

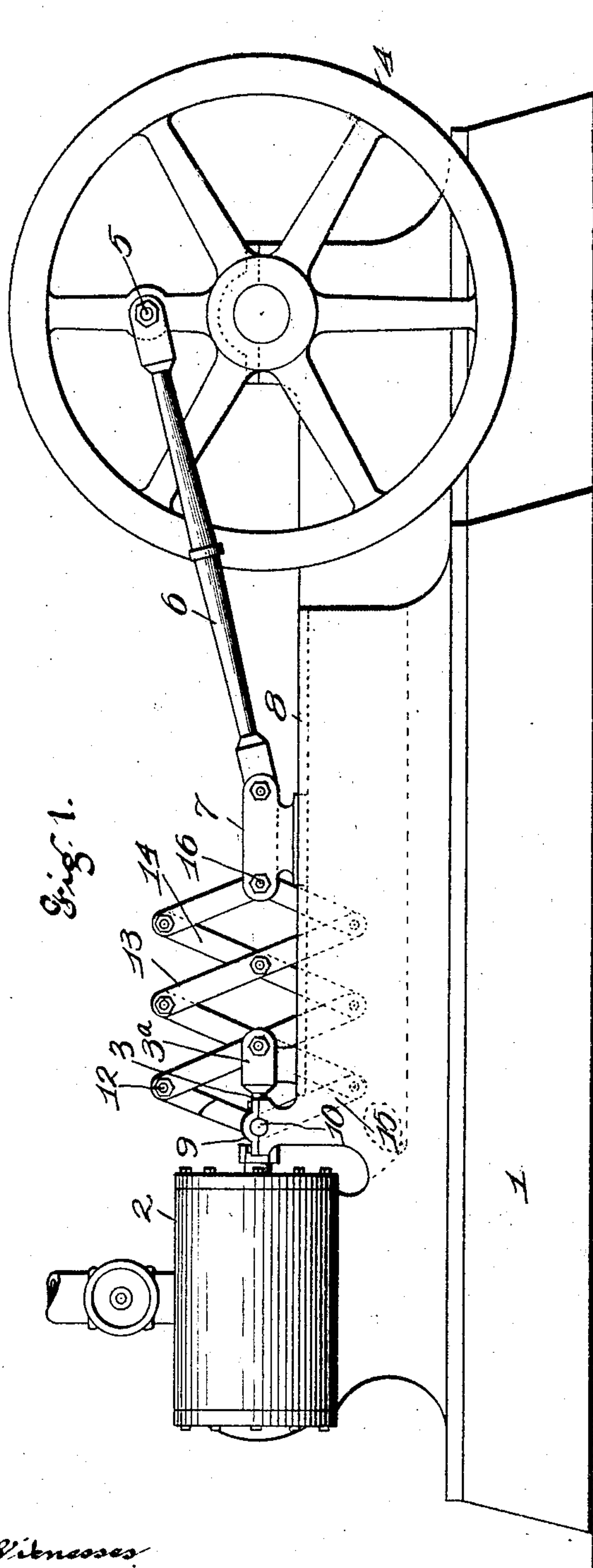
No. 771,023.

PATENTED SEPT. 27, 1904.

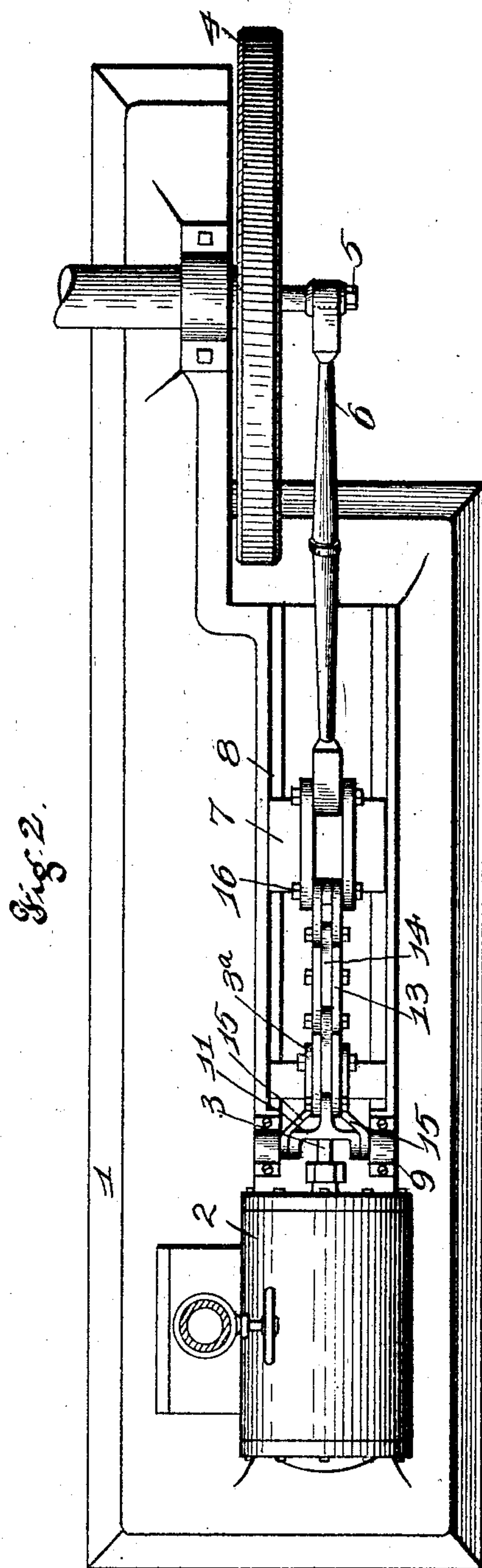
I. D. MORGAN.
PISTON ROD EXTENSION.
APPLICATION FILED MAR. 8, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
Alfred A. Hicks
M. S. Smith



