

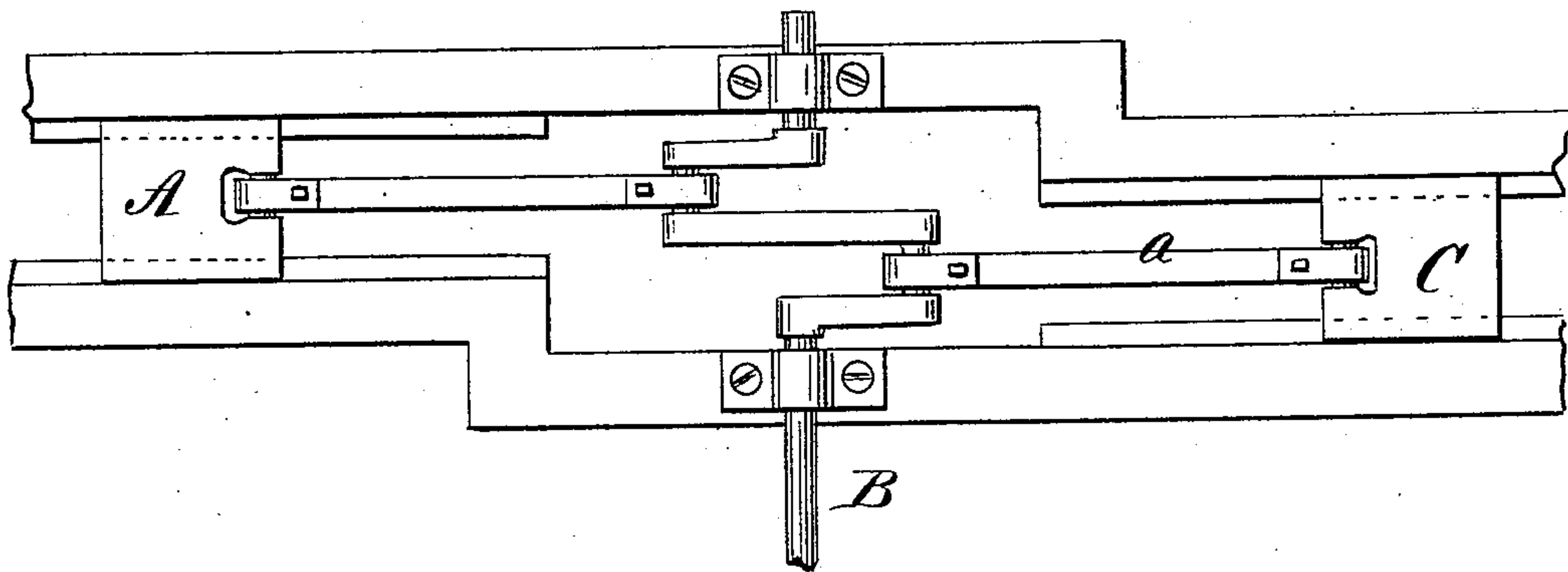
(No Model.)

O. ELWELL.  
COUNTER BALANCE.

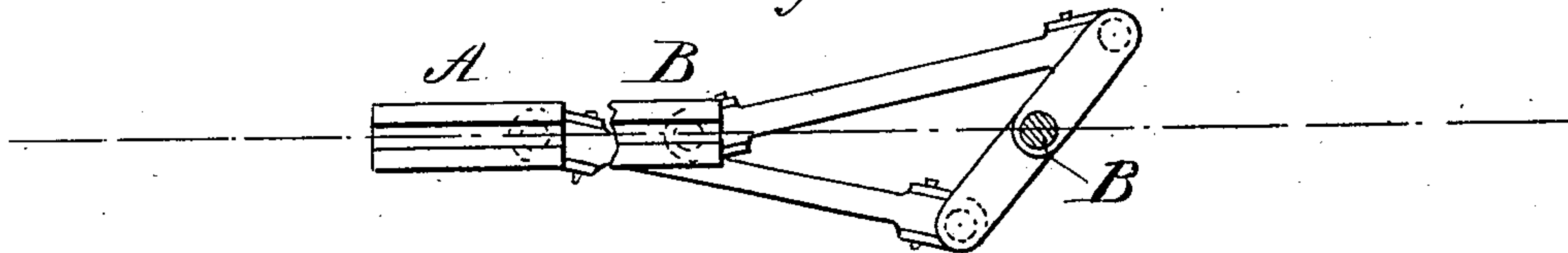
No. 284,827.

Patented Sept. 11, 1883.

