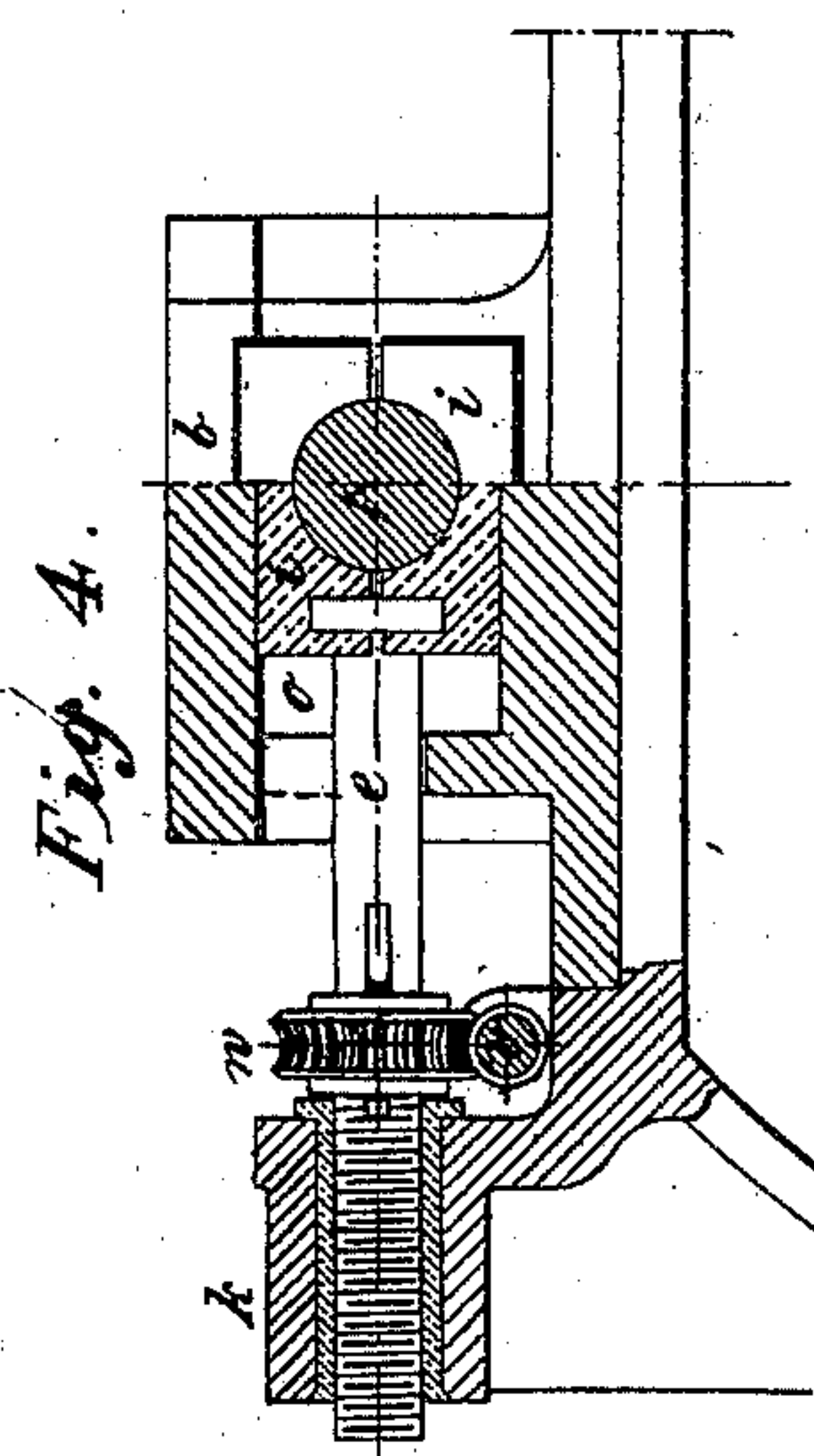
