

W. T. Flinn.

Loom.

No 84,872.

Patented Dec. 15, 1868.

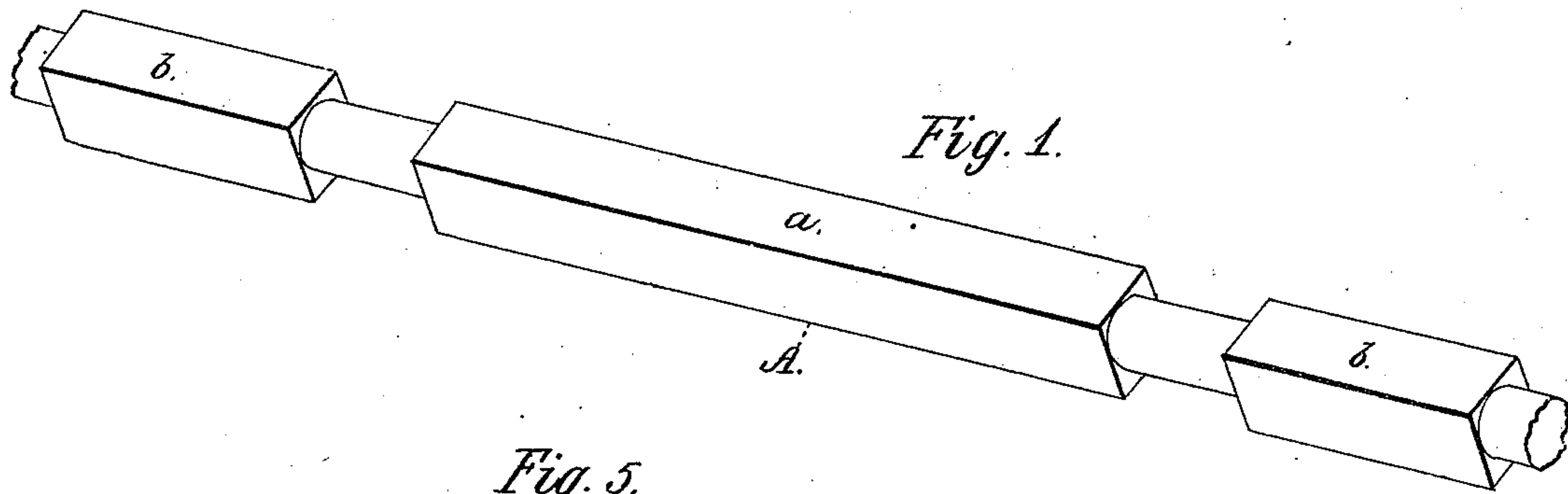


Fig. 1.

Fig. 5.

