

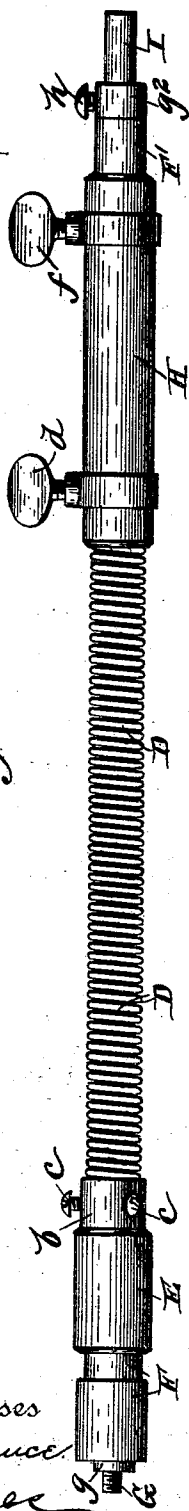
(No Model.)

J. K. PRIEST.
POWER TRANSMITTING FLEXIBLE SHAFT.

No. 501,731.

Patented July 18, 1893.

Fig. 1.



Witnesses
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Fig. 2.

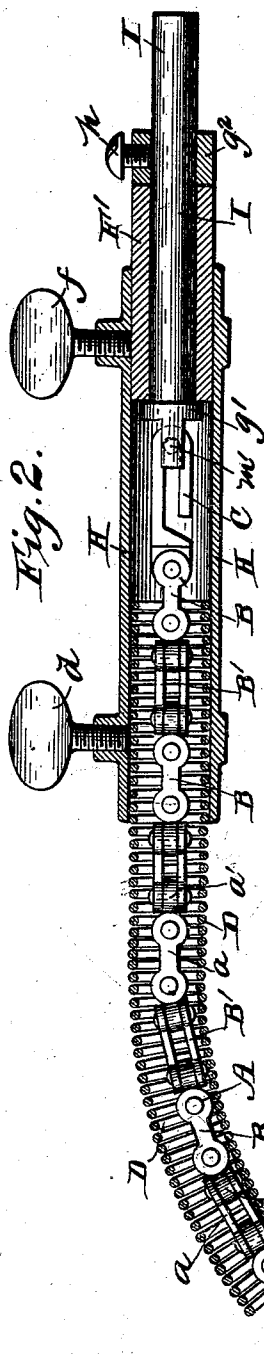


Fig. 3.

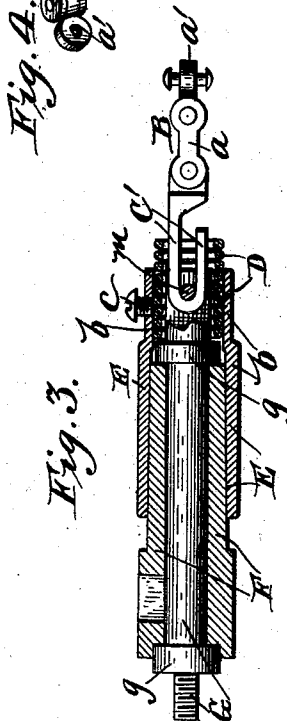


Fig. 4.

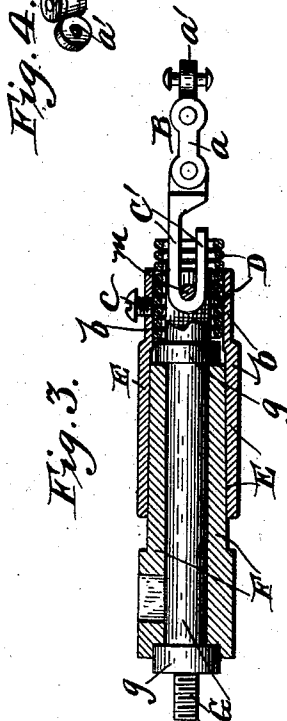
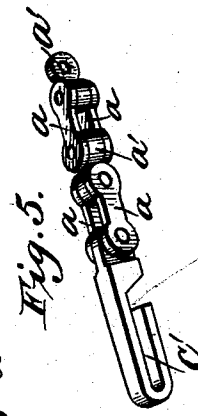


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOSEPH K. PRIEST, OF NASHUA, NEW HAMPSHIRE.

POWER-TRANSMITTING FLEXIBLE SHAFT.

SPECIFICATION forming part of Letters Patent No. 501,731, dated July 18, 1893.

