

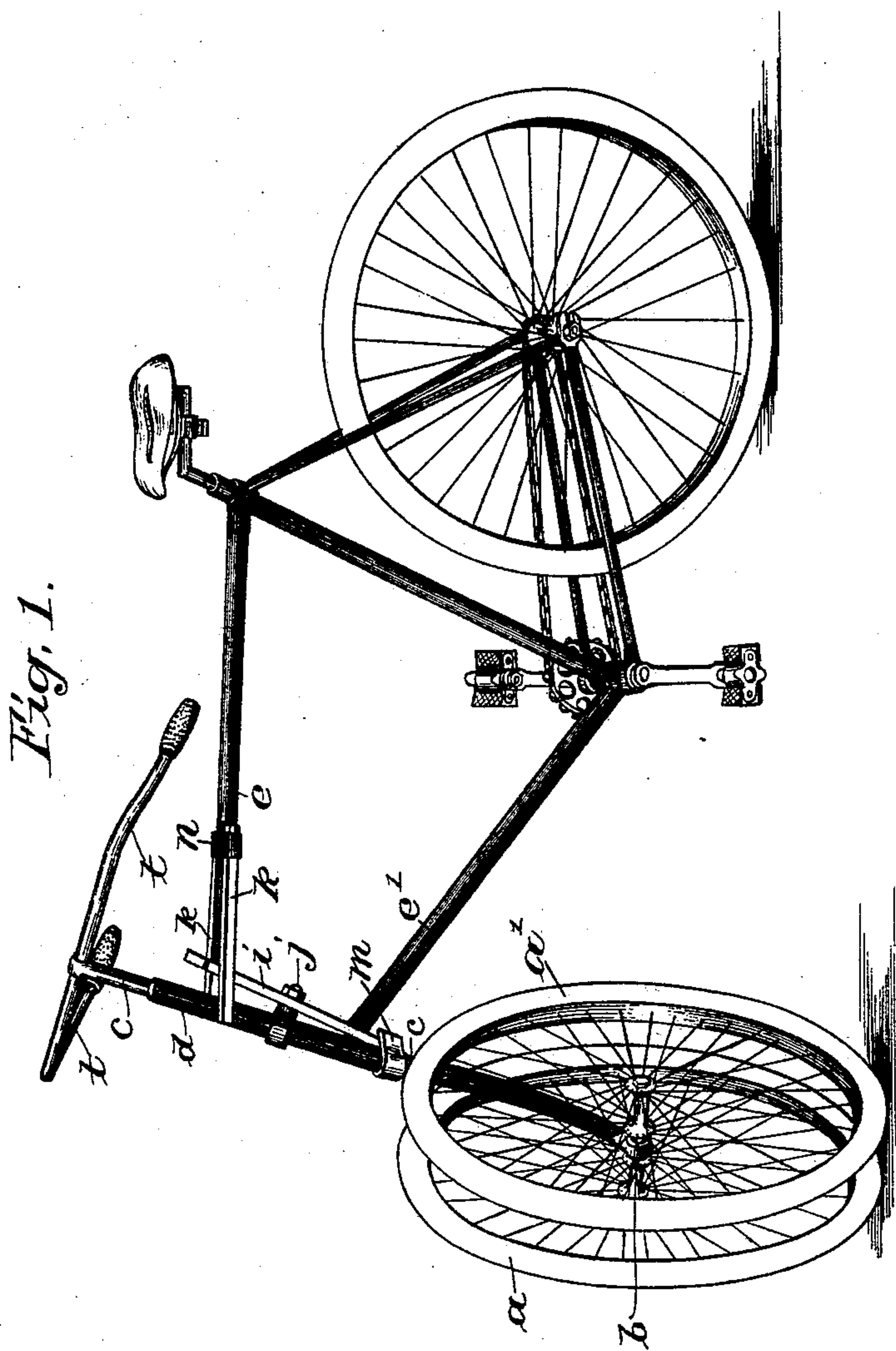
(No Model.)

2 Sheets—Sheet 1.

S. F. ESTELL.
TRICYCLE.

No. 517,741.

Patented Apr. 3, 1894.



Witnesses,
S. W. Brainard,
Byron E. McMillan

Inventor.
Samuel F. Estell
By Joseph Ridge
his Atty.

