

N<sup>o</sup> 2085



A.D. 1911

Date of Application, 27th Jan., 1911—Accepted, 1st June, 1911

COMPLETE SPECIFICATION.

**Improved Method of and Means for Securing the Bosses to the Plates or Discs of Wheels.**

I, FRANK HORNBY, of 274, West Derby Road, Liverpool, Manufacturer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 This invention relates to an improved method of and means for securing bosses to the plates or discs of wheels when the boss is constructed of a separate part from the disc or plate of the wheel. Wheels having an enlarged boss are either usually turned out of the solid or are stamped up from sheet metal, the metal of the wheel being punched, drawn or shaped in some manner to form a  
10 boss integral with and of the same material as that of the disc or plate of the wheel itself. The present invention is particularly applicable to the construction of the smaller class of boss wheels used in toys, watch making, or constructional models.

15 According to the present invention the boss and the plate of the wheel are made in two separate parts, which conduces to economy in manufacture by avoiding the waste of material arising when the wheel is turned out from the solid, and a groove or annular recess is formed in the outer cylindrical surface of the boss. An eye is punched in the wheel plate and the metal in the central part of the plate or disc of the wheel is then by the action of dies forced radially  
20 inwards, thus embedding the periphery of the eye of the disc or plate into the groove and locking the plate securely to the boss.

It has been proposed to fix collars and nuts on shafting, tubes, or the like, by forcing the metal of the collar or nut by means of dies into annular grooves formed on the shafting or the like. This arrangement, however, has been pro-  
25 posed in connection with the affixing of comparatively thick collars or nuts to the shafting or the like, so that only the exterior part of the metal of the collar has been disturbed to provide the inwardly projecting ridge engaging the grooves. In the present invention, however, the whole material of the inner part of the disc is advanced bodily into the groove, and a much stronger keying effect is obtained thereby, particularly when the grooves are serrated or milled as is the case in this invention. Such a construction also secures a much firmer  
30 locking effect between the two bodies against relative rotational movement.

The invention is illustrated in the accompanying drawings in which Fig. 1. is a longitudinal section through the boss of a wheel. Fig. 2. is a diametral section through the disc or plate of the wheel. Fig. 3. is an end view of the boss in position in the wheel plate, and Fig. 4. is a diametral section corre-  
35 sponding to Figs. 1. and 2. and showing the inner metal of the disc forced into engagement with the boss. Figs. 5. and 6. are outside views of the boss showing different methods of milling or notching the annular groove. Fig. 7. shows a view of a suitable form of die for forcing the metal of the disc into engage-  
40 ment with the groove in the boss, and Fig. 8. is a modified form of die.

In carrying out the invention the boss 1 is formed with an annular groove 2 turned in the outer cylindrical surface thereof. This groove is preferably of V shape in cross section, but may be of any other desired configuration such  
45 as semicircular, square, undercut or dovetail shape. The disc 3 is formed with

[Price 8d.]



*Improved Method of and Means for Securing the Bosses to the Plates or Discs of Wheels.*

a central eye 4 preferably of such a diameter as will only just pass easily over the cylindrical part of the boss 1. The disc 3 is threaded over the boss until the inner periphery of the eye 4 is opposite the groove 2, and a pair of dies 5 are then brought to bear on the central metal of the disc 3 as shown in Fig. 7. depressing annular channels 6 in opposite sides of the metal and forcing inwardly the central metal 3<sup>a</sup> of the disc which is thus embedded into the groove and securely attaches the disc 3 to the boss. In place of constructing the dies so that they produce continuous annular channels on opposite sides of the disc 3, they may be arranged to form a series of separate depressions in the metal of the disc, which depressions would have the same effect of forcing the metal into the groove, and in place of turning a plain groove 2 in the surface of the boss, it is preferably milled as shown at 7 Fig. 5. or made with a few notches 8 as in Fig. 6. a firm keying effect being thus secured. It is preferred that the lower die should be formed with a socket recess 9 to centre the boss 1 therein, and the upper and lower dies may be brought out at 10 so as to bear against the metal of the plate near the eye at the moment of forming the channels 6 and thus prevent the metal spreading axially when the channels 6 are being formed and constrain it to move only radially inward.

Instead of forming the grooves by direct axial compression the upper die only or both dies may be caused to rotate and be fitted with rollers adapted to gradually form the channels 6 and force the metal on to the boss.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The improved method of securing a separate boss to the plate or disc of a wheel which consists in forming an annular groove in the cylindrical surface of the boss and in subsequently axially compressing the metal of the plate or disc in the region of the eye so as to distort the metal and force it inwardly into the groove, substantially as described.

