

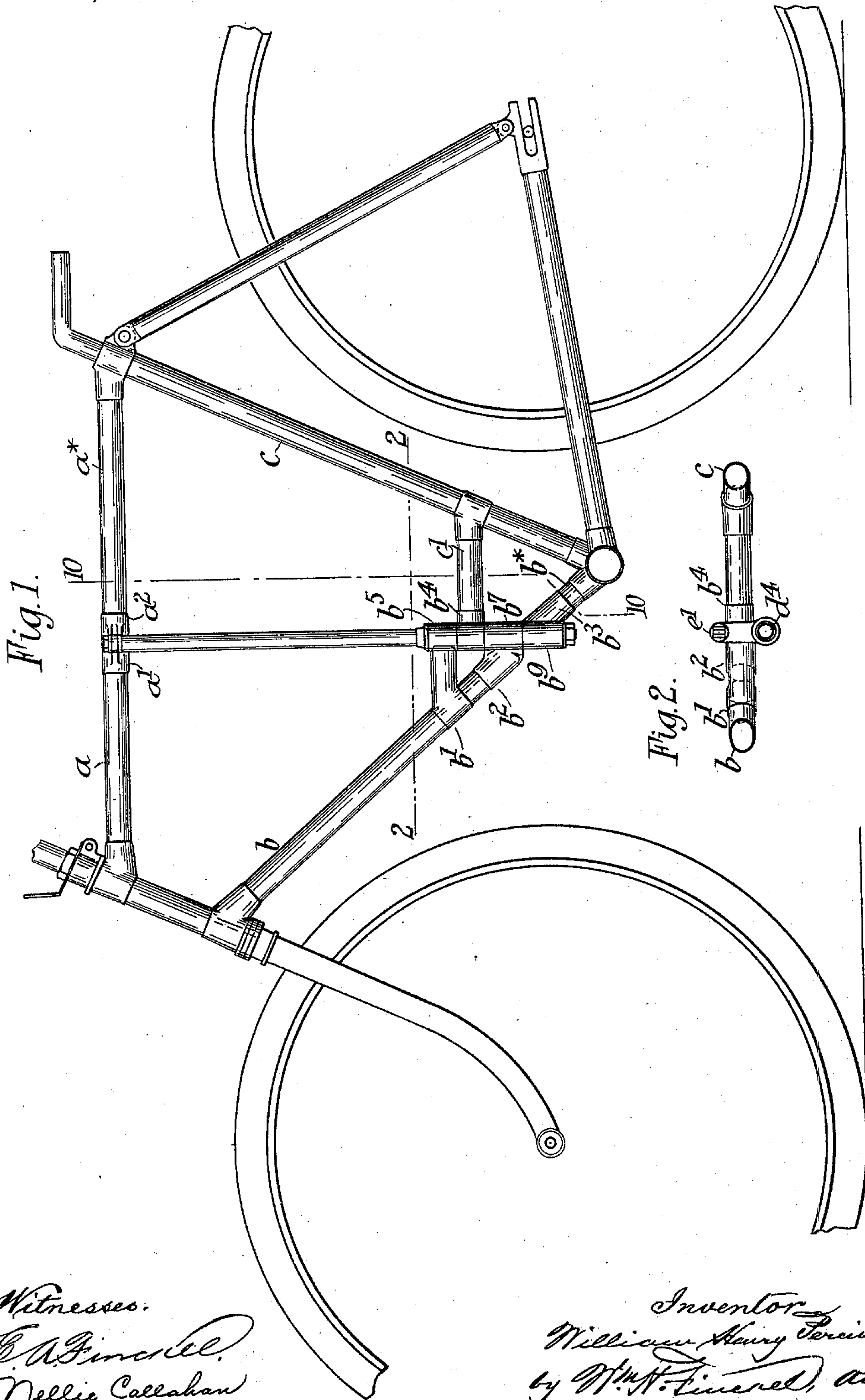
(No Model.)

5 Sheets—Sheet 1.

W. H. PERCIVAL.
FOLDING BICYCLE.

No. 598,811.

Patented Feb. 8, 1898.



Witnesses.
C. A. Finckel.
Nellie Callahan

Inventor
William Henry Percival
by W. H. Finckel, atty.

