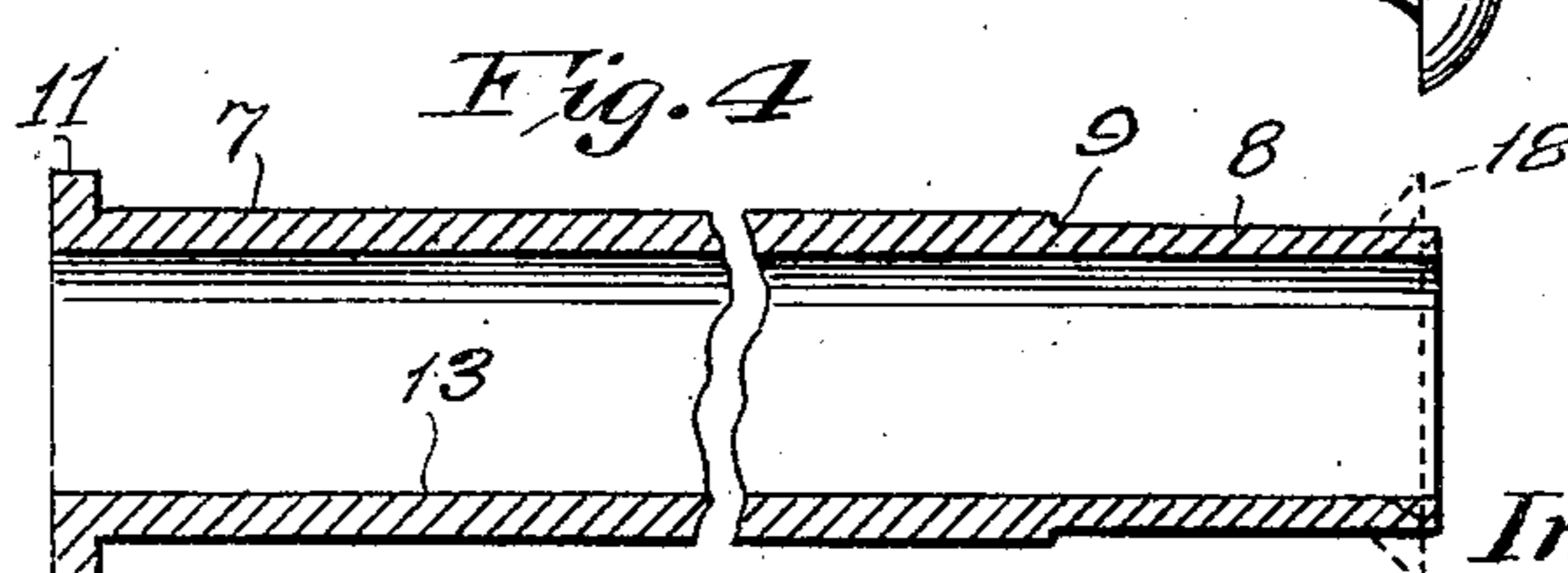
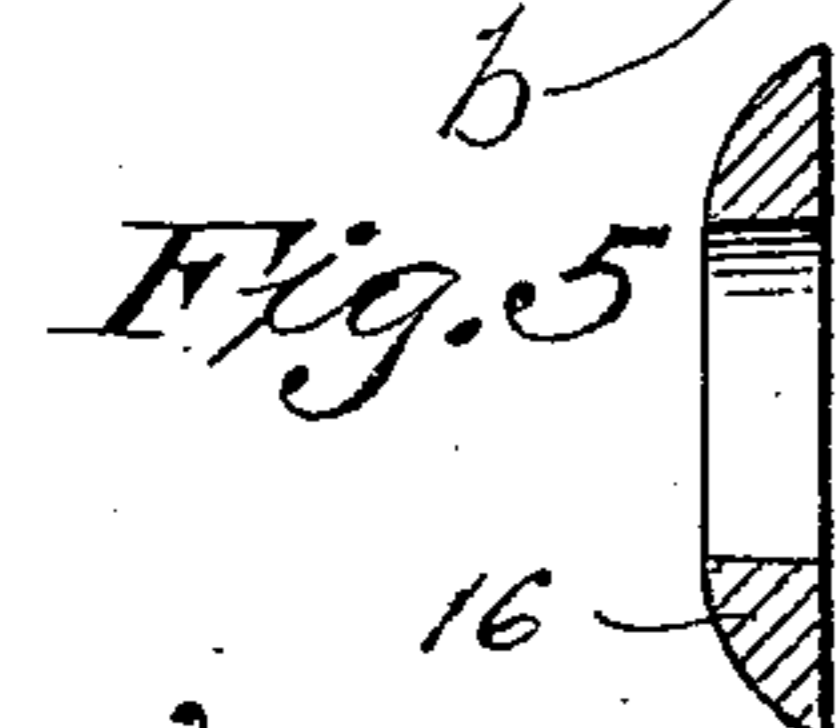
