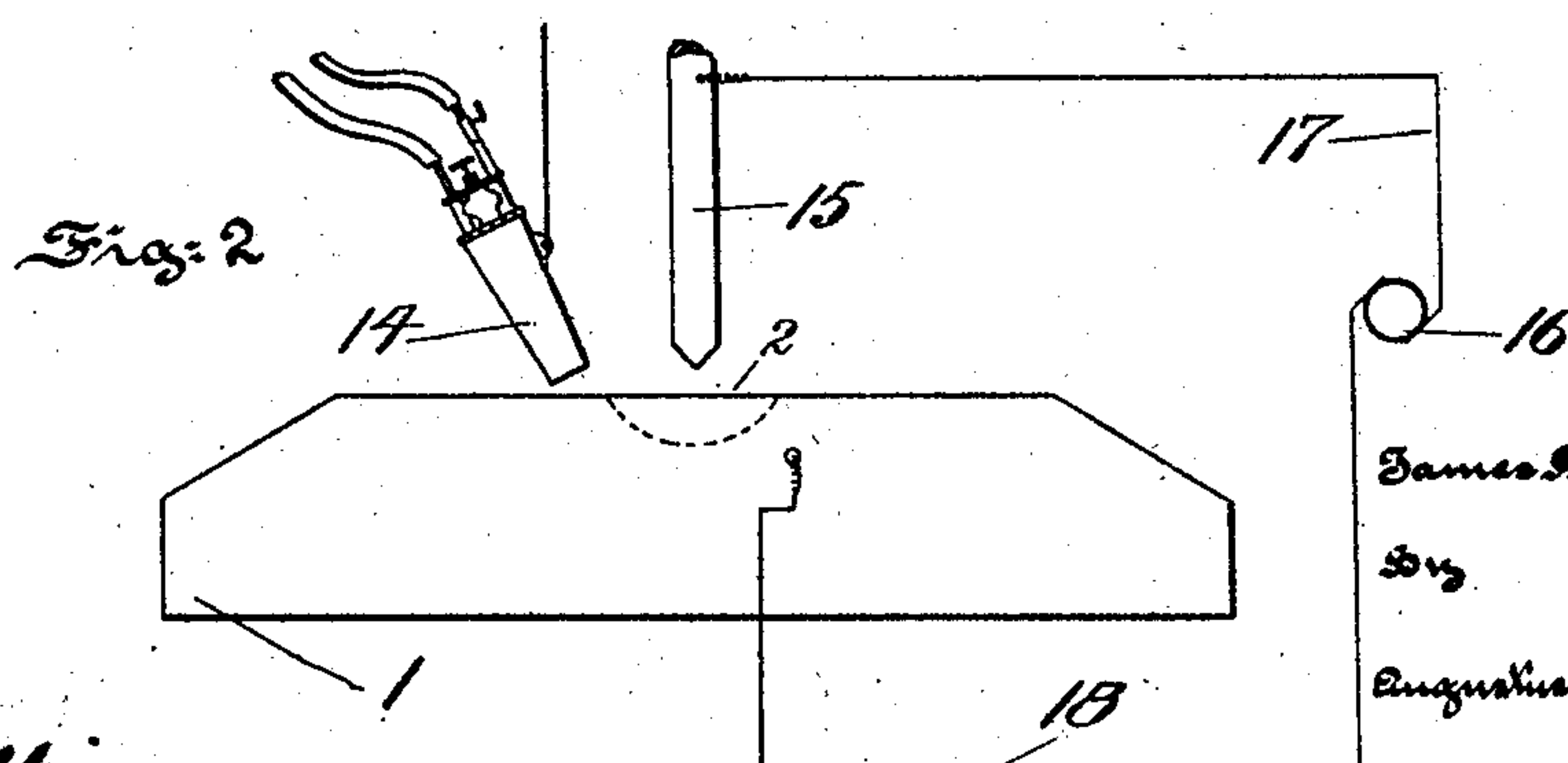