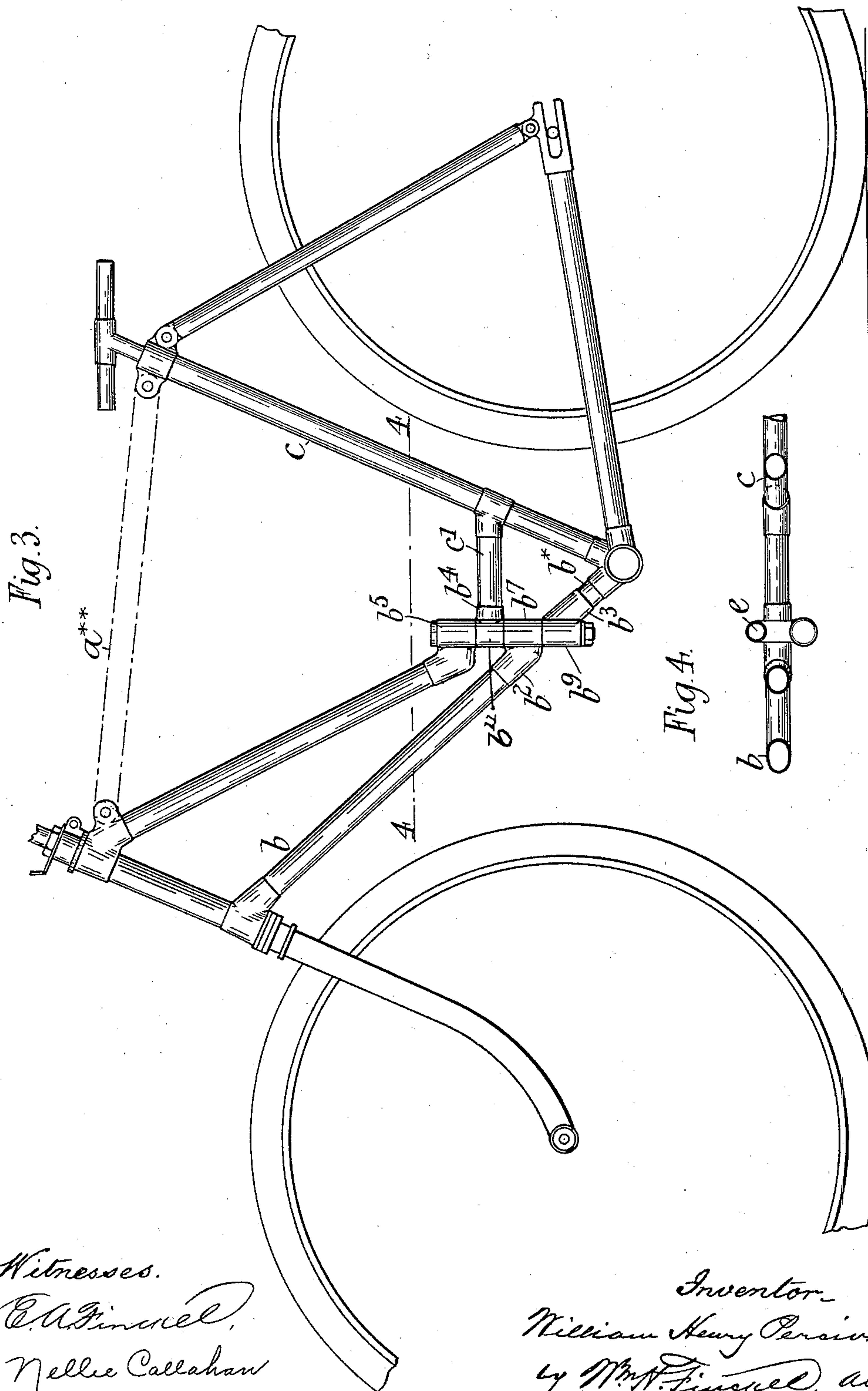
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