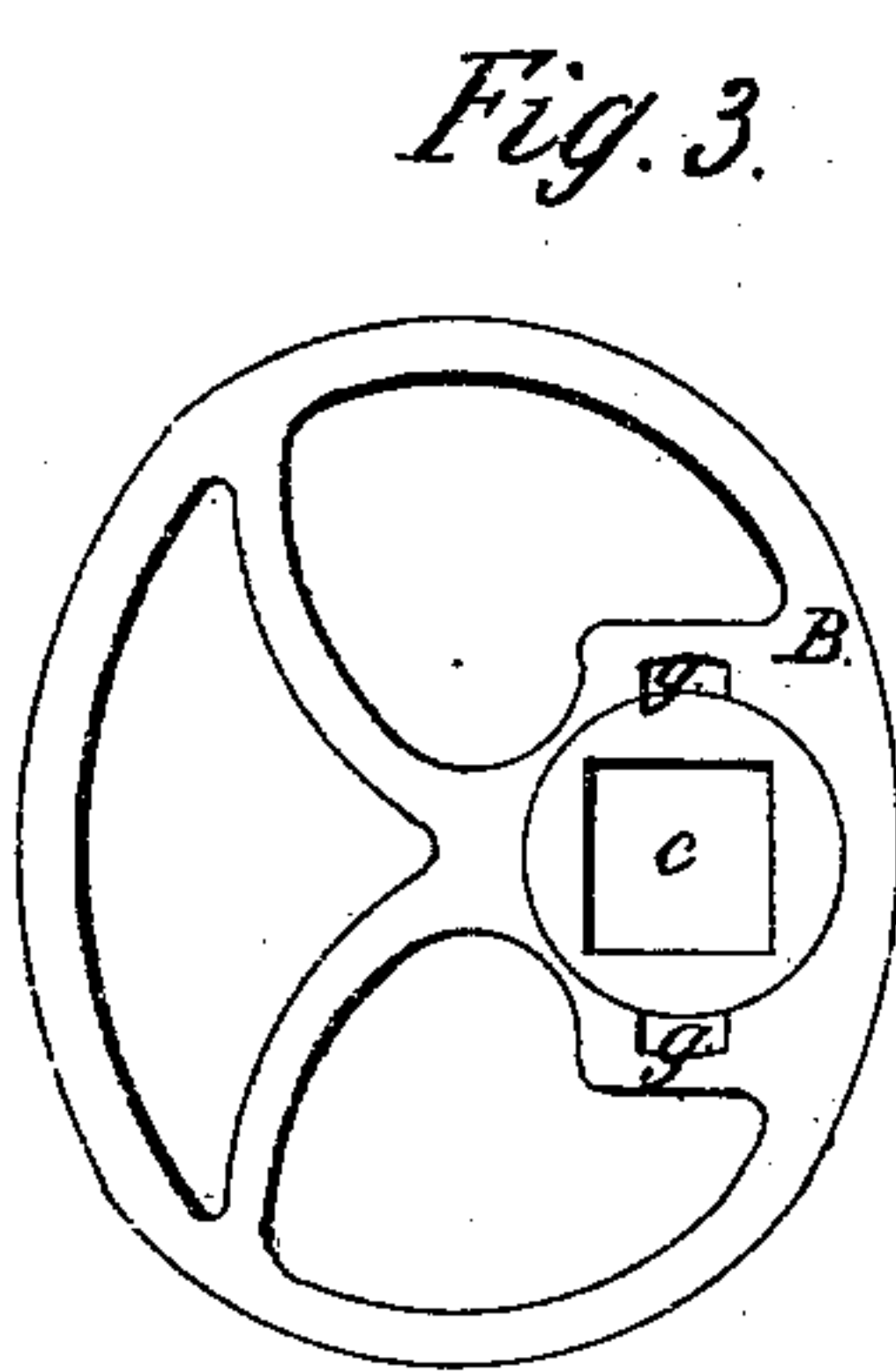


Fig. 3.