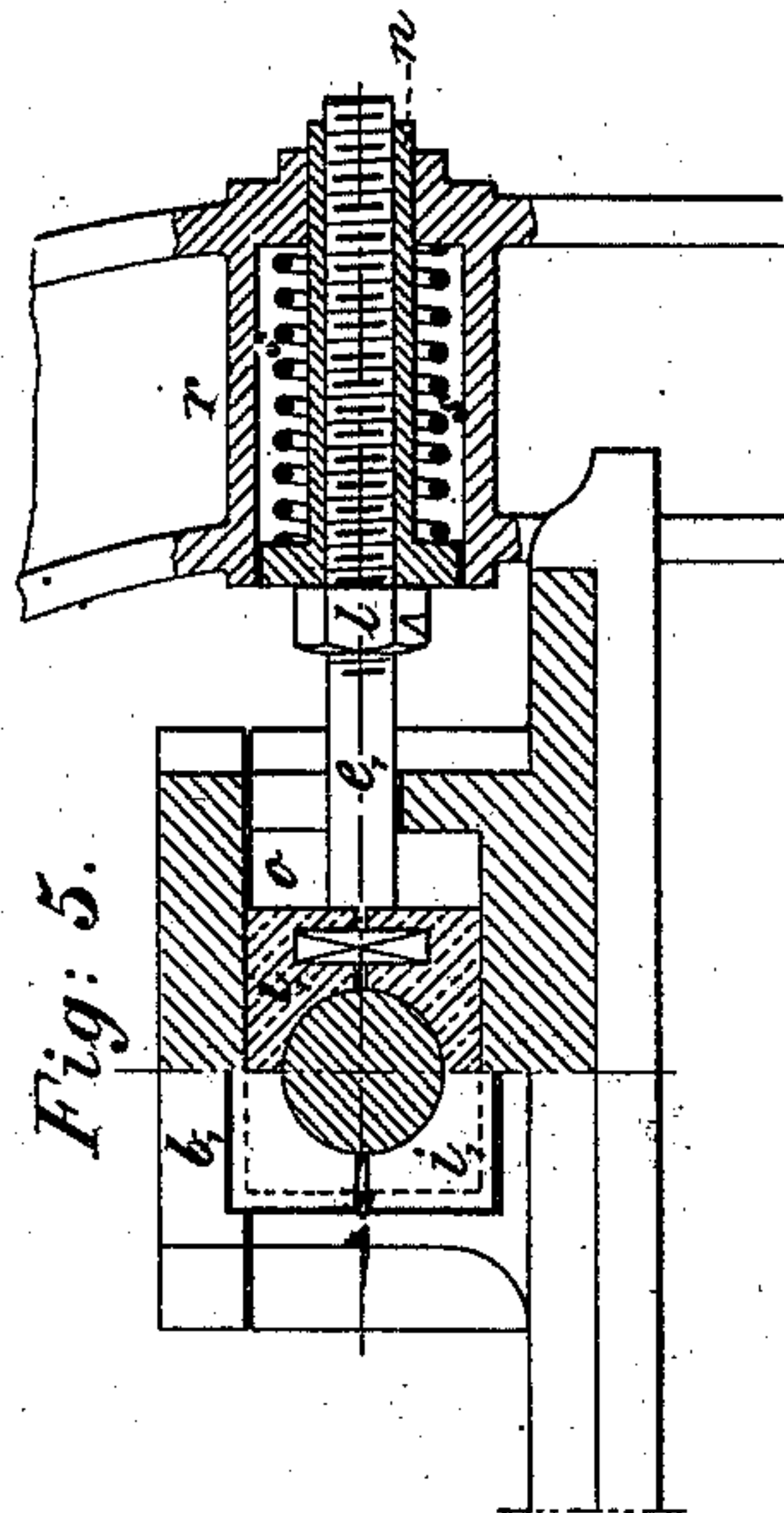
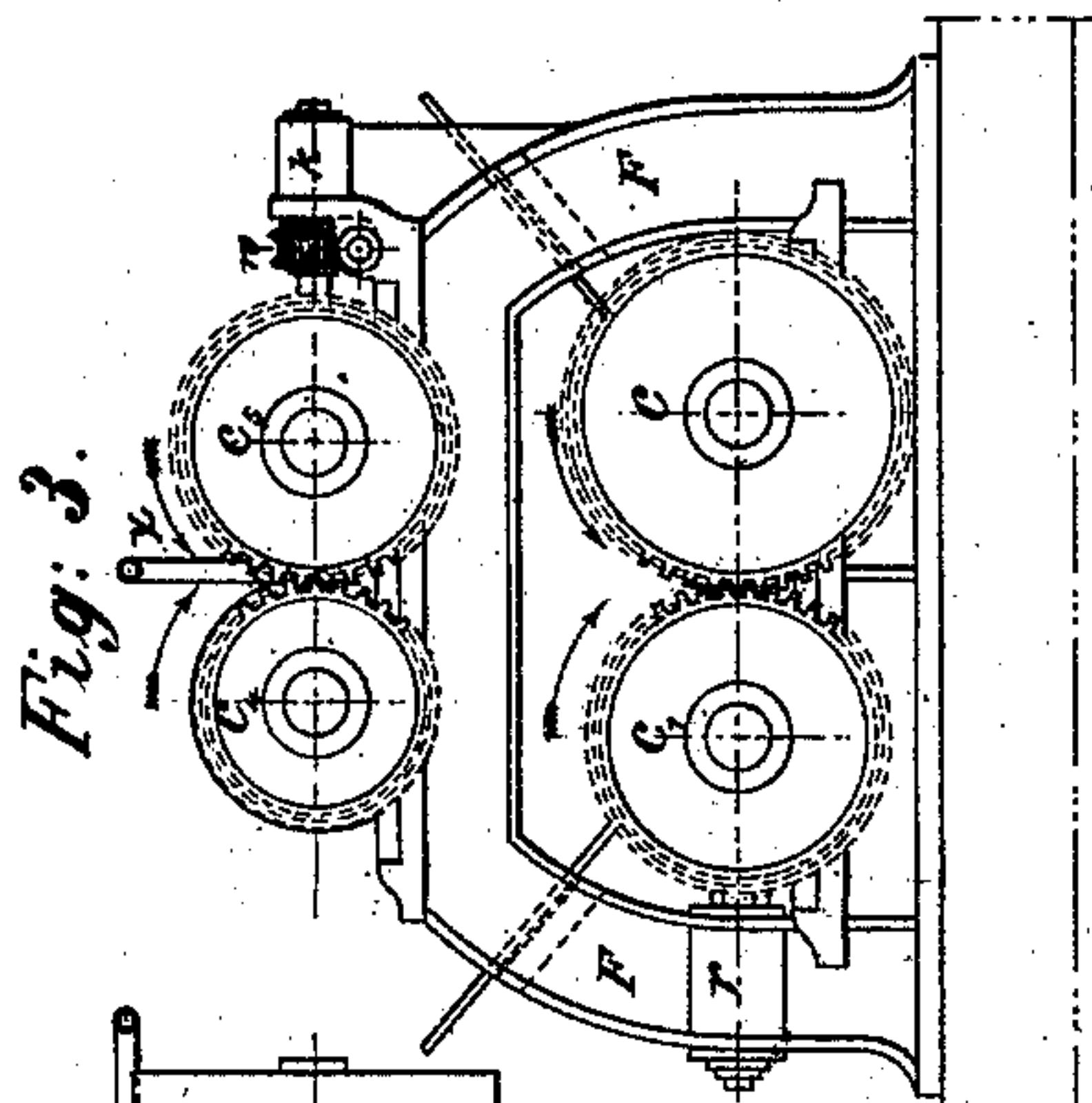