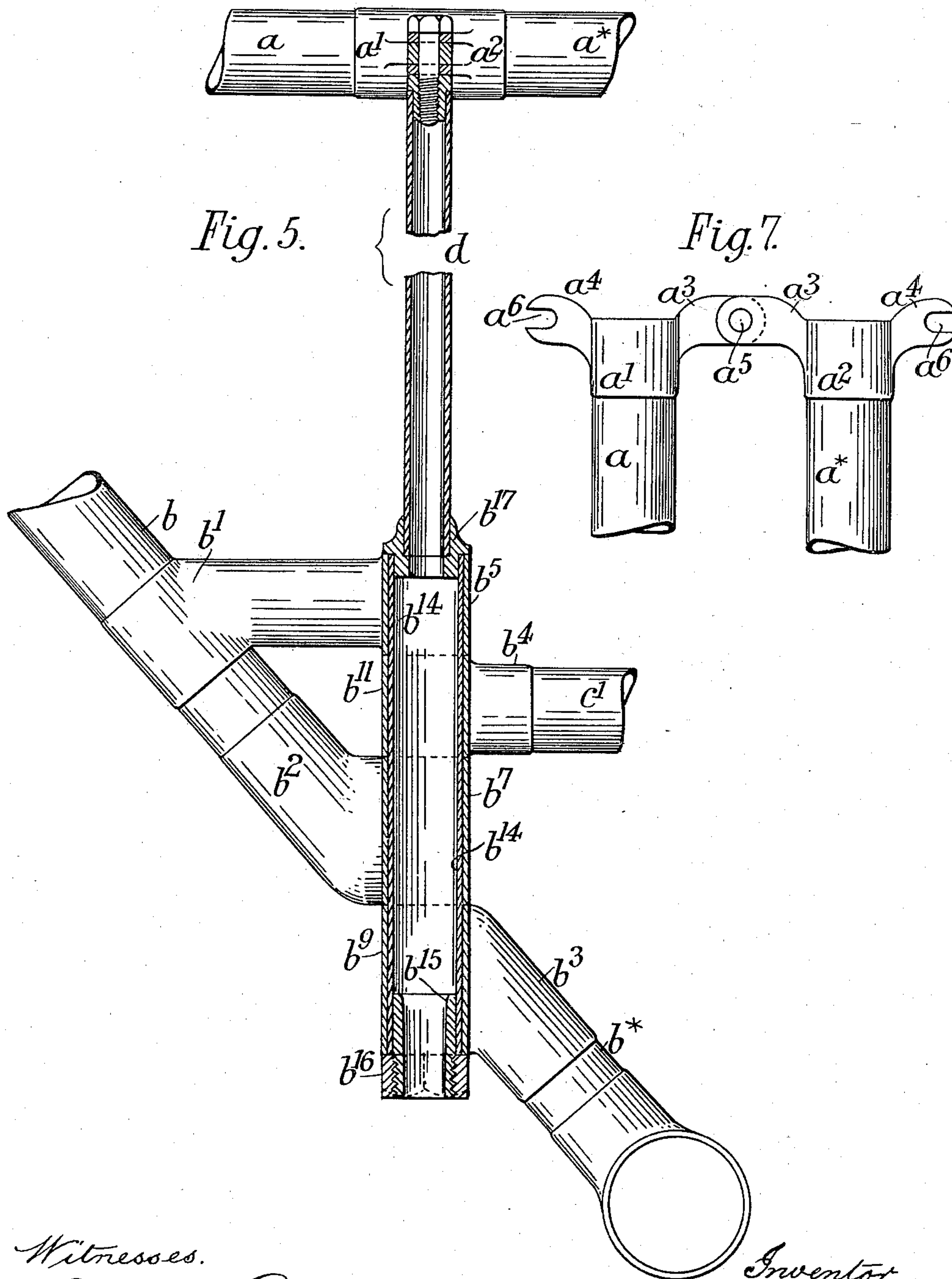
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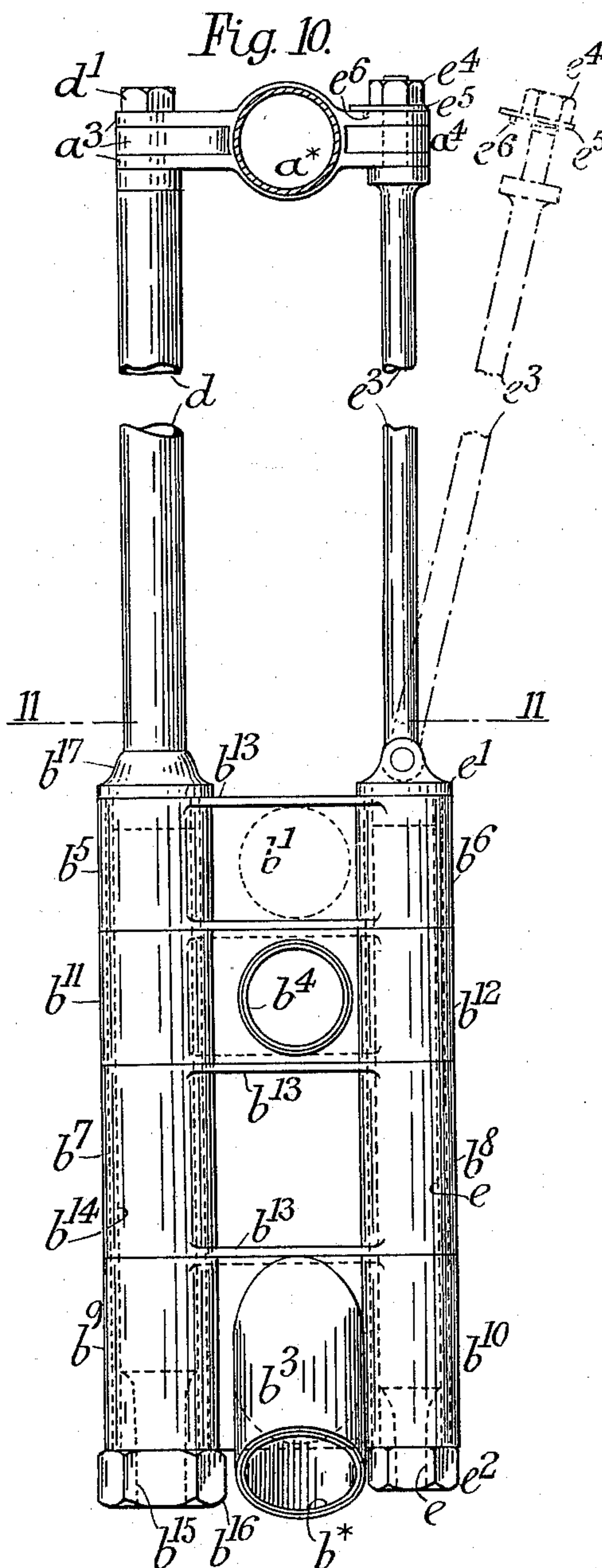