Inventor
Isaac H. Morgan
By Higdon & Longan & Hopkins Attys.

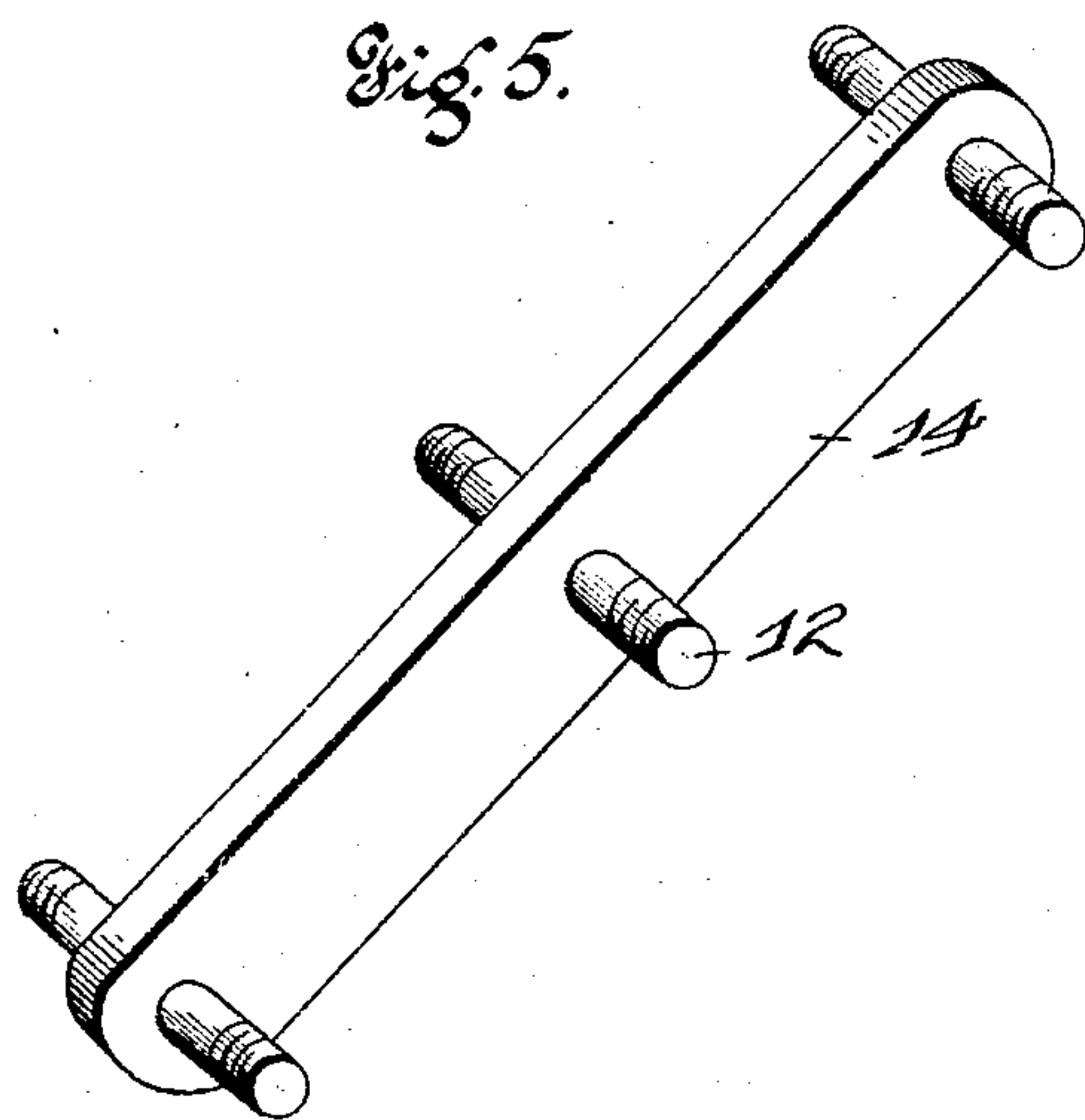
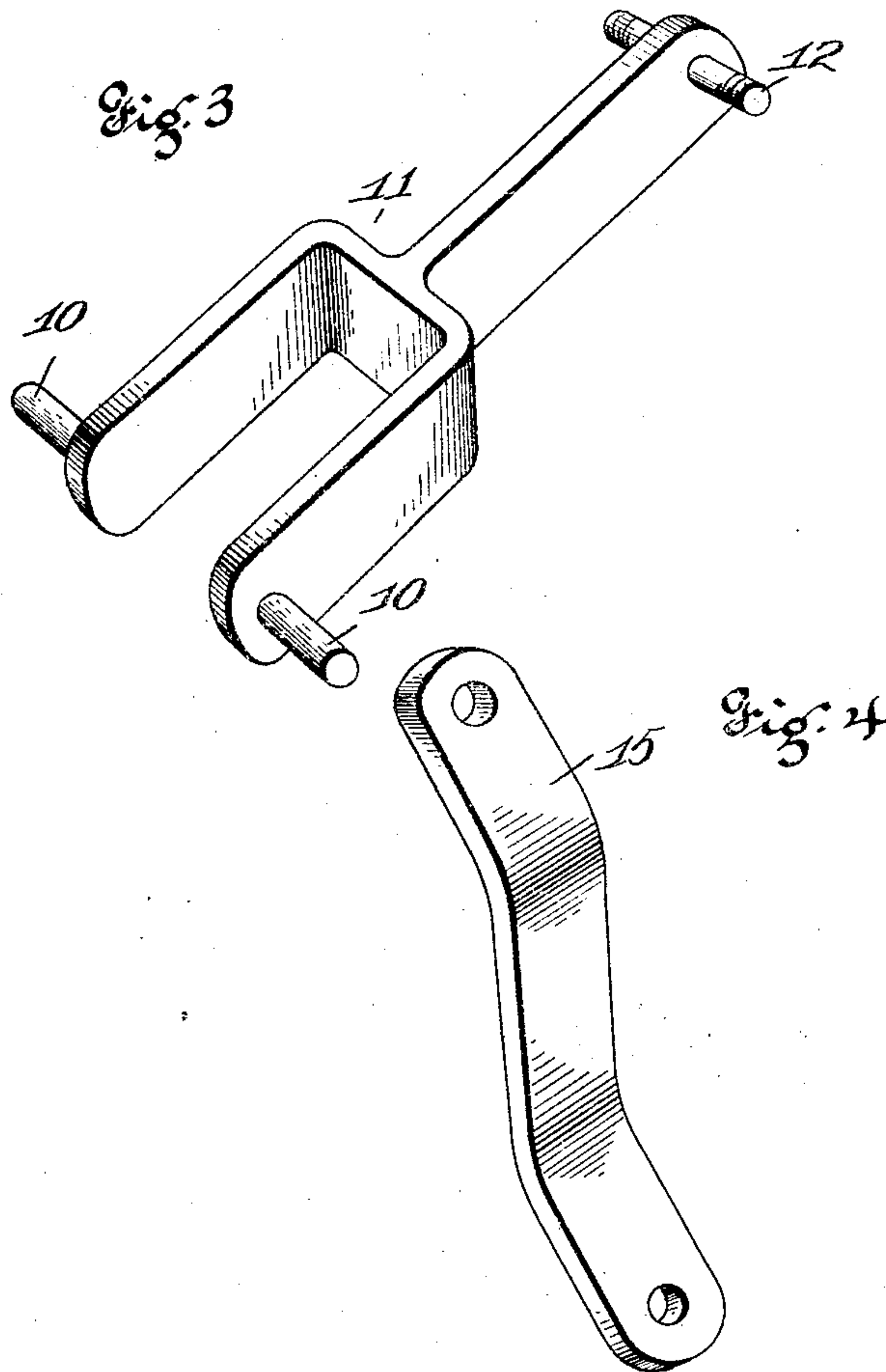
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2 SHEETS—SHEET 2.



Witnesses
Alfred A. Erickson
mission

Inventor
Isaac W. Morgan
by Sigdon & Longan & Hopkins attys.

UNITED STATES PATENT OFFICE.

ISAAC D. MORGAN, OF ST. LOUIS, MISSOURI.

PISTON-ROD EXTENSION.

SPECIFICATION forming part of Letters Patent No. 771,023, dated September 27, 1904.

Application filed March 8, 1904. Serial No. 197,195. (No model.)