Application filed March 20, 1893. Serial No. 466,905. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH K. PRIEST, a citizen of the United States, residing at Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Power-Transmitting Flexible Shafts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a power transmitting shaft having a flexible cable-like section, or connecting portion intermediate two rigid portions of such shaft, and its object is to produce a power transmitting shaft having a flexible cable-like connection free from some serious objections to the flexible sections heretofore devised. One objection is the liability of the flexible section or connecting portion to break after a short period of use except when making obtuse angles and doing light work; and another objection is that of a strong tendency of the chain of the flexible section or connecting portion to "kink" on the inside of its outside inclosing coil or casing, which tendency increases with the increased power required,—and as this kinking produces great friction between the chain and outer case, it is very important to avoid the same. In some known constructions this tendency to kink is greater than in others—and where there is the least tendency to kink the utility is the greatest.

My invention consists in a novel construction of the flexible section and of the rigid portions of the shaft to which it is applied, whereby kinking of the chain is prevented, and other benefits secured, as will be fully seen from the following specification, claims and accompanying drawings, in which latter—

Figure 1 is a side elevation of my improved power transmitting shaft with flexible section or connecting portion as it appears when straight. Fig. 2 is a longitudinal section of the same, in part, as it appears when it is bent into a curved form. Fig. 3 is a section of one of the ends of the shaft to which the chain of the flexible section is connected, this end portion being shown in elevation in Fig. 1 but removed in Fig. 2. Fig. 4 is a perspective

view of one of the links of the improved chain, and Fig. 5 is a perspective view of one of the end hooking links and two of the links of the chain.

A in the drawings shows a chain formed of links B, B', terminated at each end with hooks C C'. Each link B is formed of plates *aa'*, all the plates *a* receiving between their perforated ends the perforated ends of the plates *a'*. The perforated ends of the plates *a'* are constructed at right angles to one another, and the pivots or rivets are passed vertically through the eyes of the plates of one link and horizontally through the eyes of the plates of another link, and so on throughout the chain, and therefore the plates *a* of one link are so arranged with respect to those of another link that they alternately lie horizontally and vertically, and thus are adapted respectively for receiving the perforated ends of the plates *a'*. The hooks C C' are formed with flat shouldered ends which pass between the plates *a*. By thus constructing the chain it has been found that there is no tendency to kink, and at the same time the friction does not increase with an addition of power.

This improved chain is applied within a flexible hollow coil D, which is secured at one of its ends by a set screw *c* in an extension *b* of a rigid tubular wedging sleeve E, said sleeve being wedged upon a tubular rigid portion F of the shaft in which a rigid, revolving, screw threaded spindle G is fitted. The other end of the coil is also secured by a set screw *d* in another tubular sleeve H, which sleeve is adjustable, being confined by a set screw *f* upon a tubular adjustable portion F' of the shaft, in which a revolving rigid spindle I is fitted. The spindle G is formed with collars *g* which keep it from moving longitudinally in the tubular portion F, and the sleeve spindle I is provided with a collar *g'* and also with an adjustable stop collar *g''*, the latter being secured on the spindle by a set screw *h*. The spindles are formed at one of their ends with bifurcated portions through which hooking pins *m m'* are passed; and upon these pins the hooks C C' at the ends of the chain are hooked as shown.

It is plain from the foregoing description, that the spindles and the chain are kept in

proper line relatively, and that the chain and spindles have every freedom to make their necessary movements with the rigid and flexible portions of the shaft, and that the chain links are free to turn on their pivots or rivets either vertically or horizontally, and in doing so there is no tendency to kink or bind with undue friction.

What I claim as my invention is—

- 10 1. A power transmitting shaft of the type described, having a flexible cable-like intermediate connecting portion between its rigid portions, said connecting portion comprising between its hooking ends, two series of links
- 15 constructed respectively of pairs of flat hinging plates arranged alternately in horizontal and vertical planes, and other pairs of hinging plates each plate of a pair of the latter, being formed with both a horizontal and a
- 20 vertical hinging end, and the several pairs of plates of the two series being united by pivots which pass through the plates the joints

in vertical and horizontal planes, substantially as described.

2. In a power transmitting shaft having a flexible connecting portion between its rigid portions, the combination with a chain formed of links consisting of pairs of flat plates a, a , set alternately in horizontal and vertical planes, and other pairs of plates $a' a'$, each plate of a pair of the latter being formed with both a horizontal and vertical hinging end, and the several pairs of plates being united by pivots running alternately at right angles to one another, of hooks C, C' , wire inclosing coil D ; tubular rigid parts F, H confining screws d and f , and spindles G and I , substantially as described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

JOSEPH K. PRIEST.

Witnesses:

R. T. SMITH,

S. J. M. SMITH.