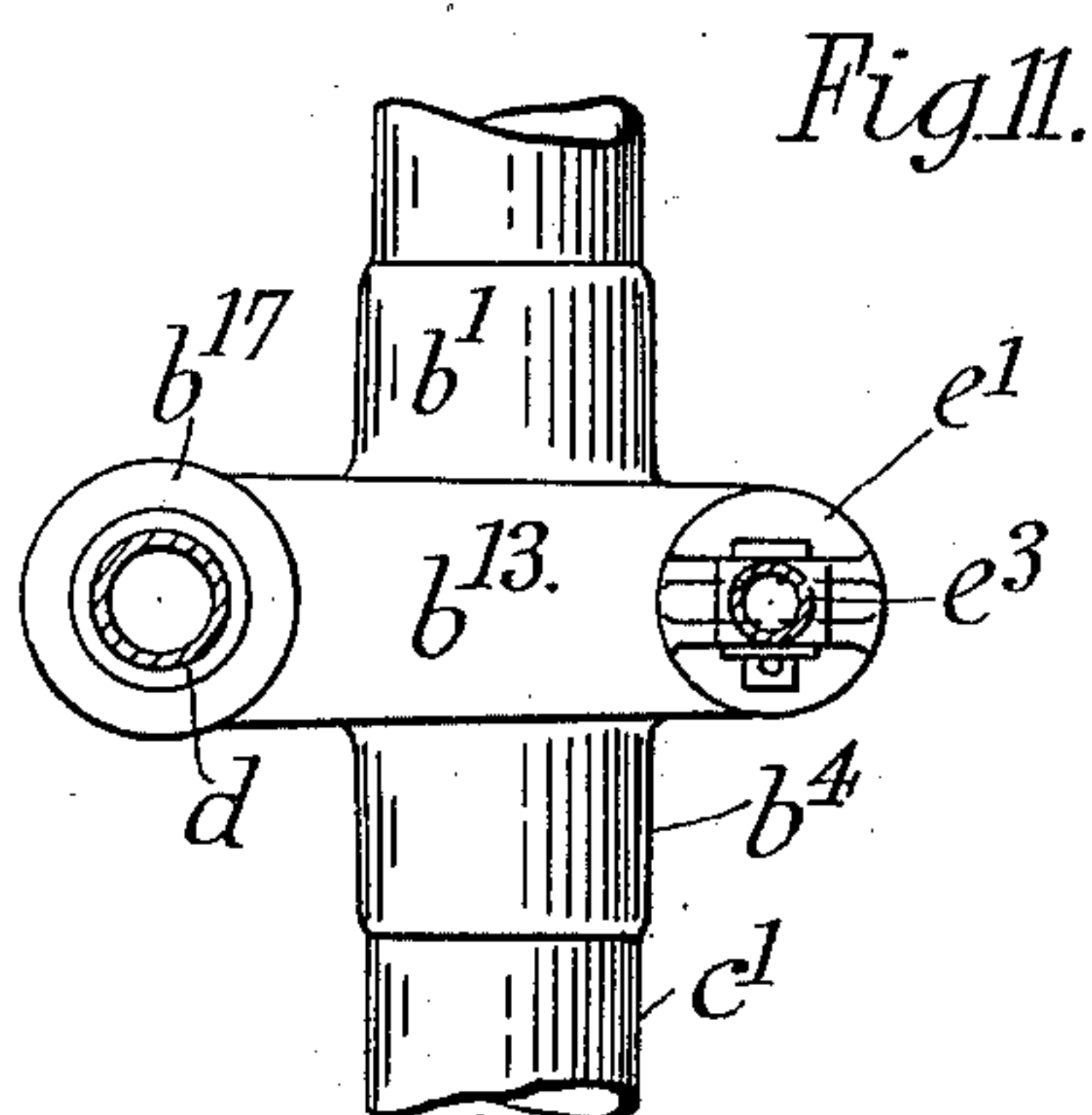
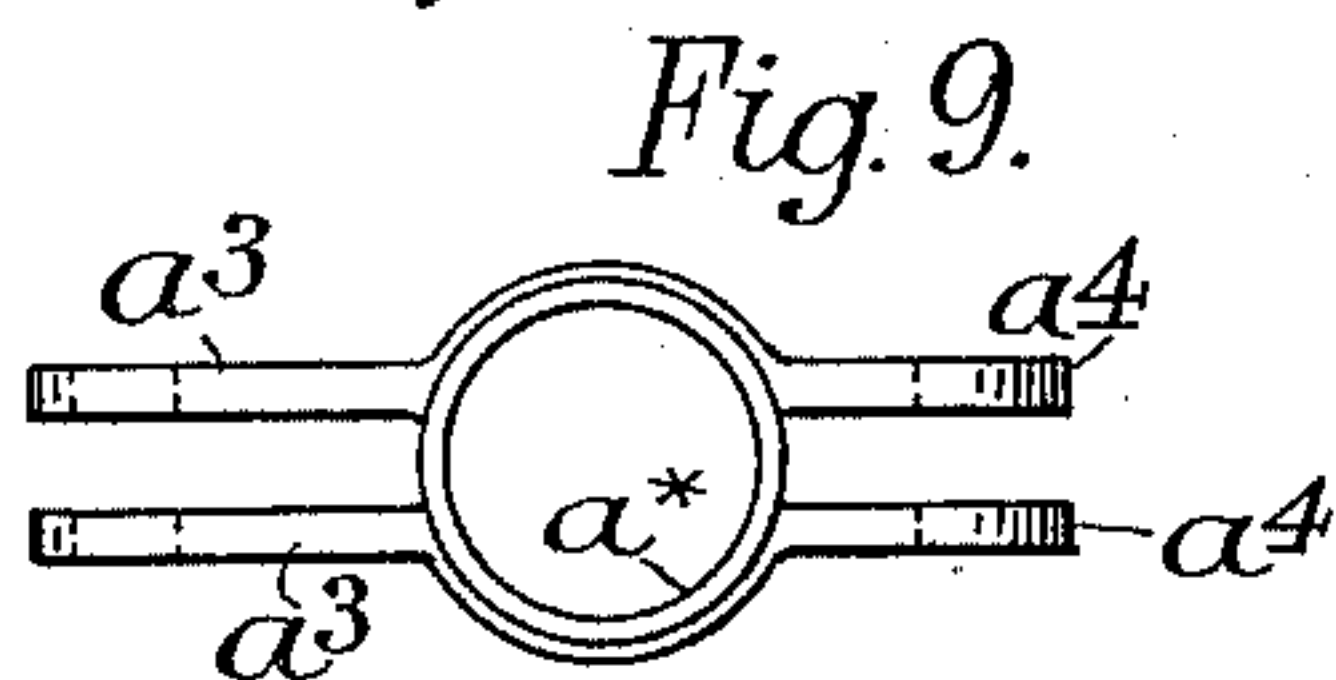
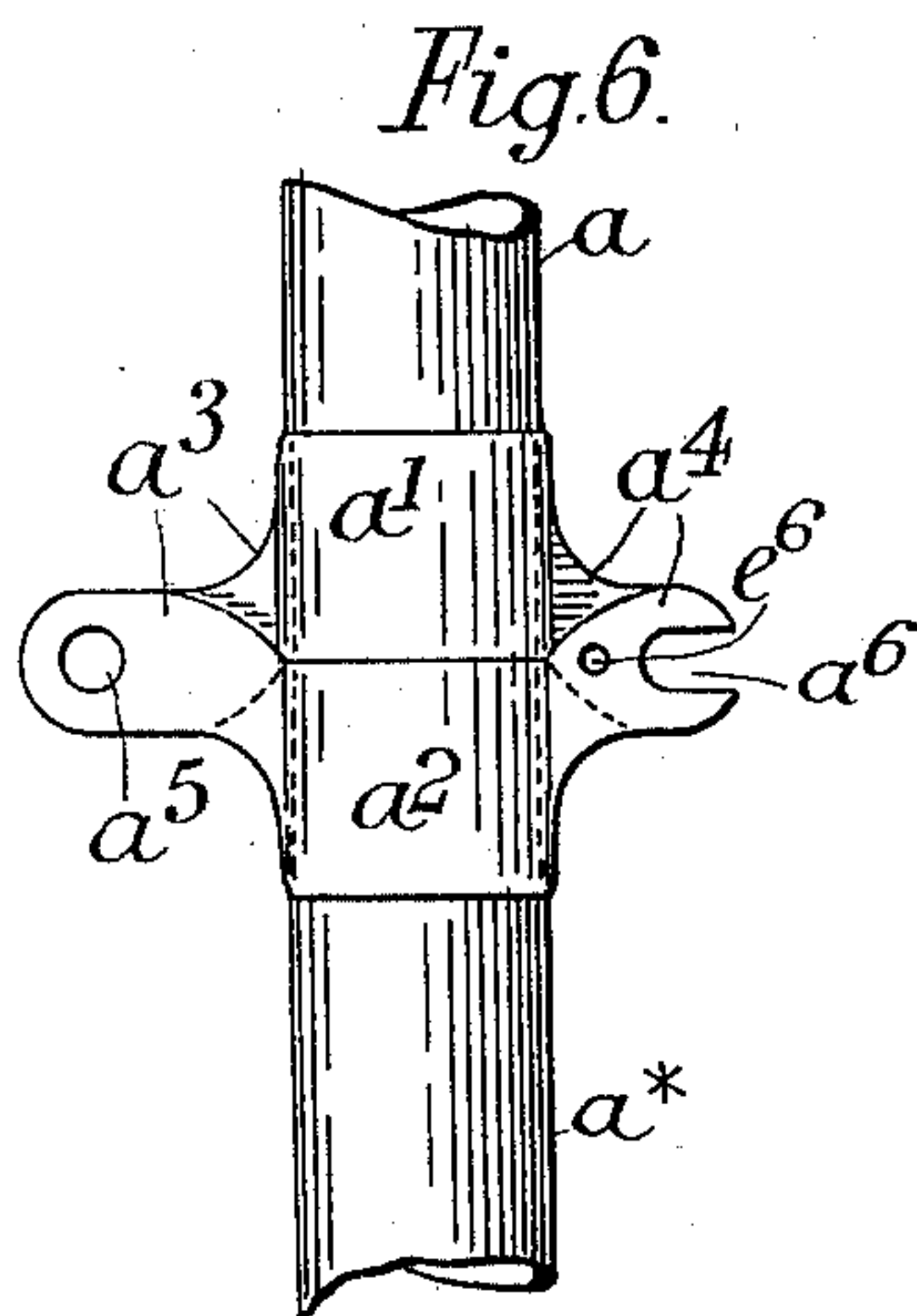