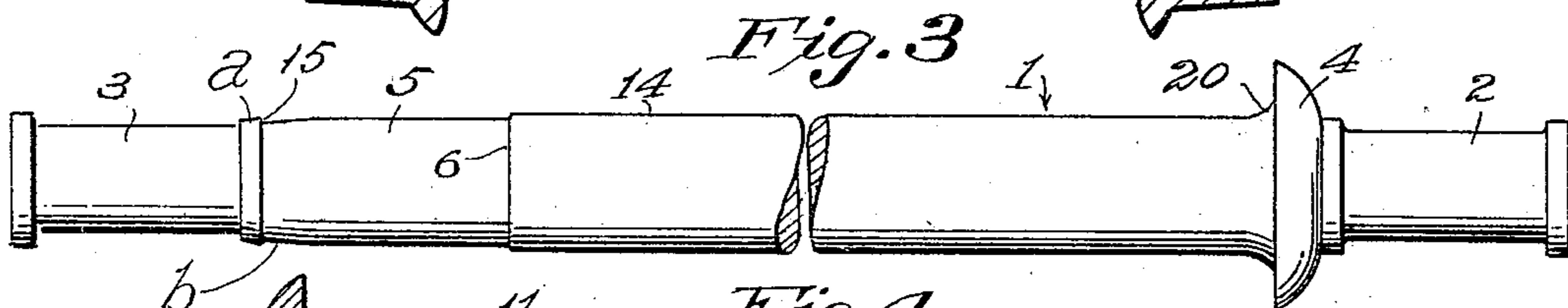