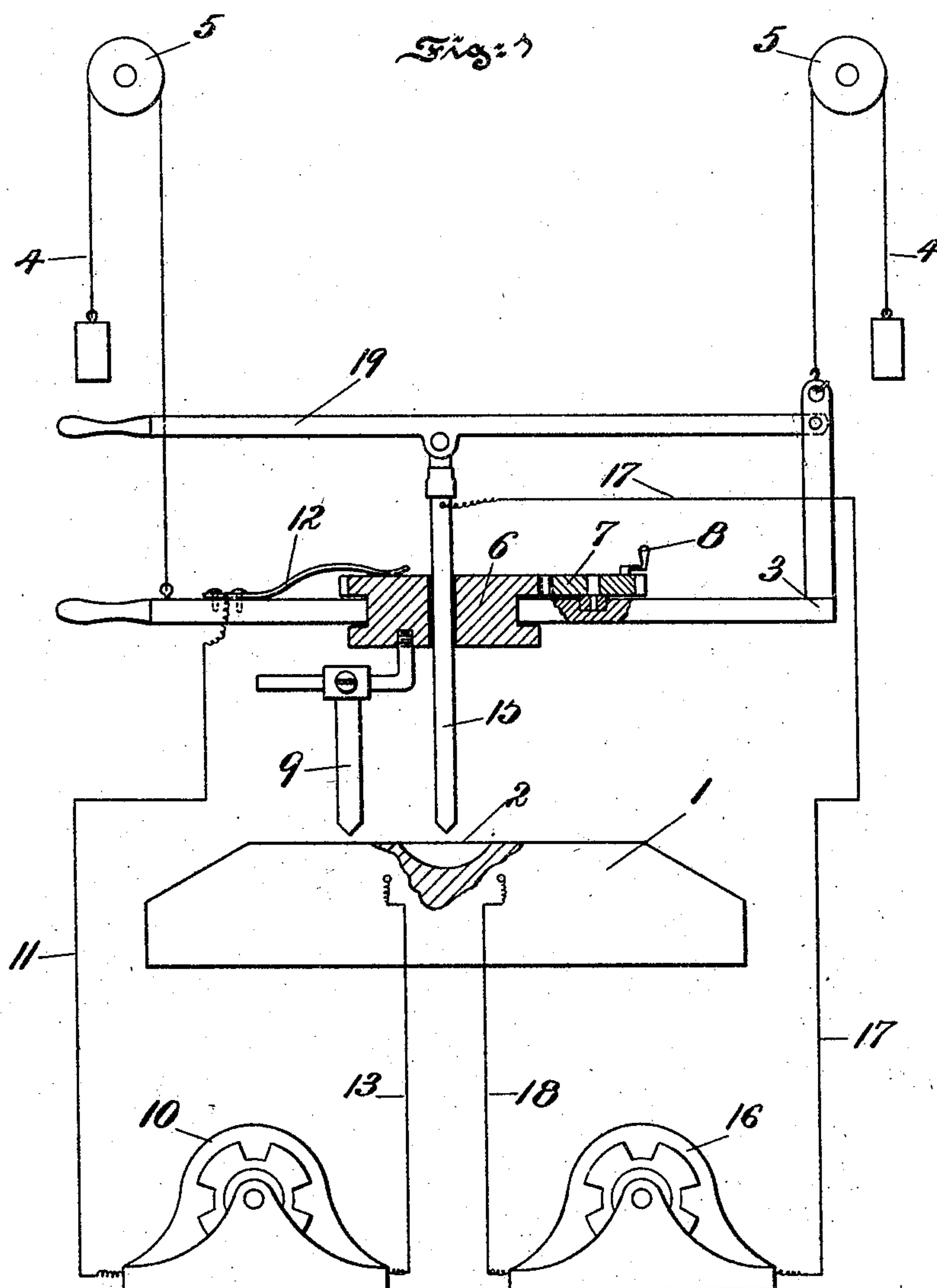
PATENTED NOV. 15, 1904.

