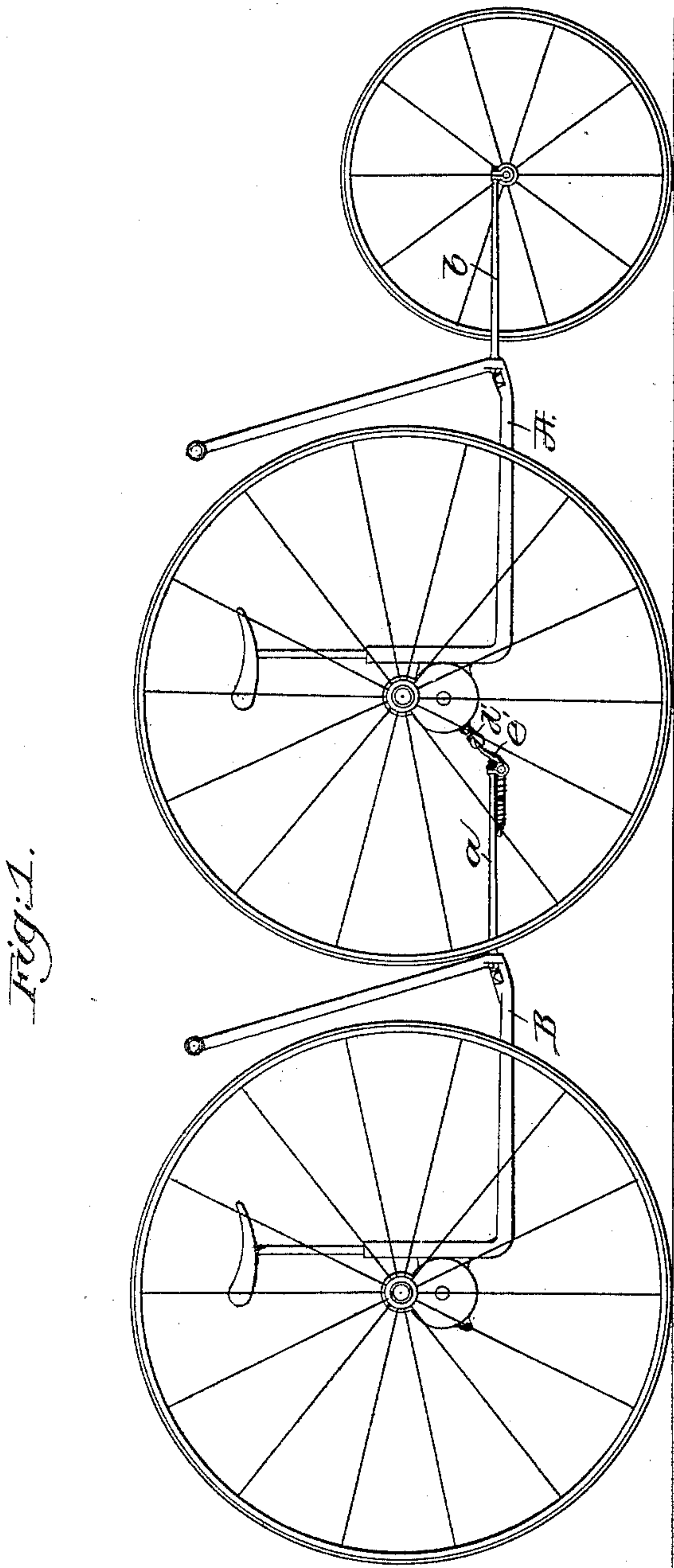


(No Model.)

S. ELLIOTT.
TANDEM VELOCIPED.

No. 442,174.

Patented Dec. 9, 1890.