2. In the method of securing a boss to the disc or plate of a wheel claimed in Claim 1, forming the groove in the boss of V or other section and milling or notching the same so as to obtain a firm keying effect between the metal of the disc and the boss when the former is forced into the groove, substantially as described.

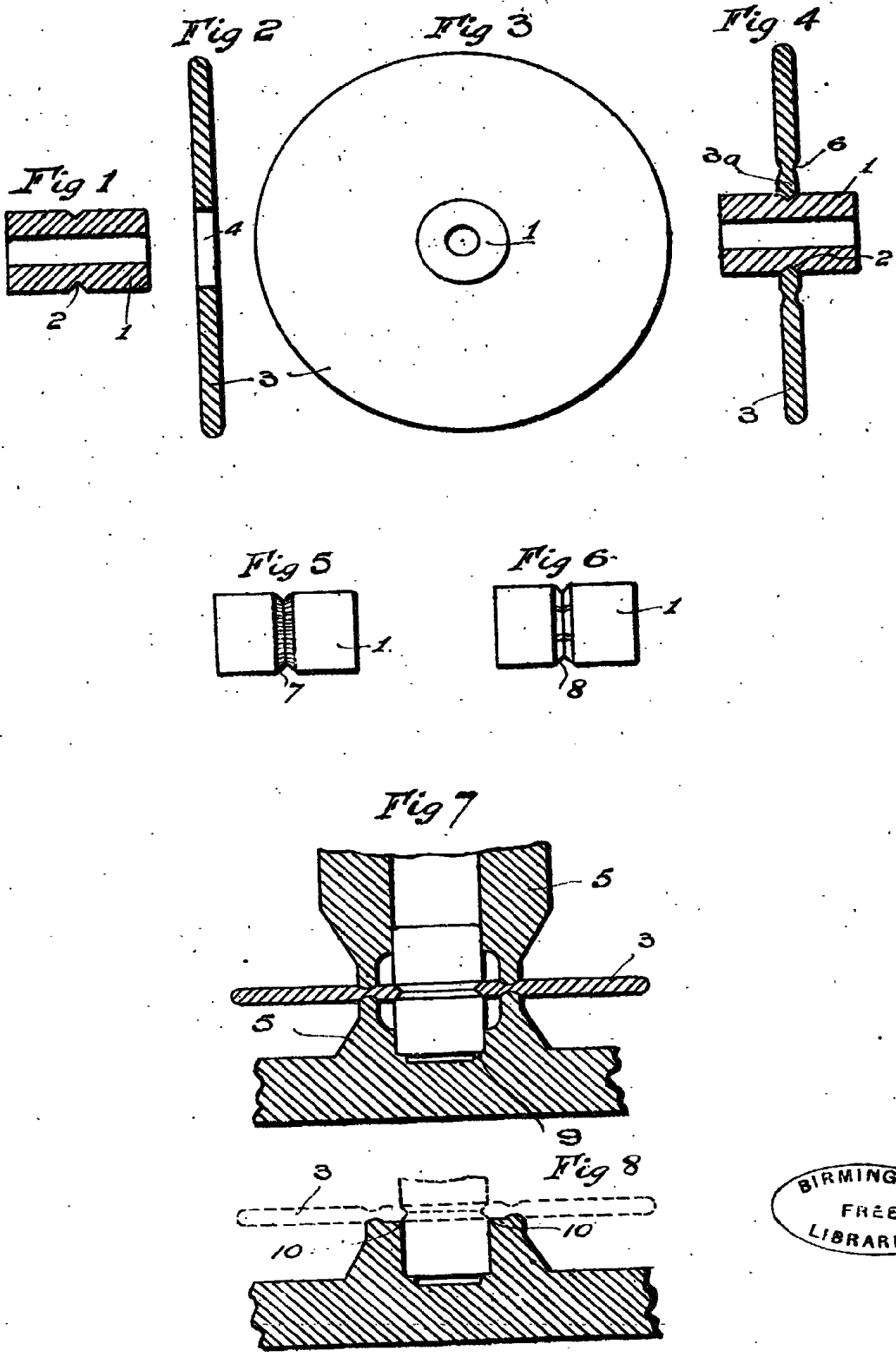
3. The improved method of and means for securing the bosses in disc, or plate wheels, substantially as described and shown in Figs. 1. to 7. of the accompanying drawings.

Dated this 20th day of January, 1911.

For the Applicant,

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[This Drawing is a reproduction of the Original on a reduced scale.]



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