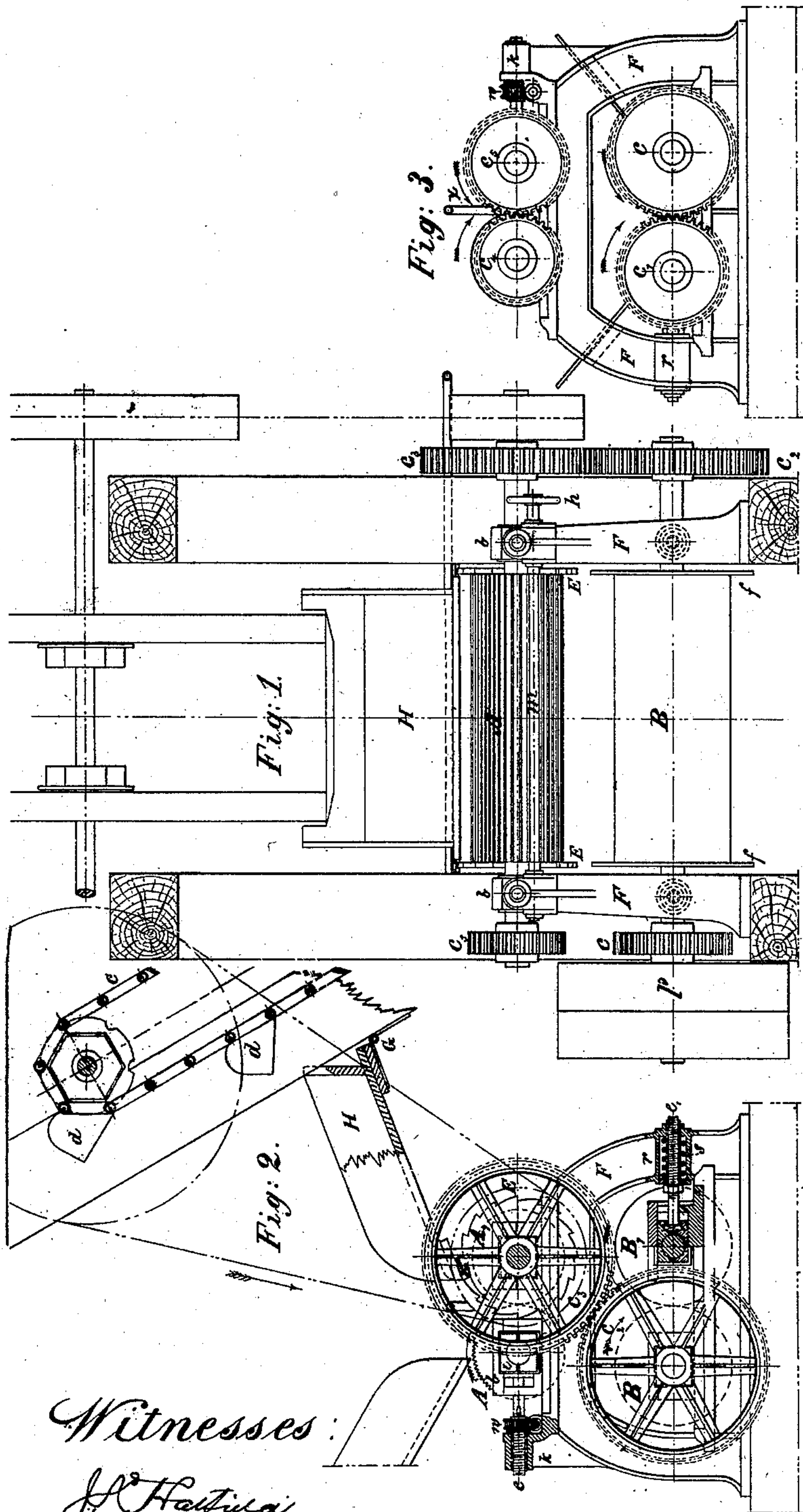