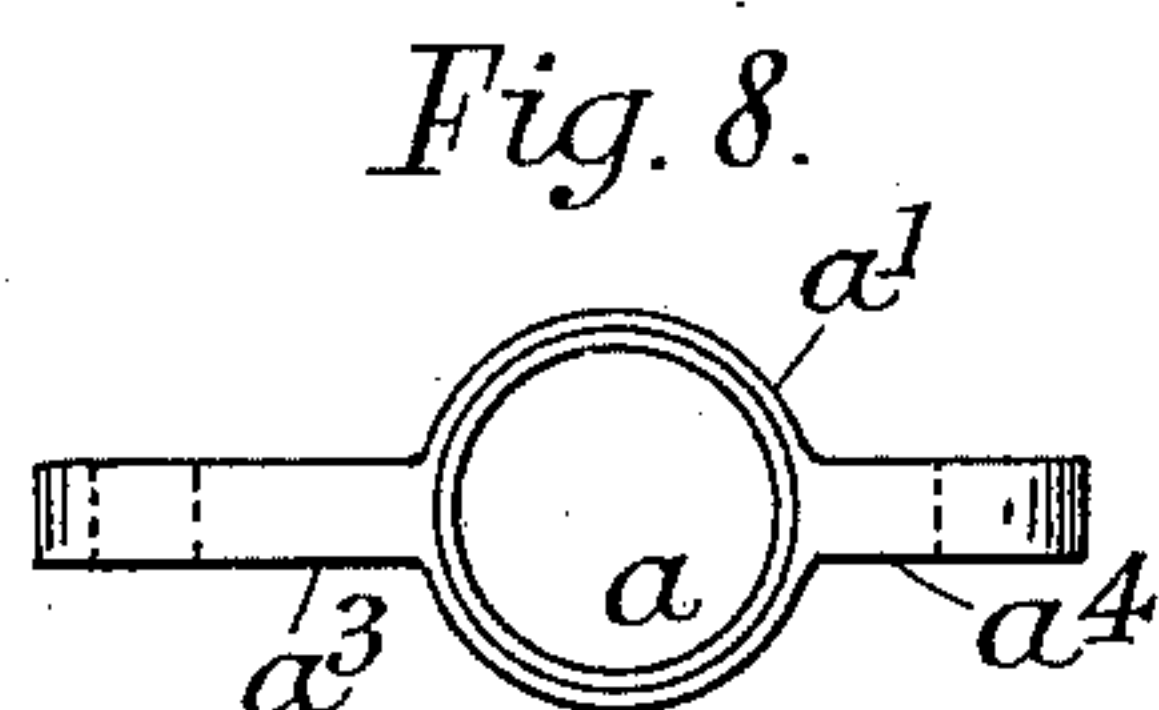
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Fig. 13.

