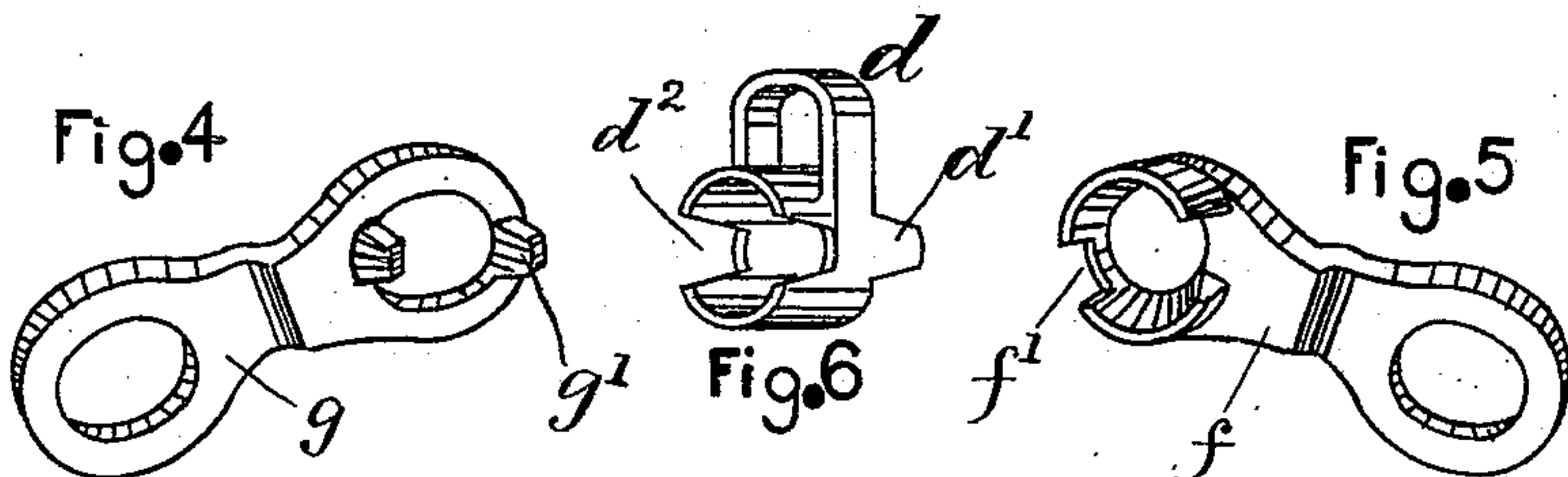