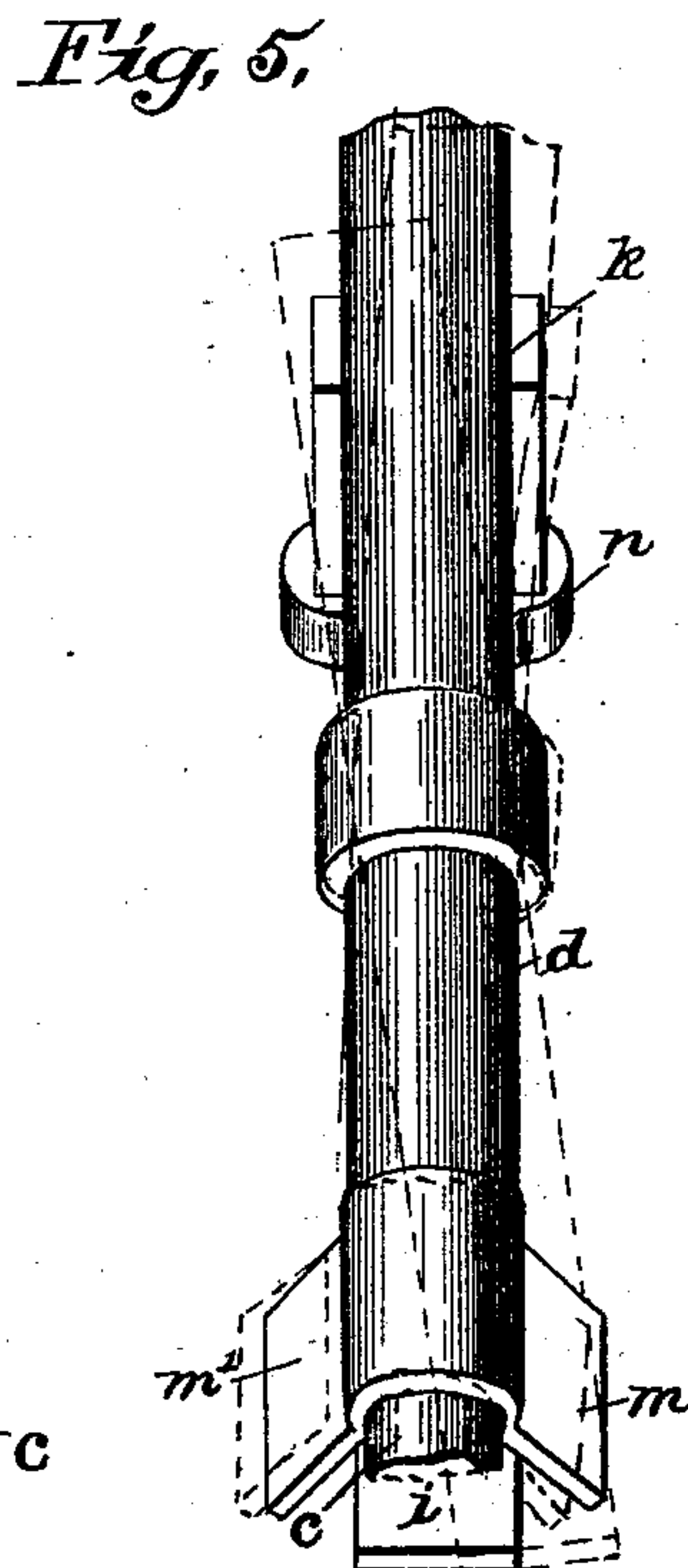