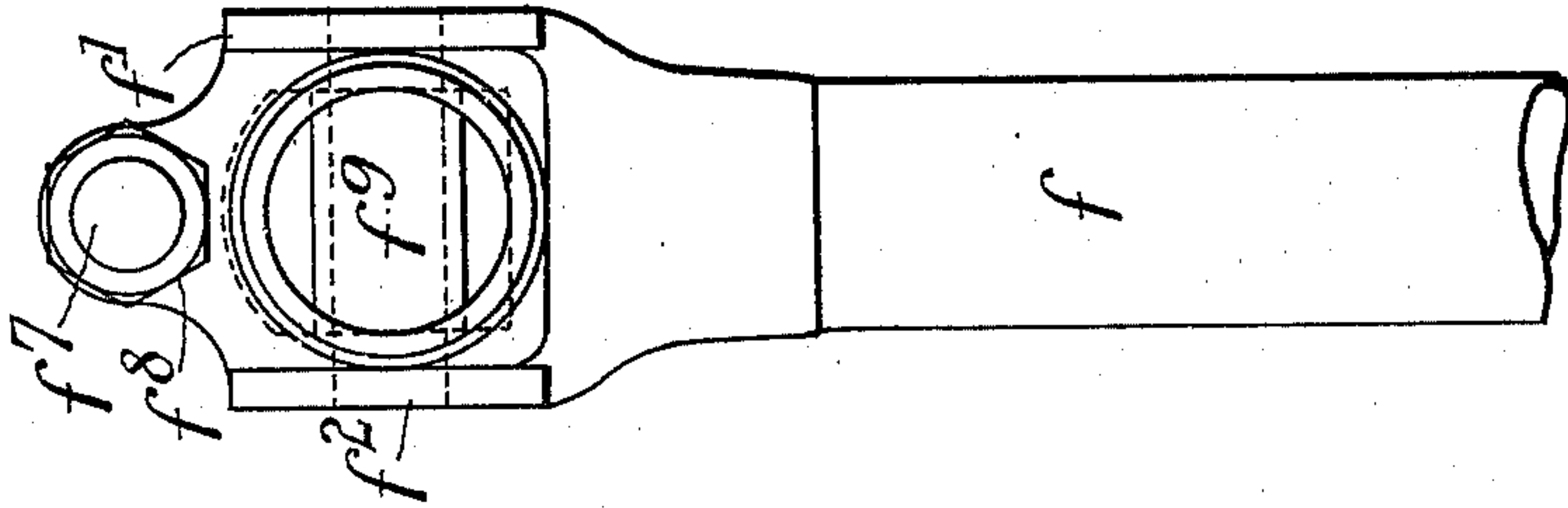
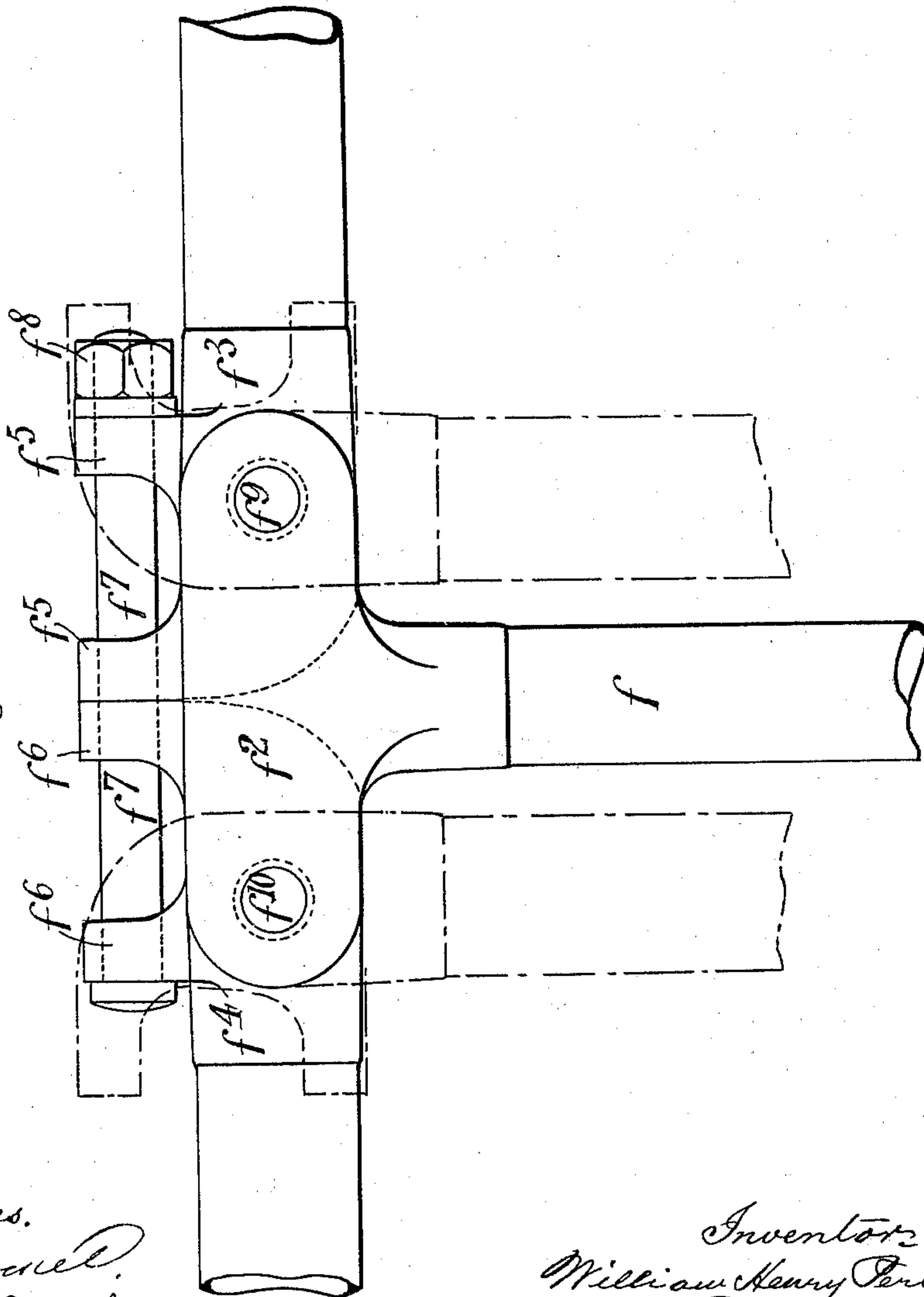