J. H. GRAVELL.

## PROCESS OF REPAIRING CASTINGS OR THE LIKE.

APPLICATION FILED MAR. 10, 1904.

NO MODEL.



**Witnesses**

~~THURSDAY~~  
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# UNITED STATES PATENT OFFICE.

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## PROCESS OF REPAIRING CASTINGS OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 775,170, dated November 15, 1904.

Application filed March 10, 1904. Serial No. 197,513. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES H. GRAVELL, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Process of Repairing Castings or the Like, of which the following is a specification.

One object of the present invention is to provide for repairing castings in such a way that the added metal will be capable of being machined and will not crack.

To this and other ends hereinafter set forth the invention comprises the improvements to be presently described and finally claimed.

In the drawings I have illustrated a type of apparatus useful in explaining my invention.

In the drawings, Figure 1 is a diagrammatic view illustrative of apparatus capable of use in the practice of the invention, and Fig. 2 is a similar view illustrating a modification of a portion of the apparatus shown in Fig. 1.

A description will now be given of the process in connection with the apparatus illustrated in the drawings.

To repair the casting 1, either the whole of it or that portion of it adjacent to the part 2 which is to be repaired is heated, for example, to dull redness, although the degree of heat may be increased or diminished. This can be accomplished in a variety of ways. In Fig. 1 use is made of electrical means for this purpose, and in Fig. 2 use is made of a flame. In Fig. 1 there is a frame 3 suitably suspended, as by means of the counterweighted cords 4, which pass over the pulleys 5. Within the frame there is arranged a rotating wheel 6, which can be driven by means of a pinion 7, actuated, as by a crank 8. This wheel is provided with an electrode 9, which when the wheel is turned travels around adjacent to the part to be repaired. A generator 10 by way of the circuit consisting of the conductor 11, spring 12, wheel 6, electrode 9, part to be repaired 1, and conductor 13 provides an arc between the electrode and part 1, which arc

does the heating. As shown in Fig. 2, the electrode 9 and its accessories are replaced by a burner 14, which may be of the type known as a "Tynan annealer" and which heats the required portion of the casting.

The previously-heated casting 1, or rather that portion of it which is to be repaired, receives molten metal of substantially the same kind as the casting itself, and this molten metal burns, fuses, or welds itself to the casting. For this purpose use is made of an electrode 15 of the required metal, so that when an arc is struck from this electrode to the part to be repaired the electrode is fused and the part to be repaired highly heated, so that the metal dropping from the electrode welds or unites with the casting.

16 is a generator supplying current by way of the circuit consisting of the conductor 17, the electrode 15, the casting and conductor 18 for maintaining the arc. The electrode 15 is shown as pivotally connected with a handle 19, pivotally connected with the frame 3, so that the electrode may be adjusted.

After the casting has been repaired in the manner described it and the added metal are permitted to cool, with the result that the casting including the added metal may be machined without cracking or in any way producing injury, and, in fact, the repaired part of the casting is to all intents and purposes as sound and good as the rest of it.

It will be obvious to those skilled in the art that modifications may be made in details without departing from the spirit thereof. Hence I do not confine myself to the exact proportions and mode of procedure set forth; but,

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The process of repairing castings which consists in heating the part to be repaired, establishing an arc between said part and an electrode of substantially the same metal as the casting thereby fusing a portion of the



electrode and uniting it to the casting, and permitting the casting and applied metal to cool gradually, substantially as described.

2. The process of repairing castings which  
5 consists in establishing an arc between an electrode and casting to heat the part to be repaired, and establishing an arc between the part to be repaired and an electrode of substantially the same material as the casting  
10 thereby fusing a portion of the electrode and uniting it to the casting, and permitting the casting and applied metal to cool gradually, substantially as described.

3. The process of repairing castings which  
15 consists in heating the part to be repaired, establishing an arc in proximity with said part, supplying substantially the same kind of metal as the casting to said arc thereby fusing

and uniting the said metal and the casting, and permitting the casting and applied metal to  
20 cool gradually, substantially as described.

4. The process of repairing castings which consists in heating the part to be repaired and maintaining the same in heated condition during the repairing operation, establishing an  
25 arc in proximity with said heated part, supplying metal to said arc thereby fusing and uniting the said metal and the casting, and permitting the casting and applied metal to cool gradually, substantially as described. 30

In testimony whereof I have hereunto signed my name.

JAMES H. GRAVELL.

Witnesses:

W. J. JACKSON,

K. M. GILLIGAN.