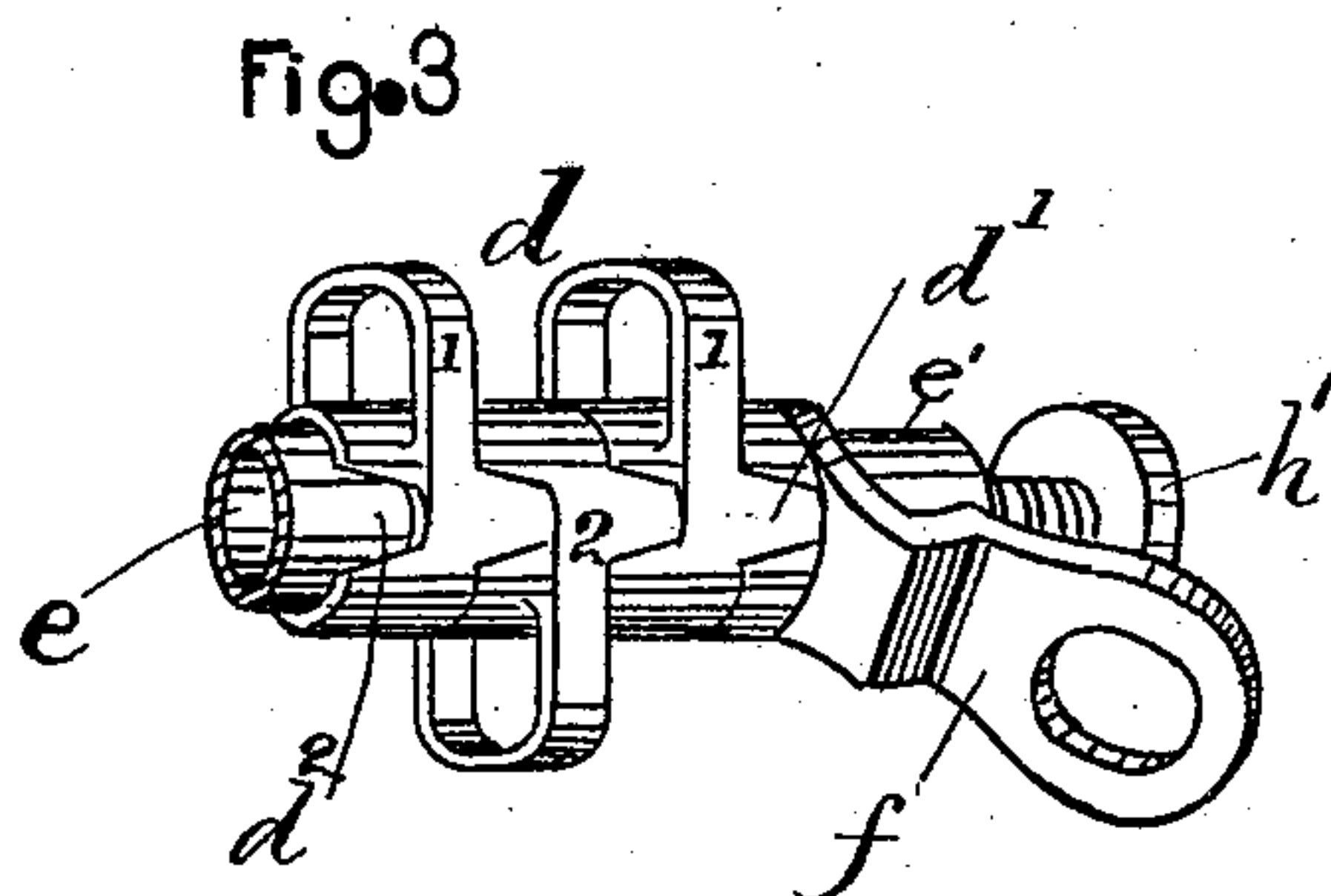