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLIAM HENRY PERCIVAL, OF LONDON, ENGLAND, ASSIGNOR OF ONE-HALF TO LEWIS PETER FORD, OF SAME PLACE.

FOLDING BICYCLE.

SPECIFICATION forming part of Letters Patent No. 598,811, dated February 8, 1898.

Application filed October 29, 1896. Serial No. 610,507. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY PERCIVAL, a subject of the Queen of Great Britain, residing at London, England, have invented certain new and useful Improvements in and Connected with Folding Bicycles, of which the following is a specification.

The object of the present invention is to construct a folding bicycle the frame and steering-bar of which may be readily folded when desired and which when in use are as rigid as in an ordinary machine.

I will describe the invention by means of the accompanying drawings, in which—

Figure 1 is a side view of one form of machine suitable for men, and Fig. 2 is a sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is a side view of a machine suitable for ladies, and Fig. 4 is a sectional view taken on the line 4 4 of Fig. 3. Fig. 5 is a view, partly in section, of part of the machine shown at Fig. 1. Fig. 6 is a plan of part of the top tube in the position it assumes when in use, and Fig. 7 is a plan of the same in its folded position. Figs. 8 and 9 are end views of the parts shown at Figs. 6 and 7. Fig. 10 is a section on the line 10 10 of Fig. 1, looking toward the front of the machine. Fig. 11 is a section on the line 11 11 of Fig. 10. Fig. 12 is an elevation of the folding steering-bar, and Fig. 13 is a cross-section of the same. Figs. 5 to 13 are drawn on a larger scale than the previous figures.

In all the figures like parts are indicated by similar letters of reference.

In carrying the invention into effect I divide the frame of a bicycle on a vertical line between the two wheels and apply hinges thereto in such a manner as to bring the wheels when the machine is folded side by side.

The upper tube $a a^*$ of the machine (represented at Fig. 1) is divided into two parts, and the adjoining ends of these parts $a a^*$ are provided with sockets $a' a^2$, having hinge-leaves a^3 , extending a short distance in a horizontal direction on one side of the tube $a a^*$, and locking-leaves a^4 , extending a short distance on the opposite side of said tube $a a^*$. These leaves a^3 are formed with holes a^5 to receive the hinge-pin, while the locking-

leaves a^4 are provided with open-ended slots a^6 to receive locking means, as hereinafter described. The lower tube $b b^*$ is also divided into two parts, and the part b is provided with sockets $b' b^2$ and the part b^* with a socket b^3 . These three sockets b', b^2 , and b^3 are each formed with two short tubes $b^5 b^6$, $b^7 b^8$, $b^9 b^{10}$ at the working ends. The tubes $b^5 b^7 b^9$ form three knuckles of the lower hinge. The fourth knuckle is formed by a tube b^{11} , attached to a socket b^4 , connected to the seat-pillar tube c by a short tube c' , a tube b^{12} being also connected to the socket b^4 . The short hinge-tubes $b^5 b^7 b^9 b^{11}$ are on one side of the frame in a vertical line passing through the center of the hole a^5 for the hinge-pin, and the short tubes $b^6 b^8 b^{10} b^{12}$ are on the opposite side of the frame in a vertical line passing through the center of the slots a^6 of the locking-leaves a^4 . Each pair $b^5 b^6$, $b^7 b^8$, $b^9 b^{10}$, $b^{11} b^{12}$ of short tubes are connected at the upper and lower parts by plates or webs of metal b^{13} .