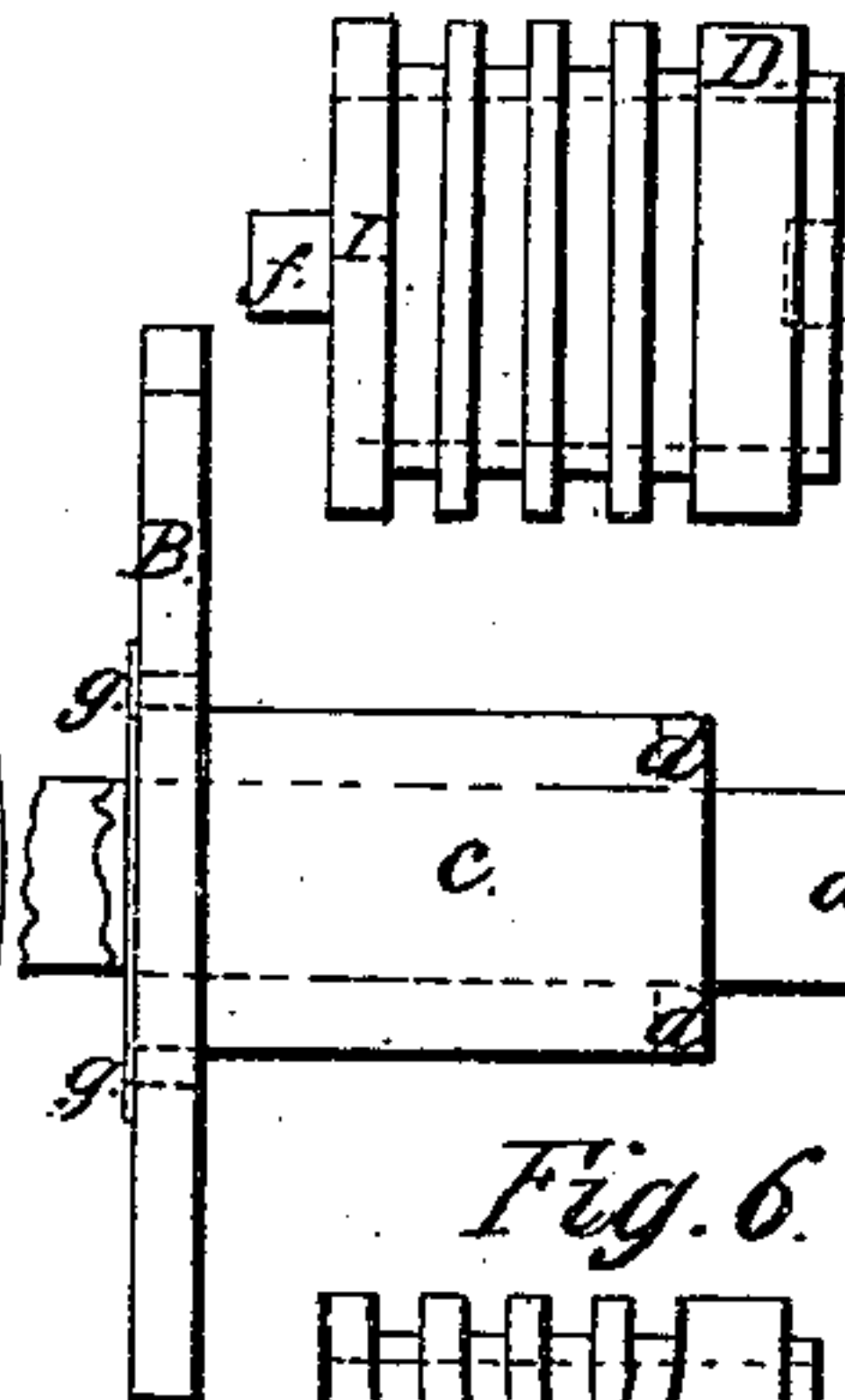


Fig. 2.

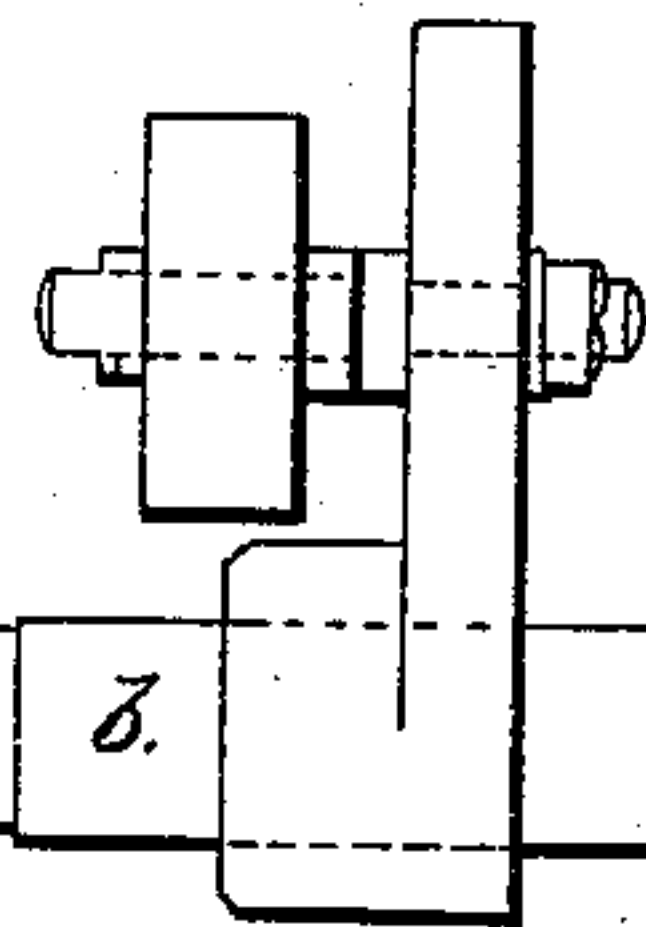


Fig. 4.