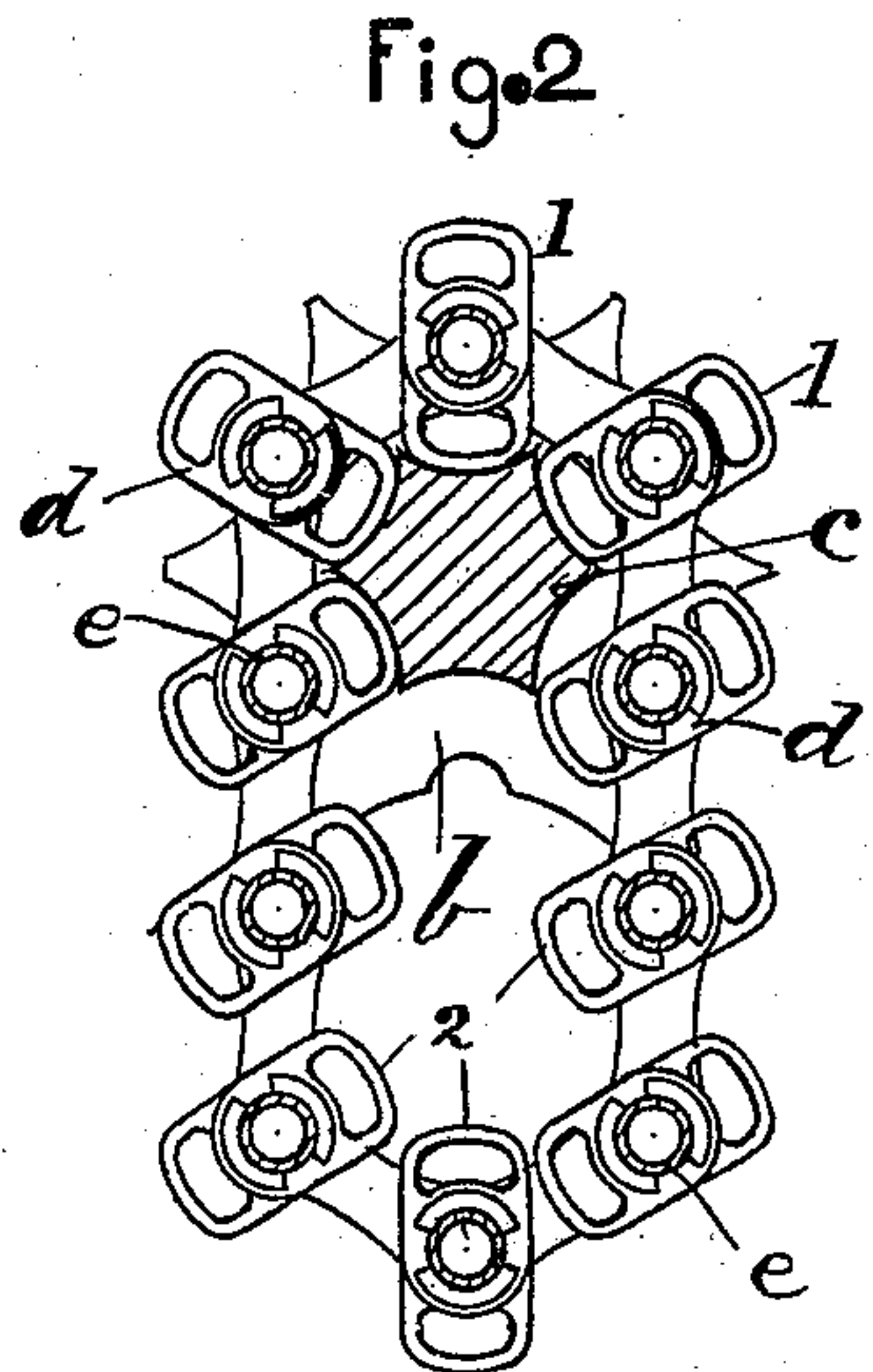