To all whom it may concern:

Be it known that I, ISAAC D. MORGAN, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Piston-Rod Extensions, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to piston-rod extensions; and it consists of the novel construction hereinafter described and claimed.

The object of my invention is to provide an improved mechanism whereby the stroke of piston-rods or the throw of cranks may be increased or diminished, as may be required by the nature of the service.

In the drawings, Figure 1 is a side elevation of a steam-engine having my invention applied thereto. Fig. 2 is a plan view of the same. Fig. 3 is a detail perspective view of a forked bar made use of in carrying out my invention. Fig. 4 is a detail view in perspective of a curved bar made use of in carrying out my invention. Fig. 5 is a detail perspective view of one of the central bars of the lazy-tongs construction.

1 indicates the base of a common steam-engine having the usual cylinder 2, piston-rod 3, fly-wheel 4, crank-pin 5, connecting-rod 6, cross-head 7, and guides 8.

Although in the present instance I have shown a steam-engine having my invention applied thereto, yet it will be readily understood that the construction hereinafter described may as well be applied to hydraulic elevator piston-rods, air-compressor piston-rods, or, in fact, any common construction in which a piston-rod or a crank are now used. The only essentials are a piston-rod, a crank, a connecting-rod, and a lazy-tongs connection between the connecting-rod and piston-rod, or if motion is to be communicated from a crank to a piston-rod, as in a common air-compressor, then the construction may not be changed in any particular from that shown herein; but if motion is to be communicated from the piston-rod to a cross-head carrying a number of rope-sheaves, as in a hydraulic elevator, then the connecting-rod and crank of course will be dispensed with, or if it be desired to reduce

the stroke of a long crank and communicate its motion to a shorter crank, or vice versa, then the cylinder 2 will of course be dispensed with, as will also the piston-rod 3, and another connecting-rod, such as 6, will be connected to the lazy-tongs at one end and to a second crank at its opposite end.

Mounted in laterally-alined bearings 9, which in the present instance are formed integral with the guides 8 and are located one upon each side of the piston-rod 3, are the journals 10 of a forked bar 11. Said journals 10 project in alinement from the outer sides of the forks of said forked bar near the free ends thereof, and projecting from the opposite end of said forked bar is a bolt 12, which is provided with a common nut at each end and which bolt connects said forked bar to one end of the lazy-tongs, which is composed of the usual number of crossed levers 13, 14, depending, of course, upon the stroke which is to be imparted to the crank in accordance with the well-known principle that the longer the stroke the greater the number of pairs of crossed levers must be employed. 15, 15 indicate two curved bars, the upper ends of which are pivotally mounted upon the journals 10 of said forked bar next to the bearings 9 and the lower ends of which are pivotally connected, by means of another bolt 12, to the lower end of the adjacent crossed lever 14. The outer end of the piston-rod 3 is connected to another cross-head 3^a, and the latter is connected to the lazy-tongs by means of another bolt 12, which passes through said cross-head and through the crossed levers 13, 14 at their crossing-point. The opposite end of the lazy-tongs is pivotally connected to the cross-head 7 by means of a bolt 16. In this connection I desire to state that the bolts 12 of the forked bar 11 and of the crossed levers 14 are fixed rigidly within said forked bar and said levers, so that they act as gudgeons and prevent any wear from taking place within said forked bar and levers.

One of the principal advantages of my invention is that it converts the lazy-tongs into what I call an "extension-lever," which latter exerts its force in a direct central line from the piston-rod to the crank-pin.

I claim—

1. A stroke increasing or diminishing device, the same comprising a suitable base, guides on said base, a cross-head for said
5 guides, laterally-alined bearings carried by said base, a forked bar having journals at its forked end mounted within said bearings, a pair of curved bars pivotally mounted at one end upon said journals and having their op-
10 posite ends connected to one member of the lazy-tongs, a lazy-tongs the corresponding member of which is connected to the end of said forked bar which is opposite its forked end, the opposite end of said lazy-tongs be-
15 ing connected to said cross-head, a power-transmitting bar also connected to said cross-head, and a power-transmitting rod connected to the pair of crossed levers which are farthest from said cross-head, substantially as
20 described.

2. A stroke increasing or diminishing de-

vice, the same comprising a suitable base, guides on said base, a cross-head, laterally-alined bearings, a forked bar having journals at its forked end mounted within said bear- 25 ings, a pair of curved bars pivotally mounted at one end upon said journals and having their opposite ends connected to one member of the lazy-tongs, a lazy-tongs, one member of which is connected to said forked bar, the 30 opposite end of said lazy-tongs being connected to said cross-head, a piston-rod connected to said lazy-tongs, a crank, and a connecting-rod, which connects said crank to said cross-head, substantially as described. 35

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

ISAAC D. MORGAN.

Witnesses:

MAY C. FELLHAUER,
JOHN C. HIGDON.