As will be seen at Fig. 5, the four short tubes $b^5 b^7 b^9 b^{11}$ are held firmly in position by a tube b^{14} , which acts as a hinge-pin. This tube at its lower end has a plug b^{15} , the projecting end of which is screw-threaded to receive the nut b^{16} . The upper end of this tube b^{14} has a cap-shaped plug b^{17} brazed therein, and into said plug is brazed a smaller upwardly-extending tube d , which is of length to reach the under side of the hinge of the tube $a a^*$, and it is fitted with a screw-threaded plug at its upper end to receive a screw-bolt d' , which, passing through the holes a^5 in the leaves a^3 , acts as a hinge-pin to such upper hinge.

Through the short tubes $b^6 b^8 b^{10} b^{12}$ is passed a locking-tube or hollow rod e , provided at its upper end with a cap e' , brazed therein, and at the lower end with a plug, the projecting end of which is screw-threaded to receive a nut e^2 .

To the cap e' is hinged a rod e^3 , the upper end of which passes into the open-ended slots a^6 of the locking-leaves a^4 and is screw-threaded to receive a nut e^4 , which retains it in position by means of the washer e^5 , having a projection e^6 fitting into a recess in the upper leaf a^4 .

The folding handle-bar shown in Figs. 12

and 13 is provided with hinges and locking means constructed in a somewhat similar manner to the hinge and locking means for the frame.

5 The stem f is provided at its upper part with a casting having two plates f' f^2 .

The handle-bar is divided into two equal parts, each end of which is fitted into a socket f^3 or f^4 . These sockets f^3 and f^4 have at-
10 tached to their top sides tubes f^5 and f^6 , cut away in the center to reduce their weight and through which is passed the bolt f^7 , provided with the nut f^8 . The sockets f^3 f^4 are hinged to the stem by means of the bolts f^9 and f^{10} .

15 To permit of the folding of the handle-bar, the bolt or screw connecting the brake-lever with the brake-rod is first removed, or such parts may be connected together in any other convenient manner to enable them to be read-
20 ily separated or to be moved in relation to each other.

It will be understood that the form of the hinge shown in Figs. 3 and 4 on the lady's machine is very similar to that shown at Figs.
25 1, 2, 5, 10, and 11, the only difference being that the tubes d and e are not continued above the hinge. When this form of machine is intended to be ridden by a gentleman, it is provided with a tube which may be readily re-
30 moved and which is indicated by dotted lines a^{**} .

When it is desired to fold the machine shown at Fig. 1, the nut e^4 is loosened, the washer e^5 slightly raised, and the rod e^3 turned
35 out of the open-ended slots a^6 , as shown in dotted lines in Fig. 10. The nut e^2 is unscrewed and the tube e is withdrawn from the tubes b^6 b^8 b^{10} b^{12} . The machine may then be folded.

40 When it is desired to reduce the width of the folded machine as much as possible, the handle-bar is also folded by unscrewing the nut f^8 and withdrawing the bolt f^7 , each half of handle-bar folding down on the centers
45 f^9 f^{10} , as shown by the broken lines in Fig. 12.

When folding the machine shown at Fig. 3, it is only necessary to unscrew the nut e^2 and to remove the locking-bar e .

Having fully described my invention, what
50 I desire to claim and secure by Letters Patent is—

1. In a folding bicycle, the combination

with the divided frame, of the hinge-sockets b^5 , b^{11} , b^7 , b^9 , secured to the meeting ends of the lower bar of said frame, the hinge-leaves a^3 55 secured to the meeting ends of the upper bar of said frame, the hinge-pin b^{14} permanently engaging said hinge-sockets and hinge-leaves, the locking-sockets b^6 , b^{12} , b^8 , b^{10} , secured to the meeting ends of the lower bar, the slotted 60 locking-leaves a^4 secured to the upper bar, and the locking-pin e engaging said locking-sockets and slotted locking-leaves and adapted to be bodily removed therefrom to permit the folding of the frame, substantially as de- 65 scribed.

2. In a folding bicycle, the combination with the divided frame, of the hinge-sockets b^5 , b^{11} , b^7 , b^9 , the permanent hinge-pin b^{14} en-
70 gaging said hinge-sockets, the cap b^{17} secured to said hinge-pin, the hinge-leaves a^3 , the rod d engaging said hinge-leaves a^3 and rigidly secured to the cap b^{17} , the tubular locking-sockets b^6 , b^{12} , b^8 , b^{10} , the removable locking-pin e , engaging said locking-sockets, the slot-
75 ted locking-leaves a^4 , the rod e^3 , hinged to the removable locking-pin and adapted to engage the slotted locking-leaves a^4 , a lock-nut e^4 engaging the rod e^3 , and a washer e^5 interposed between the lock-nut and one of the hinge-
80 leaves a^4 and provided with a pin e^6 engaging said hinge-leaf, substantially as and for the purpose set forth.

3. In a folding bicycle, the combination with a steering-post f and a head f' , f^2 there-
85 on, of handle-bars pivoted upon said head, each provided with a tube f^5 , f^6 , and a bolt f^7 passing through and fitting said tubes f^5 , f^6 , to support the handle-bars for use, and adapted to be removed therefrom to permit the
90 folding of the handle-bars, substantially as described.

4. In a folding bicycle, the combination with a steering-post f having a head f' , f^2 thereon, of handle-bars fitting into sockets 95 f^3 , f^4 pivoted at f^9 , f^{10} , and carrying tubes f^5 , f^6 , and a bolt f^7 fitting said tubes f^5 , f^6 , and a nut f^8 on said bolt to retain the handle-bars in position for use, substantially as and for the purpose described.

WILLIAM HENRY PERCIVAL.

Witnesses:

OSCAR L. VEECHIO,
THOS. G. KEYS.