1824

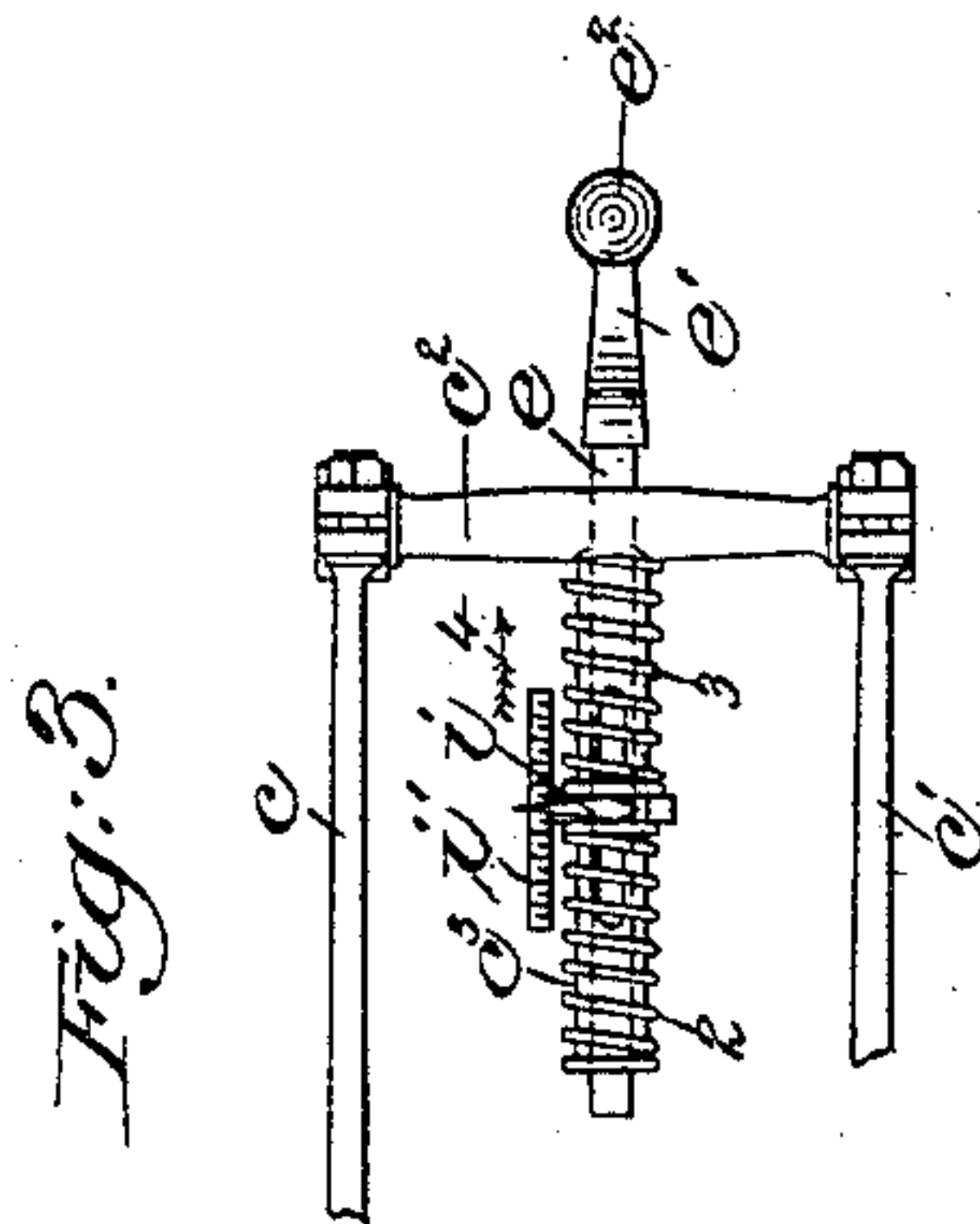


Fig: 3.