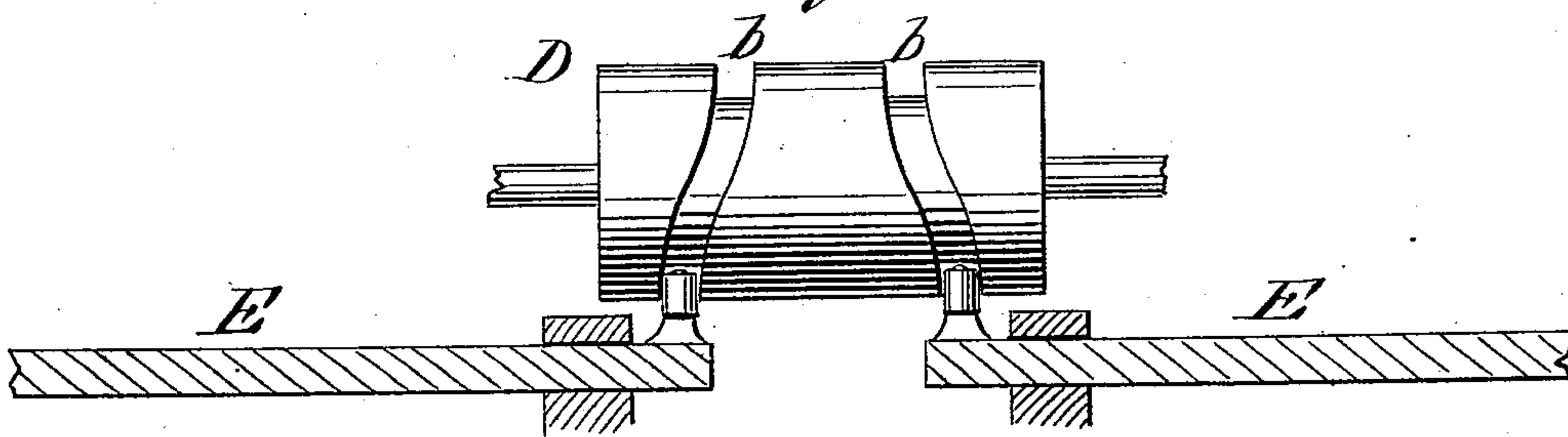
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ORLANDO ELWELL, OF VAN ETTENVILLE, NEW YORK.

## COUNTER-BALANCE.

SPECIFICATION forming part of Letters Patent No. 284,827, dated September 11, 1883.

Application filed May 23, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, ORLANDO ELWELL, of Van Ettenville, in the county of Chemung and State of New York, have invented a new and  
5 Improved Counter-Balance, of which the following is a full, clear, and exact description.

The object of my invention is to obtain both a running and a standing balance for the moving parts of machinery having reciprocating  
10 motion, for the purpose of preventing jarring and obtaining a steady motion, so that such machinery can be run safely at a high rate of speed.

The invention is intended to be applied to  
15 all classes of machines having reciprocating motion—such, for instance, as saw-mills, gig-saws, steam-engines, sewing-machines, mowing-machines, grain-separators, &c.; and the invention consists in the use of a counterbal-  
20 ance-weight connected for movement with the crank or other moving part, so as to counterbalance the weight and inertia of such parts and produce an even and steady motion, as hereinafter described and claimed.

25 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 of the drawings is a plan view, representing my invention as applied to an engine-crank. Fig. 2 is a side view, representing the application of the invention to a crank in a slightly-modified form. Fig. 3 represents the counter-balance as applied to a cam.

35 Referring first to Fig. 1, A represents the cross-head or slide of an engine connected to one crank of a double-crank shaft, B; and C is a weight equal to the weight of the cross-head A, piston, and piston-rod, the weight C  
40 being connected by a rod, a, to a second crank upon the shaft.

It will be seen that in the rotation of the crank-shaft B the parts A C will be moved in opposite directions, and will counterbalance  
45 each other, the weight C thus serving to over-

come the inertia of the reciprocating cross-head, and cause an even and steady movement of the crank-shaft without any jar. It is not essential that the counter-balance be of exactly the same weight as the reciprocating  
50 parts, because if it be lighter its velocity can be increased by using a longer crank, so that the inertia of the two parts shall be the same.

In Fig. 2 an arrangement is shown of the counter-balance as placed upon the same side  
55 of the shaft as the cross-head or slide A. Either form may be used, according to convenience.

In Fig. 3 the invention is shown as applied to a cam, D. The cam is made double, or with  
60 two grooves, b, inclined in opposite directions and engaged by the reciprocating bars E E, that counterbalance each other upon the cam. In this case the inertia of either one of the bars is exerted on the cam in the opposite di-  
65 rection of the other, thereby preventing the jarring of the machine. This principle is applicable where motion is obtained by devices other than the crank or cam, and serves to in-  
70 sure a steady motion of the moving parts and to reduce friction upon the joints. It is not necessary that the counter balance or weight have no other purpose, as in some cases two engines may be applied to work upon oppo-  
75 site or double cranks, so as to balance each other in the same manner.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

In a counter-balance, the combination, with  
80 the double-cranked shaft, of the frame having ways at opposite ends, and the cross-head connected to one crank by a connecting-rod and the weight C connected to the other crank similarly, essentially as shown and described, and  
85 for the purpose set forth.

ORLANDO ELWELL.

Witnesses:

OWEN S. CLARK,  
O. R. DIMON.