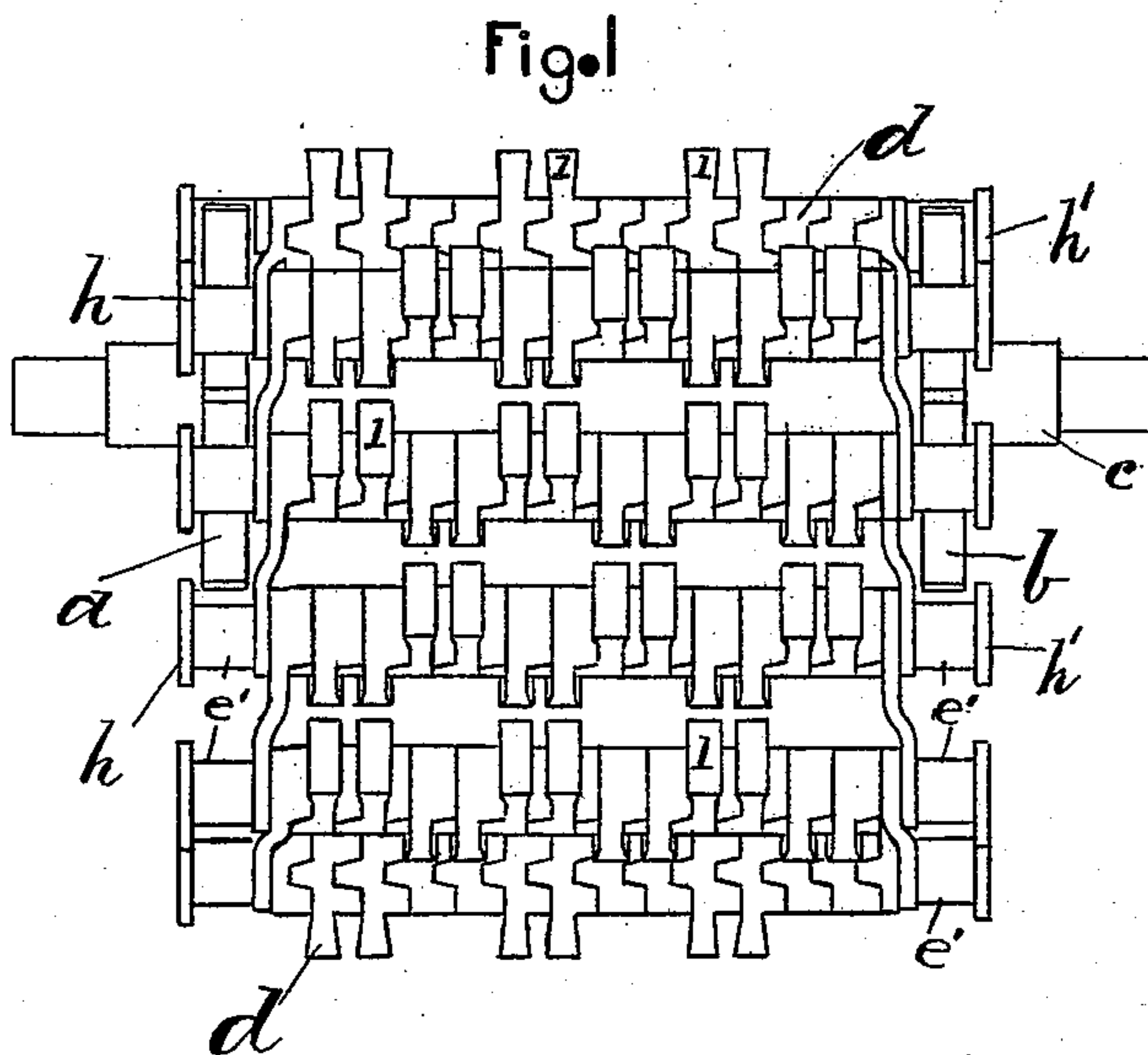