S. STUTZ.  
Ore-Crusher.

No. 203,793.

Patented May 14, 1878.



Witnesses:  
J. H. Haffner  
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Inventor:  
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# UNITED STATES PATENT OFFICE.

SEBASTIAN STUTZ, OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN ORE-CRUSHERS.

Specification forming part of Letters Patent No. **203,793**, dated May 14, 1878; application filed April 27, 1877.

*To all whom it may concern:*

Be it known that I, SEBASTIAN STUTZ, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Coal and Ore Crushing Machinery; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a front elevation. Figs. 2 and 3 represent end views, and Figs. 4 and 5 are enlarged detail views.

Similar letters of reference in the accompanying drawings denote the same parts.

This invention relates to improvements in crushing and pulverizing machines of the class in which the material is crushed and pulverized by being passed between two or more pairs of rolls.

It consists in a novel construction, combination, and arrangement of the parts, as herein-after specifically described and claimed.

In the drawings, A A' and B B' represent two pairs of rolls, mounted in housings F F. The former or upper rolls A A' are corrugated to break the larger pieces of the material, while the lower rolls B B' have smooth surfaces to still further reduce the material to the required size.

The combination and arrangement of mechanism for revolving each pair of rolls A A' and B B' at different rates of speed, whereby a sliding movement at their points of contact is produced, is one of the novelties of my invention. This I obtain by making the cog-wheels  $c c^1$  and  $c^4 c^5$  fixed upon the shafts of the rolls B B' and A A', respectively, of different diameters.