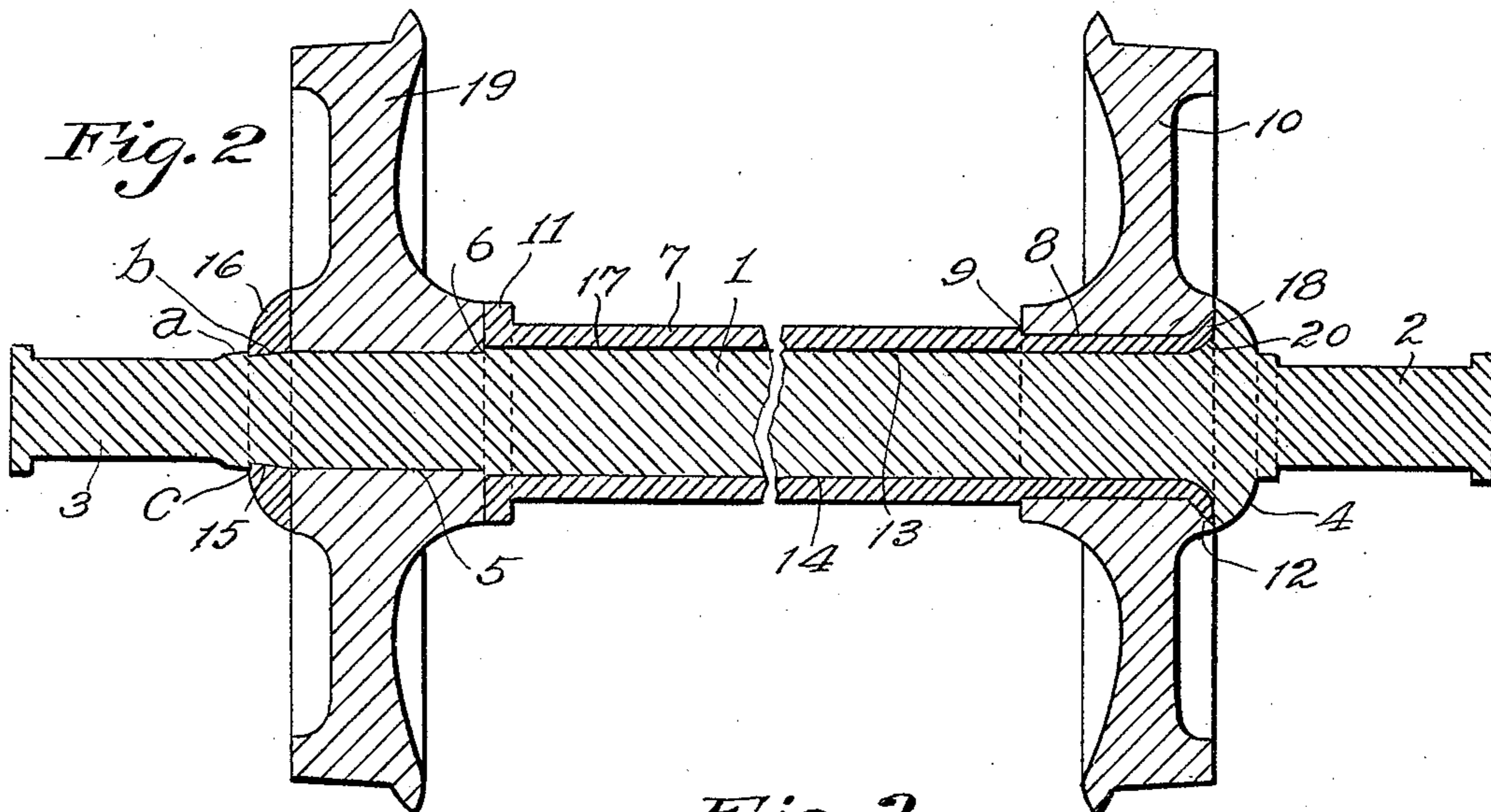
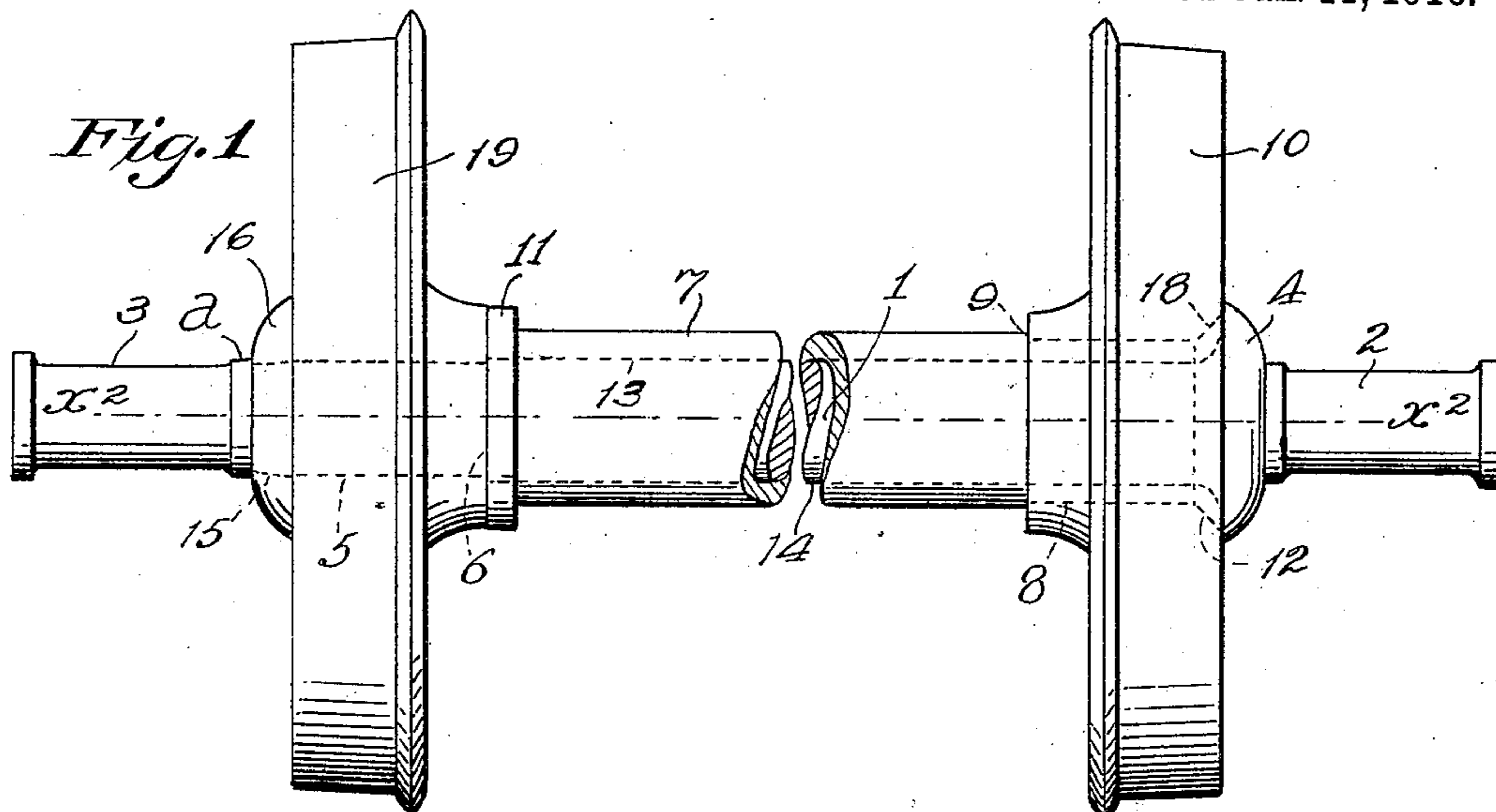