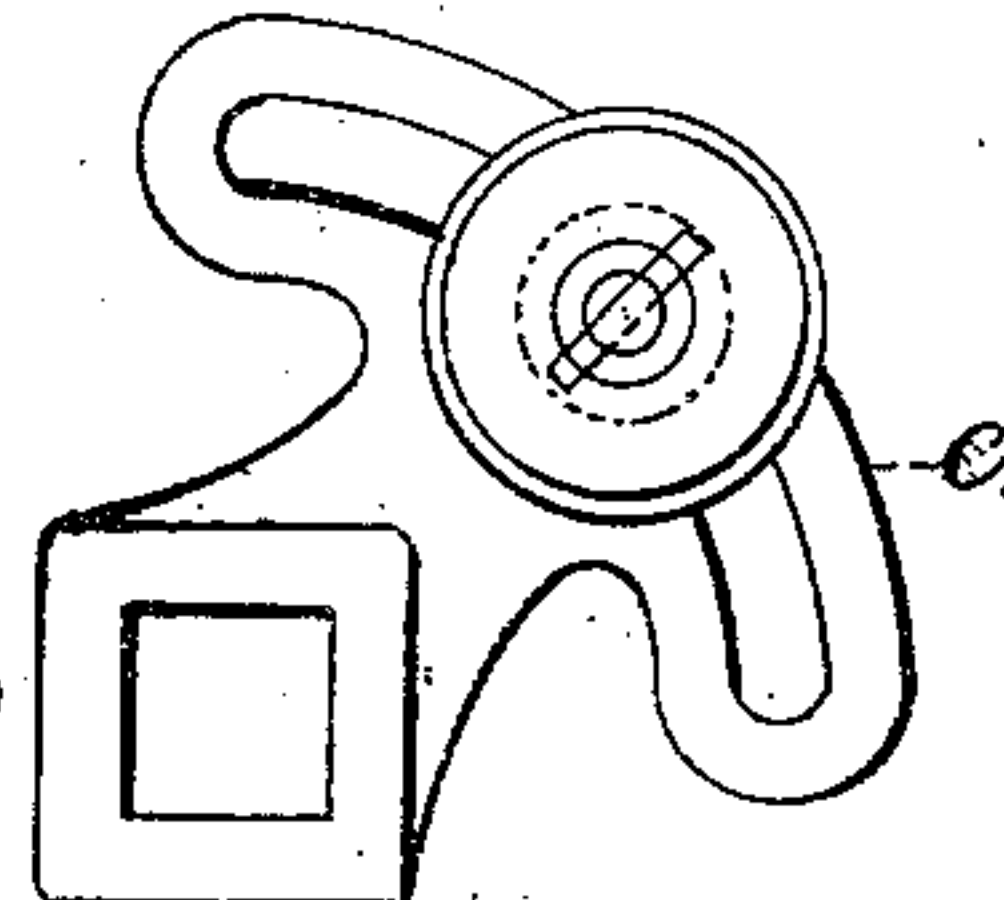


Fig. 6.

Fig. 7.