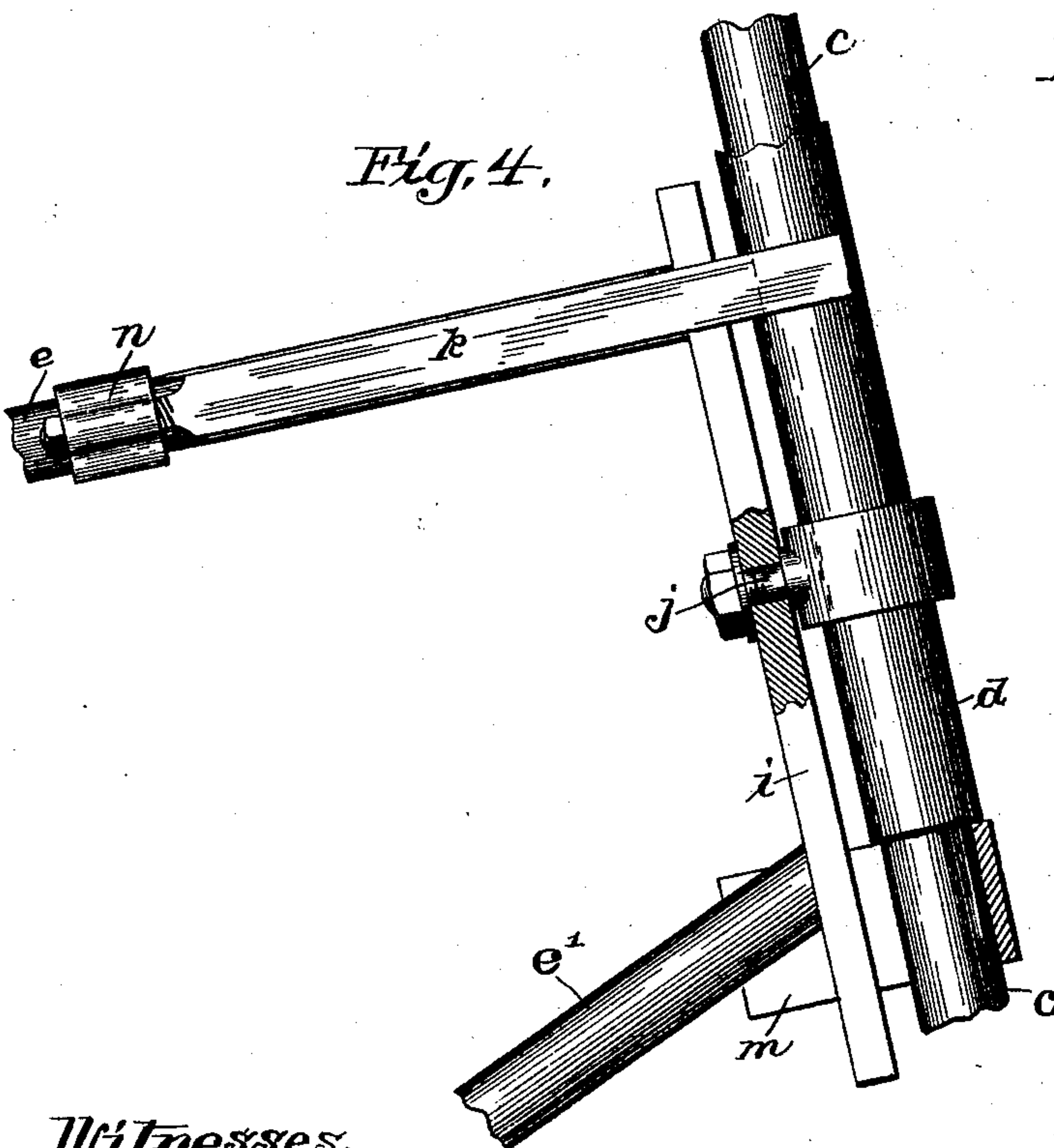
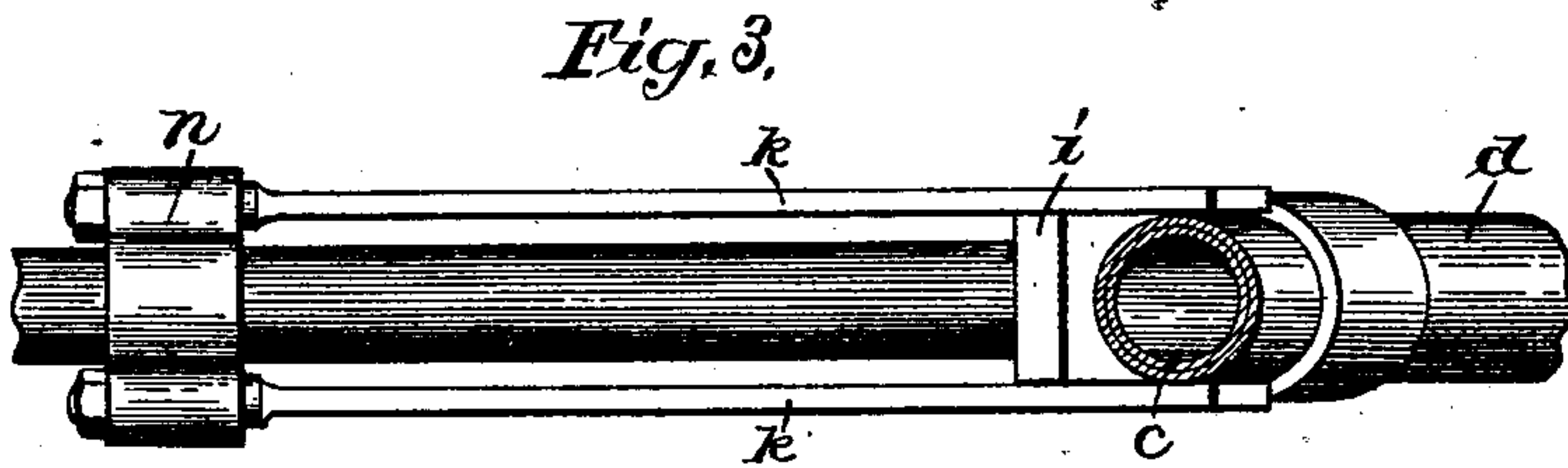