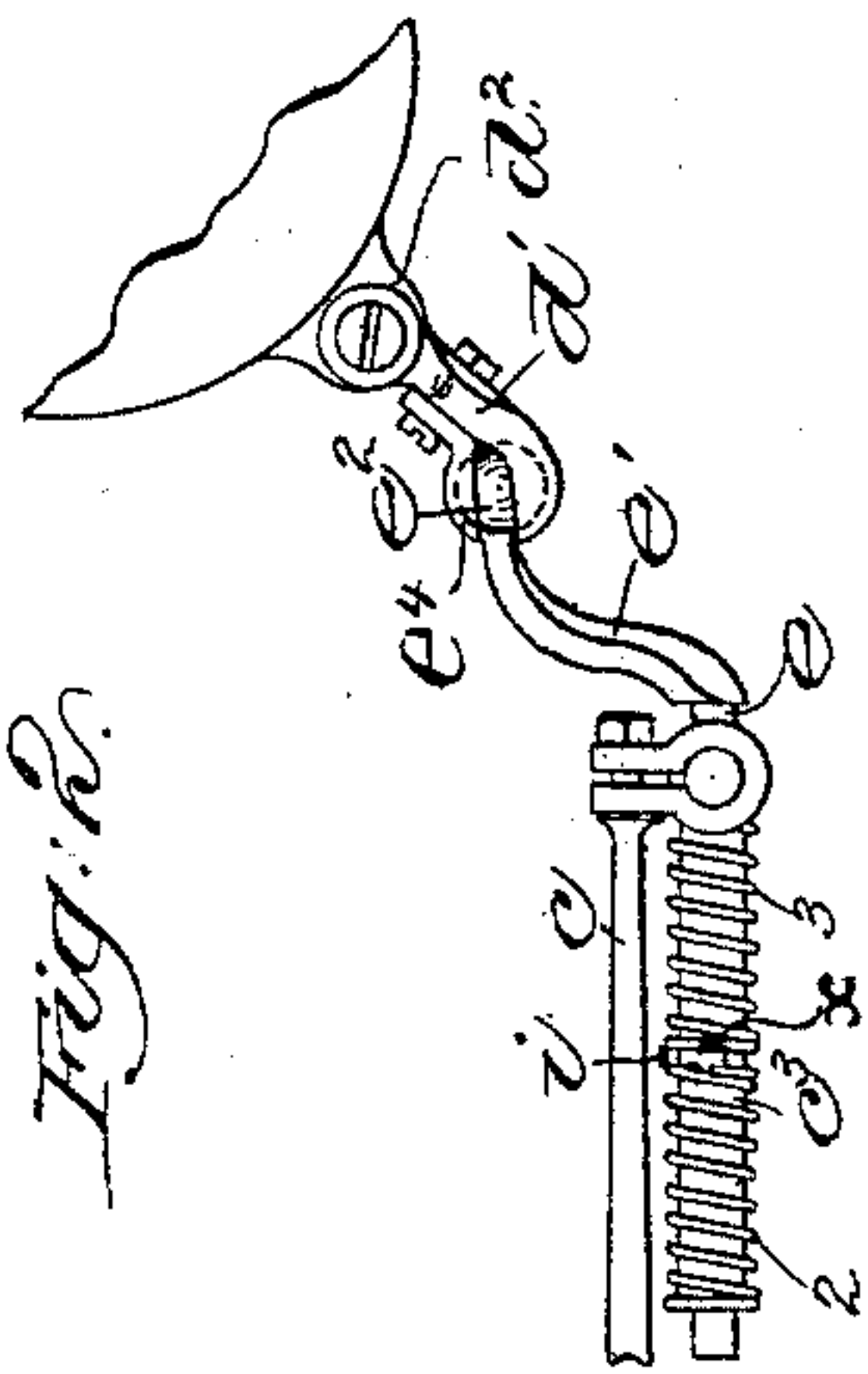


Fig. 2.

Witnesses.
Frank. Emery
Howard F. Eaton.

Inventor.
Sterling Elwell
by Leroy Gregory.
copy.

UNITED STATES PATENT OFFICE.

STERLING ELLIOTT, OF NEWTON, MASSACHUSETTS.

TANDEM VELOCIPEDE.

SPECIFICATION forming part of Letters Patent No. 442,174, dated December 9, 1890.

Application filed June 23, 1887. Serial No. 242,257. (No model.)

To all whom it may concern:

Be it known that I, STERLING ELLIOTT, of Newton, county of Middlesex, and State of Massachusetts, have invented an Improvement in Tandem Velocipedes, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to simplify and cheapen the construction of tandem velocipedes or velocipedes adapted for two riders.

In accordance with my invention two axle-bearing frame-works suitable for two tricycles are united one to the other by a universally-jointed connecting device, the tandem velocipede thus made being steered by a steering-wheel on the leading frame-work. As will be described, the construction of the connecting device and its joints are such as to enable the two frames to move one with relation to the other in substantially every direction, as is necessary when traveling over rough roads, &c. An indicating device is also provided for determining or visually indicating which one of the riders is doing the more work, said indicating device being herein shown as applied to the connecting device and having a graduated scale and pointer to visually indicate the relative power applied by the riders.

Figure 1 shows in side elevation a tandem velocipede embodying this invention; Fig. 2, an enlarged side elevation of the connecting and indicating devices; and Fig. 3, a top view of the connecting and indicating devices shown in Fig. 2, a part of the frame being removed.