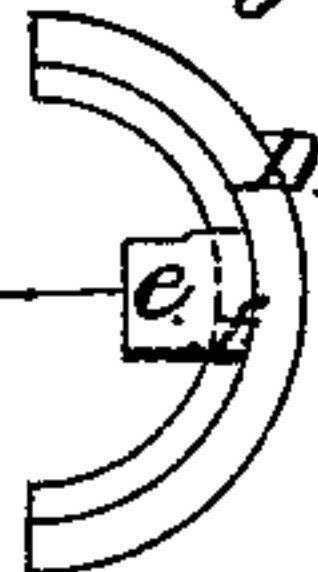
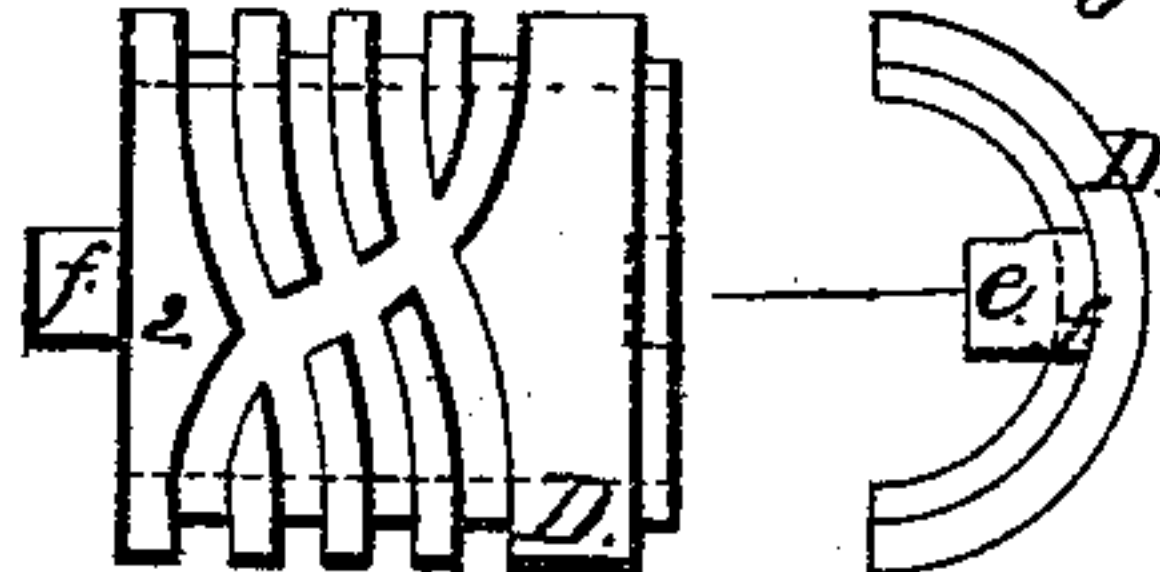
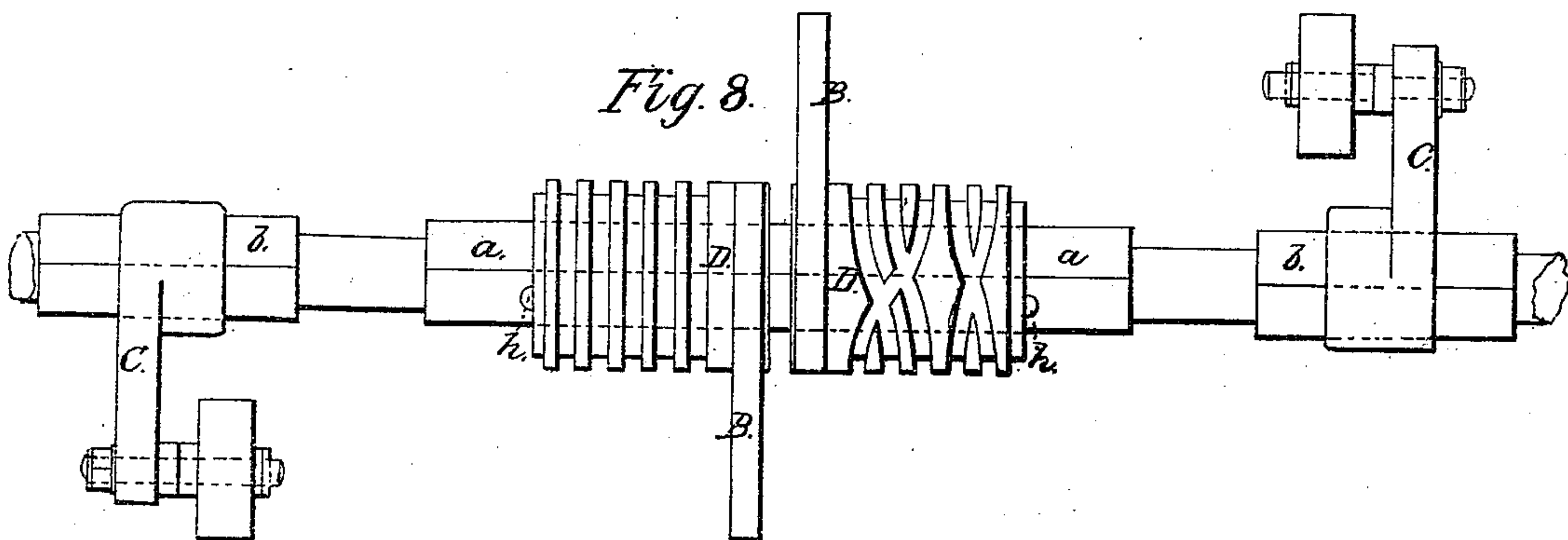


Fig. 8.