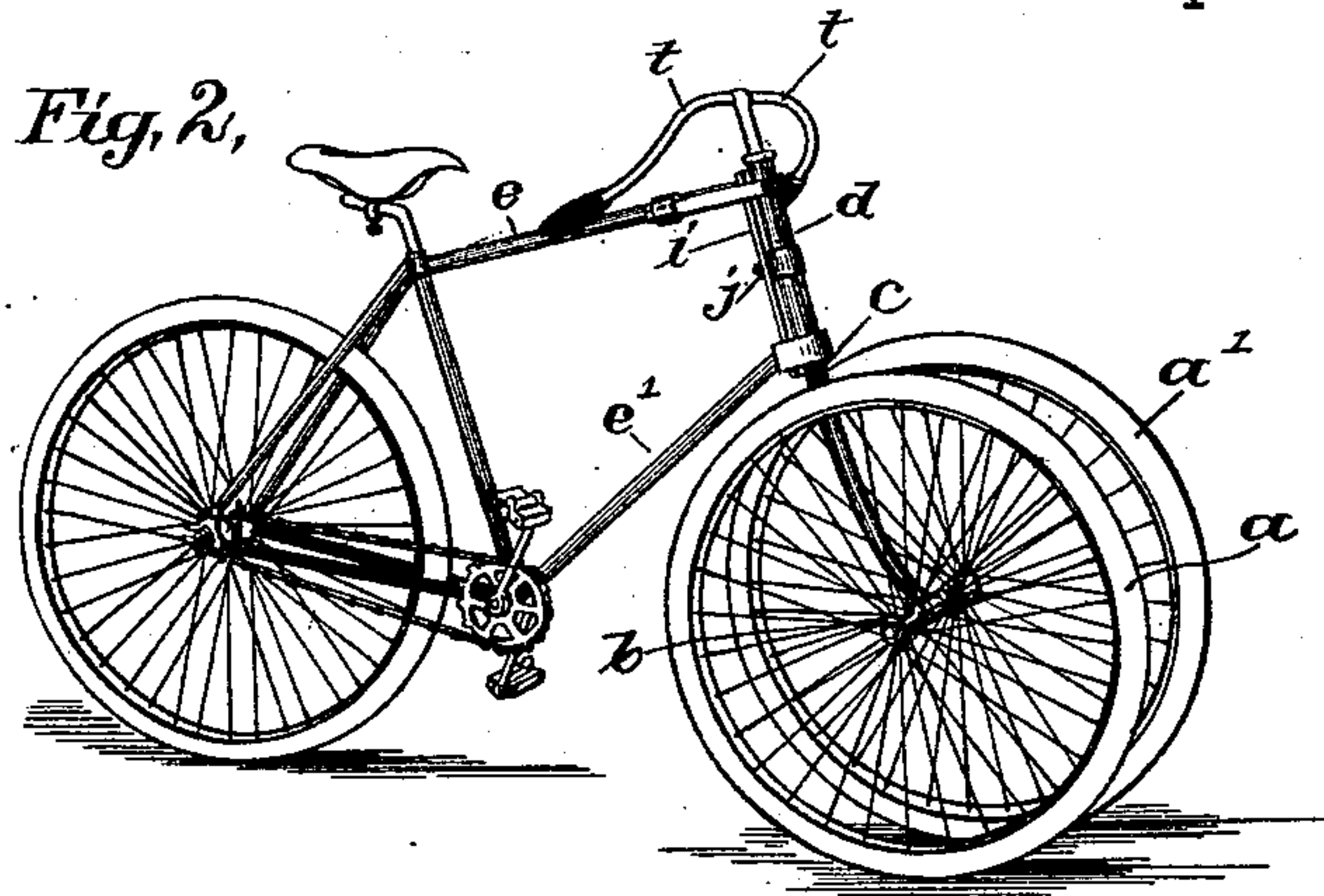
(No Model.)