The main axle-bearing frames A B are suitably shaped to support the parts of ordinary tricycles, each frame having a steering-wheel carrying-fork, as *a b*; but the steering-wheel of the frame-work B is removed, leaving, however, the two arms *c c'*. The arms *c c'* of the frame-work B are joined together by a cross-bar *c²*, which in the present embodiment of my invention is employed to sustain the connecting device, the latter, as will be described, supporting the indicating device. The connecting device consists, essentially, of

c² and through a tubular extension *c³* thereof, one side of the said bar *e* being upwardly curved, as at *e'*, and provided with a ball, as *e²*, which enters a socket *d'*, loosely pivoted to an ear *d²* of the frame-work A. The upper side of the socket *d'* has secured to it a cup-shaped or hollow cap *e⁴* to co-operate with the socket *d'* and ball *e²*, thereby forming a ball-and-socket joint or connection. The cup *e⁴* and arm *d'* are placed at sufficient distance apart to leave a slot or opening between them to permit the arm *e'* to move laterally, as desired, while the holder itself moves vertically owing to its pivotal connection with the ear *d²*. It is obvious, instead of this form of universal joint, that any other form may be substituted therefor, it only being necessary that the two frames supporting the wheels be connected so as to move one with relation to the other.

The bar *e*, moving within the tubular extension *c³*, is provided with a projection or stud, which is passed upward through a slot cut in the said extension, where it has secured to it a pointer *i*, which co-operates with a graduated scale *i'*, secured to the said extension, the bar *e* being moved in one or the other direction within the tubular extension, and the pointer at such time traveling over the said scale. A spiral spring 2 surrounds the tubular extension *c³* between its outer end and the stud carrying the pointer, and another spiral spring 3 surrounds the extension *c³* between the cross-bar *c²* and the stud carrying the pointer, the tendency of each of the said springs being to hold the pointer at a fixed or determined point called the "zero-point."

It is obvious that the two springs 2 3, acting against each other, while they would stop at the point where the elasticity of each exactly balanced the other, would at the same time be extremely sensitive, the slightest force being sufficient to move them, and to overcome the disadvantages of this tendency, so as to hold the machines in the same relation to each other and keep the pointer at zero, except when one rider is exerting more force than the other, I affix to either side of the tubular extension *c³* a stop *x*, against which the springs will stop when the pointer is moved away from zero, thereby prevent-

ing the spring from distending beyond the central point or a certain limit.

Should the rider of the frame A be working his machine with more power than the rider of frame B, the pointer will be moved against the spring 3 in the direction of the arrow *a*, and should the rider of the frame B be applying more power to his machine than the rider of the frame A the tubular extension *c*³, carrying the graduated scale, will be moved in the direction of the arrow 4 against the tension of the spring 2, thereby causing the pointer to indicate opposite to the arrow 4.

While I have herein shown an indicating device which I deem preferable, I do not desire to limit my invention to the specific form of connecting device, as I consider myself the first to employ a connecting device of any kind for the purpose specified.

I claim—

1. In a tandem velocipede, the main frames A B and a connecting device therefor, combined with an indicating device to determine the relative power being applied to each of the said frames, substantially as described.

2. In a tandem velocipede, the main frames A B, combined with a connecting device and with an indicating device which forms a part of the connecting device, substantially as described.

3. In a tandem velocipede to be operated

by two riders, an indicating device having a pointer and a graduated plate to determine which rider is applying the most power.

4. In a tandem velocipede adapted to be separated into two parts, a universally-jointed connecting device for the two parts and an indicating device to determine to which part the greatest amount of power is being applied, substantially as described.

5. In a tandem velocipede, two axle-bearing frames loosely connected together, combined with an indicating device comprising a pointer borne by one of the axle-carrying frames and a co-operating index borne by the other, substantially as described.

6. In a tandem velocipede, two axle-bearing frames loosely connected together and two springs tending to hold them a certain distance apart, substantially as described.

7. In a tandem velocipede, two connected axle-bearing frames and an indicating device consisting of a pointer and an index and two springs acting in opposite direction, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of subscribing witnesses.

STERLING ELLIOTT.

Witnesses:

BERNICE J. NOYES,
F. L. EMERY.