C. F. PHILLIPS.
 DIFFERENTIAL AXLE FOR RAILWAY CARS AND LOCOMOTIVES.
 APPLICATION FILED NOV. 9, 1908.

946,527.

Patented Jan. 11, 1910.



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UNITED STATES PATENT OFFICE.

CHARLES F. PHILLIPS, OF LOS ANGELES, CALIFORNIA.

DIFFERENTIAL AXLE FOR RAILWAY-CARS AND LOCOMOTIVES.

946,527.

Specification of Letters Patent.

Patented Jan. 11, 1910.

Application filed November 9, 1908. Serial No. 461,823.

To all whom it may concern:

Be it known that I, CHARLES F. PHILLIPS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Differential Axles for Railway-Cars and Locomotives, of which the following is a specification.

An object of this invention is to provide a practical, solid, strong and simple substitute for the car wheels and axles now in common use for railway cars and locomotives in which each axle is provided with two wheels rigidly fixed thereto; the said substitute being of equal or greater strength than the present construction, being also composed of but five simple parts, and allowing the wheels to move differentially, to avoid any sliding of the wheels or torsion of the axle while rounding curves or by reason of unequal tread of the wheels on the track.

This invention relates to features of the construction of a solid axle or shaft extending through both wheels, and the mounting of one or both of the wheels thereon by sleeve-like means extending along and fitting upon the intermediate portion of the shaft so that said wheels are fixed against movement along the shaft and are relatively rotatable.

The invention may be variously applied and I shall illustrate the same in the form I at present deem most desirable for railway cars.

The accompanying drawings illustrate the invention.

Figure 1 is an elevation of an antifriction support for a railway car embodying this invention in the form at present preferred for that purpose. Fig. 2 is an axial section of the same on line indicated at x^2 , Fig. 1. Fig. 3 is a detached view of the shaft shown in Figs. 1 and 2. Fig. 4 is a detached mid-sectional view of the sleeve shown in Figs. 1 and 2, before the same is inserted into the wheel. Dotted lines indicate the shape of the end of the sleeve after it has been expanded. Fig. 5 is a view of the stop detached.

The shaft or axle proper, 1 is provided at its ends with the usual journals 2, 3, and is provided adjacent the journal 2 with an annular shoulder 4 that is forged with the shaft. Said shaft is also provided adjacent the other journal 3 with a wheel-seat 5 and a shoulder 6 constructed in the usual manner

of car axles to receive the car wheel which will be seated thereon as usual by hydraulic pressure in the process of completing the structure.

7 is a sleeve provided at one end with a wheel-seat 8 terminating against a shoulder 9, and upon which seat a wheel 10 is seated by hydraulic pressure. The sleeve is provided at its other end with a flange 11. The wheel 10 may be provided with a counter sink 12 into which the end of the sleeve 7 may be expanded by any suitable means, so that when the wheel 10 has been forced upon its seat 8 and the end of the sleeve has been expanded, the wheel and the sleeve are secured together with great strength and rigidity. The bore 13 of the sleeve and the intermediate body 14 of the shaft are turned to fit each other. The shaft is provided outside the wheel-seat 5 with a shoulder seat 15 for a collar 16 that corresponds to the shoulder 4, but is not integral with the shaft 1.