2 Sheets—Sheet 2.

S. F. ESTELL.
TRICYCLE.

No. 517,741.

Patented Apr. 3, 1894.



Witnesses,
S. H. Brainard,
Cyron E. M. Millan

Inventor,
Samuel F. Estell
By Joseph Ridger
his Atty.

UNITED STATES PATENT OFFICE.

SAMUEL F. ESTELL, OF CHICAGO, ILLINOIS.

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 517,741, dated April 3, 1894.

Application filed May 27, 1893. Serial No. 475,805. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. ESTELL, of Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Tricycles, of which the following is a full and complete description, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective of the vehicle when in position of which it is susceptible by reason of my improvement. Fig. 2 is a perspective with the wheels in parallel planes. Fig. 3 is a section, in plan, of the head of the frame and contiguous parts. Fig. 4 is a side elevation at the head of the frame, and Fig. 5 is a front elevation of the same.

The purpose of my invention is to so construct a tricycle that it shall be compact, and at the same time have sufficient base to maintain its normal position when at rest, even when supporting the weight of a rider; this in conjunction with, and made feasible by, a certain pivotal and oscillatory movement, hereinafter set forth.

In my improvement the opposite wheels are placed in front and closely together, and the rear wheel so connected therewith as to permit lateral oscillation of the latter. As a result of this construction the rider is enabled, in a curved path, to incline the rear portion of the vehicle, and thus, notwithstanding the proximity of the front wheels, one to the other, which maintain their vertical positions, an equilibrium, as with the bicycle, may be maintained. Provision is also made for automatically guiding the "cycle." The front wheels, *a*, *a'*, are mounted on a short rigid axle, *b*.

Centrally of axle *b* is rigidly secured a part *c*, corresponding in function to the front fork of a bicycle. On the upper portion of the latter is a loose sleeve, *d*.

The frame and other rear portions of the "cycle" are identical, in the present example, with a well known form of bicycle. The two tubes or bars of the frame, *e* and *e'*, are connected, at the front to a bar *i*. The latter is pivotally connected at *J* centrally of its length, to the sleeve, *d*. Beneath sleeve *d*, and rigidly attached to the part *c*, are pro-

vided rearward extending flanges, *m*, *m'*, between which the position of the lower end of bar *i* is located. Attached to tube *e*, and secured by means of a collar *n*, are provided springs *k*, *k*, that embrace the sides of sleeve *d*. As apparent, by reason of the pivotal joint at *J*, oscillation of the frame and rear wheel is permitted. The purpose of the springs *k*, *k*, is to modify the lateral action. When bar *i* is made to incline from a line coincident with part *c*, its engagement with flange *m* or *m'* serves to change the direction of the front wheels, and as an apparent result, and as shown in Fig. 1, the inclination of the frame and the direction of the wheels conform each to a curve in their respective relations thereto.

The dotted lines, (Fig. 5) indicate the oscillatory movement of the frame. Thus, though the pair of wheels remain vertical, and thereby equally share in supporting the weight, the frame and rear wheel may be leaned to suit the speed and the radius of the curve, to thereby contract momentum.

The springs *k*, *k*, are designed to be of such strength as to flex readily when the rider's body is laterally inclined, and yet offer enough resistance to flexion to maintain an upright position of the frame and its rider when erect, with the "cycle" at rest.

The automatic steering appliance is designed as an adjunct, but it is entirely non-essential to the principal feature of my invention; tiller arms *t* being provided for controlling direction in the absence of self-guiding provision, and also to aid, if desired, when the latter is present.

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

1. In a tricycle having its pair of wheels in front and a laterally oscillating rear wheel, the automatic guiding mechanism consisting of sleeve *d*, pivotal bar *i*, springs *k*, *k* and flanges *m*, *m'*, in combination with part *C* and a rear frame all constructed and operating in the manner substantially as and for the purpose set forth.

2. In a tricycle the wheels *a*, *a'*, axle *b*, part *c*, and the rear frame in combination with

sleeve *d*, pivot *J*, bar *i*, and springs *k*, *k*, substantially as described.

3. The combination of part *c*, sleeve *d*, pivot *j*, and springs *k*, *k*, in a tricycle having a pair
5 of opposite wheels in front, substantially as specified.

4. The combination of part *c*, sleeve *d*, bar

i, pivot *j*, and flanges *m* and *m'*, substantially as specified.

SAMUEL F. ESTELL.

Witnesses:

BYRON E. McMILLAN,
WM. S. ESTELL.