To better explain this arrangement, suppose the cog-wheels  $c c^1$  to be of, say, thirteen and seventeen inches diameter, respectively. The thirteen-inch wheel, being on the shaft of the roll B, will revolve the latter, say, eighty times per minute. It follows, therefore, that the roll B', having a seventeen-inch wheel, will be revolved only about sixty-one revolutions in the same time. Thus, a sliding movement is produced at the point of contact between the two rolls B B', the result of the sliding movement being that the material is crushed finer with less pressure upon the rolls, and the latter

kept clean, one by the other, without the use of scrapers.

Another feature of the invention consists in the construction and arrangement of the mechanism shown by Figs. 1 and 4, whereby the roll A may be adjusted from or toward the roll A', in order to reduce the pieces to the most convenient size.

I will now proceed to describe the means for carrying out this part of my invention.

$b b$  are pillow-blocks, which inclose half-boxes  $i i$ , forming the bearings of the movable roll A, said blocks being provided on the outside with open spaces  $o o$ , to allow of considerable play to the half-boxes.  $e e$  are screw-rods, mounted in brackets  $k k$  cast with the housings F F, the headed ends of said rods being let into the half-boxes, as shown in Fig. 4, and their opposite ends passed through brass nuts inserted in the brackets  $k k$ . On the rods  $e e$  are mounted worm-wheels  $n n$ , engaging with worms  $v v$ , secured to a cross-shaft. The rods are provided with feathers, and the worm-wheels with corresponding grooves, so that the rotation of the worm-wheels by the worms will cause the rods to move longitudinally, and thus adjust the roll A toward or from the roll A', in order to vary the distance between said rolls, and thus reduce the material to the desired size.

A third feature of the invention consists in the novel construction and arrangement of the spring devices for preventing accidental breakage of the parts, which might otherwise result from the passage of the unusually hard material between the rolls.

$r r$  are boxes or sockets cast or otherwise connected with the housings F F. These boxes are located in the same horizontal plane as the center of the journals, and serve to contain either steel or rubber springs, which exert their pressure upon the journals of the roll B through stems  $e' e'$ , whose headed ends are let into both half-boxes  $i i$ . The outer ends of the stems are screw-threaded and surrounded by flanged pipe-boxes  $n n$ . Springs  $s s$  surround the latter, and exert their pressure on the flanges thereof, which, in turn, bear against adjusting-nuts  $l l$ , and thus communicate the pressure through the stems to the journals of the roll B'.



By this means the size of the pieces of the material to be let through the crusher can be regulated according to their gravity. This is very important in crushing impure coal mixed intimately with slate and sulphur, in order to obtain a perfect separation by the washing machinery, through which it subsequently passes.

For the purpose of preventing the material from escaping at the ends of the rolls, one roll of each pair is provided with large flanges *f f* and *E E*. The flanges *E E* of the upper roll *A A'* form cam-wheels at the same time, and support the lower end of the inclined chute *H*. The rear of the latter is suspended in hinges *G G*. By the action of cam-wheels *E E* an alternating up-and-down movement is given to the lower end of the chute *H*, and thus a feeding apparatus combined, which spreads the material upon the entire length of the rolls. By means of the endless chain *C* and the buckets *d d* the material is raised up and emptied upon the inclined chute, where it slides down to the rolls.

The sticking of the coal or ore between the ribs of the upper pair of rolls is prevented by directing a light stream of water upon the

rolls. To this end, a small pipe, *x*, provided with holes of about one-fourth of an inch in size, is fixed above the rolls *A A'*.

Motion is given to the machinery by the pulley *p*, fixed upon the shaft of the roll *B*, and is transmitted to the upper rolls *A A'* by means of the cog-wheels *c<sup>2</sup>* and *c<sup>3</sup>*, as shown by Fig. 2.

I claim as my invention—

1. In a crushing or pulverizing machine, the combination, with the upper corrugated rolls *A A'*, of equal diameter, the two lower rolls *B B'*, of equal diameter, but larger than the upper rolls, of the pinions *c c<sup>1</sup> c<sup>4</sup> c<sup>5</sup>*, of unequal diameter, substantially as described, for the purpose specified.

2. The combination of the screw-stems *e' e'*, having the nuts *l l*, with the half-boxes *i' i'*, flanged pipe-boxes *n n*, springs *s s*, and boxes or sockets *r r*, substantially as described, for the purpose specified.

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Witnesses:

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