(No Model.)

J. HILL.  
LOOM PATTERN CHAIN.

No. 486,336.

Patented Nov. 15, 1892.



Witnesses  
*Edward Hill*  
*John Whitehead*

Inventor  
*James Hill*  
*Per Samuel Hey*  
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# UNITED STATES PATENT OFFICE.

JAMES HILL, OF KEIGHLEY, ENGLAND.

## LOOM PATTERN-CHAIN.

SPECIFICATION forming part of Letters Patent No. 486,336, dated November 15, 1892.

Application filed January 29, 1892. Serial No. 419,699. (No model.) Patented in England July 28, 1891, No. 12,781.

*To all whom it may concern:*

Be it known that I, JAMES HILL, a subject of the Queen of Great Britain, residing at 35 Ethel Street, Keighley, in the county of York, England, have invented a new and useful Improvement in Loom Pattern-Chains, of which the following is a specification, and for which I have obtained English Letters Patent, dated July 28, 1891, and numbered 12,781.

My invention relates to improvements in pattern surfaces or chains formed of pulleys mounted upon bars or pins held together by a series of links fitted over each of their extremities, these said pattern-chains being usually employed for controlling and regulating the movements of the loom's heddles and shuttle-boxes through the medium of other well-known operating mechanisms.

The object of this invention is to produce metal pattern-chains that shall at all times bear the full complement of parts for producing any movement (within their ranges) in the heddles or shuttle-boxes without necessitating the detachment or addition to any of their component parts, so that by having a pattern-chain of the desired length or consisting of the desired number of links and their accompanying bars or pins and other parts constructed in accordance with this invention any desired movement may be effected by the adjustment of the parts (hereinafter described) which form the pattern-surface. This object I attain by the mechanism illustrated in the accompanying sheet of drawings, in which—

Figures 1 and 2 are side and sectional end elevations, respectively, showing a pattern-chain in connection with its barrel, said chain being made in accordance with my invention. Fig. 3 is a perspective view on an enlarged scale, showing part of a bar or tube and one link, together with the other improved parts for forming the pattern-surface. Figs. 4 and 5 are drawings in detail on the same scale as Fig. 3, illustrative of the links for the respective ends of the bars or tubes forming the chain. Fig. 6 is a drawing in detail, also on the same scale as Fig. 3, showing the improved part forming the pattern-surface, as hereinafter described.

Similar letters and figures of reference in-

dicating similar parts throughout the several views.

The usual and well-known form of pattern-barrel, consisting of the sprocket-wheels *a* and *b*, mounted upon a shaft *c*, may be made use of in connection with my improved pattern-chain.

In place of using the well-known form of pulleys and their spacing-hoops for retaining the same in their proper paths of motion to effect the desired movements of the parts in connection with which they are employed, as is well understood, I make use of the cams *d*, which I mount upon the tubes *e* in preference to mounting them upon solid bars or pins which, to be of the same strength as these tubes, would also be considerably heavier and so add to the weight of the chain, which is undesirable. The cams *d* are formed by their hubs having projections *d'* and recesses *d''*, so that when mounted upon the tubes *e* they will gear with each other, whether they are extending upward from the tube *e*, as are those marked 1, or downward therefrom, as those marked 2, while by the links *f* and *g*, having corresponding recesses and projections *f'* and *g'* to those *d'* and *d''* on the cams *d* into which they are made to couple or gear, said cams *d* are held in such relative positions on their tubes *e* with said links *f* and *g* that when their pattern-barrel revolves to bring them into operation those that are arranged to be operative are brought into a vertical position or made to extend radially from the barrel, as do those marked 1, and those that are arranged to be inoperative extend inwardly toward the center of said barrel, as do those marked 2. At the opposite ends of the tube *e* are shown short tubes *e'* and screws *h h'*, which latter are screwed into the ends of said tubes *e*, as shown in Fig. 3, and when their heads are screwed in against the end of the short tubes *e'* they securely fasten the cams in place. It will be noticed that the recesses *d''* are on exactly-opposite sides of the hub, so that by unscrewing the screws *h'* sufficiently the links and hubs may be separated sufficiently to allow of the position of the cams being changed from the position shown by the cam 1 in Fig. 3 to the position shown by the cam 2 in said figure, so as to be operative or inoperative, as



desired, and this without actually removing the cams or links from off the pins.

Such being the nature and object of my invention, what I desire to secure by Letters Patent, and claim, is—

1. The combination of the cams  $d$ , having projections and recesses  $d'$  and  $d^2$ , with the links  $f$  and  $g$ , formed with like projections and recesses, as described, to gear with said cams  $d$ , and the tubes  $e$ , supporting said cams and links, substantially as specified.

2. The combination of the cams  $d$ , having their hubs formed with projections and recesses to gear with each other, the links  $f$  and  $g$ , formed with like projections and recesses to gear with said cams  $d$ , the tubes  $e$ , supporting said cams and links, and the binding-screws  $h$  and  $h'$ , substantially as specified.

3. A series of cams  $d$ , having projecting perforated hubs, the hub of one cam having projections engaging in radial recesses in the hub of the next adjacent cam, pins passing

through said cams, and means for securing the cams and pins together, substantially as described.

4. In a pattern-chain, a series of pins and links, in combination with a series of cams  $d$ , having projecting perforated hubs, the hubs being provided with radial recesses and projections on their opposite ends, said recesses being arranged on opposite sides of the hubs to allow of the cams being arranged operatively or inoperatively, as required, substantially as described.

5. The combination, with a series of cams and a corresponding series of pins, of a series of links each having one end rigidly connected to one set of cams and the other loosely connected to the succeeding set, substantially as described.

JAMES HILL.

Witnesses:

SAMUEL HEY,  
HARRY ELLISON.