In assembling the parts after the wheel 10 has been fixed to its sleeve 7, a stiff lubricant 17 will first be applied to either the surface of the bore 13, or to the body 14, or to both and then the sleeve will be slipped onto the body 14. Said sleeve is of such length that when the expanded end 18 thereof is against the shoulder 4, the flange 11 will be flush with the shoulder 6. Thereupon the other wheel 19 will be applied to the wheel-seat 5 and forced thereon by hydraulic pressure in the manner customary in the process of applying railway wheels to railway axles of the common construction. When the wheel has thus been applied the device is complete and ready for use, and the boxing of the car, not shown, may be applied to the journals 2, 3, in the usual way. For additional security the collar 16 may be applied to the seat 15, by heating the collar and forcing the same onto the seat while hot, and then allowing the collar to cool and shrink into said seat 15 and said shaft has an oblique face externally as at a to allow the collar to slip onto the seat b from the end of the shaft and to come against the wheel, and the shaft is provided with an abrupt inner face as at c so that when the heated collar has been slipped into place it will contract by cooling and cannot be removed.

In actual use the journals will rotate within the boxing of the car in the usual manner and either wheel may turn inde-

pendently of the other to compensate for inequality of the tread or the travel of the wheels, thus avoiding any sliding of either wheel on either rail, and also avoiding any internal strain due or owing to unequal travel of the treads of the wheels. By this construction the wheels are mounted on a solid shaft and are fixed against endwise movements thereon and at the same time are relatively rotatable. By this construction the wheels are fixed against movement lengthwise of the shaft and are free to rotate independently of each other. The amount of such relative rotation need not be great and therefore the liability to wear is negligible. The main purpose of the lubricant 17 is to protect against corrosion by rust or otherwise. Such lubricant may be of any suitable hard lubricating material or compound.

The shoulder 4 has an inwardly tapering portion 20 to fit the inside of the expanded end 18 of the sleeve, thus to avoid looseness, and when said expanded end of the sleeve is seated on the taper portion 20, the flange end of the sleeve will be flush with the shoulder 6 at the inner end of the wheel-seat 5 and will form a thrust bearing for the wheel 19, thus to avoid liability of excessive wearing of the wheel limb.

The car wheels 10 and 19 are the usual flanged car wheels in which the flanges are at the inner sides of their treads, and may be of any approved construction and are designed to run on the usual railway rails so that the strains which come upon the wheels in practical use will tend to shift the wheels inwardly, and this tendency is met by the sleeve 7.

I claim:

1. An antifriction support for railway

cars and locomotives comprising a shaft provided at its ends with journals 2, 3, and adjacent one journal with an annular shoulder 4 and adjacent the other journal with a wheel-seat 5 and a shoulder 6, a sleeve 7 provided at one end with a wheel-seat 8 terminating against a shoulder 9, a wheel 10 seated on the wheel-seat 8 and against the shoulder 9, said sleeve being provided at its other end with a flange and the wheel 10 being provided with a countersink into which the end of the sleeve is expanded, the shaft being provided outside the wheel-seat 5 with a shoulder-seat 15, a wheel 19 on the wheel-seat 5 and against the shoulder 6, and a collar 16 shrunk on the seat 15, the shaft having an abrupt inner face to retain the collar 16, and the wheels having flanges at the inner sides of their treads, said sleeve engaging the inner face of the hub of the wheel 19.

2. The combination with a shaft having two shoulders, of a sleeve provided with a shoulder, a wheel seated on the sleeve against the shoulder, said sleeve being expanded into the wheel and mounted on the shaft with the outer face of the hub of the wheel against the inner face of one shoulder, another wheel seated on the shaft against the other shoulder and engaging the end of the sleeve, and means to hold the last-named wheel seated on the shaft, said wheel being flanged at the inner sides of their treads, and said sleeve being rotatable on said shaft.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 31st day of October, 1908.

CHARLES F. PHILLIPS.

In presence of—

JAMES R. TOWNSEND,
M. BEULAH TOWNSEND.