Witnesses,
S Boerum
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Inventor.

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United States Patent Office.

WILLIAM T. FLINN, OF BRIDESBURG, PENNSYLVANIA, ASSIGNOR
TO BARTON H. JENCKS, OF SAME PLACE.

Letters Patent No. 84,872, dated December 15, 1868.

IMPROVEMENT IN LOOMS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, WILLIAM T. FLINN, of Bridesburg, in the county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an isometrical view of a prismatic cam-shaft presenting four angles and four plane sides.

Figure 2 is a side view of a portion of such shaft, with one picking-dog and one cam, and its hub or sleeve upon it.

Figure 3 is an end view of the cam-hub with cam attached.

Figure 4 is a similar view of one of the picking-dogs.

Figures 5 and 6 are side views of the grooved shell which is applied to the cam-hub or sleeve.

Figure 7 is an end view of one-half of the grooved shell.

Figure 8 is a side view of the cam-shaft, with the cams, their hubs and shells, and the picking-dogs in position for operation.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain new and useful improvements on looms which are designed for weaving twilled and other fabrics, wherein the treadles which operate the heddles are worked automatically by cams which receive rotary and endwise sliding movements, so as to change from one treadle to another, at proper times, and thus depress the treadles in regular order.

The invention also relates and is confined to an improvement on cams which are constructed with hubs or sleeves, having grooves in their peripheries, into which grooves swivel-dogs play, which dogs cause the cams and hubs to receive endwise motion upon their shaft during the rotation of the cams, the hubs, and the shaft.

Prior to the invention which I shall hereafter describe, looms which were designed for weaving twilled fabrics, were provided with feathered cam-shafts, upon which cams were placed that received lateral and also endwise motion, and at the same time rotary motion. Such cams were designed for operating the treadles of the loom, and thereby automatically moving the heddles. They were constructed upon the ends of sleeves or cylindrical hubs, in the periphery of which grooves, running both in straight and oblique directions, were made. In these grooves worked dogs, which were allowed to swivel in fixed bearings upon the frame of the loom.

The shaft upon which such cams and grooved hubs were placed was cylindrical, with feathers or key-tenons inserted into grooves made in it, which feathers were received by corresponding recesses formed in the cam-hubs.

As the feathers upon the shafts were the only means provided for carrying the cams and hubs around with such shaft, and as the cams and hubs required to receive endwise motion to change the cams from one treadle to another, it has been found that the feathers very soon wear, so as to produce backlash and "lost motion," which, in looms of the class above referred to, will occasion serious derangement of the entire mechanism.

Other objections attend the use of feathers with this peculiarly-constructed cam. They work loose and bind the cams and cam-hubs; they are very expensive to apply to the shafts; they involve the necessity of nicely boring and key-seating the cam-hubs; and they create considerable friction and strain, especially upon the swivel-dogs used to move the cams and hubs laterally upon their shaft.

Another objection attending the use of the grooved cam-hubs, was the impossibility of changing the endwise throw of the cams without removing the cam-shaft from its bearings, slipping the cams and their hubs from this shaft, and introducing in their stead others, carrying a greater or less number of grooves.

This last difficulty was partially obviated by casting the cam-hubs in sections, so that the section having oblique grooves in its periphery could be removed, and other sections secured in their places.

I am aware that Roswell Starr filed an application in the United States Patent Office, in the year 1846, which was subsequently rejected, wherein he represented and described a contrivance designed for moving "any number of leaves of harness, for the purpose of shedding the warp in weaving any kind of fabric, by means of vibrating cams."

Starr applied his "vibrating" cams upon a shaft which, in cross-section, was square, and moved the cams laterally by means of dogs, which run in grooves formed upon the inside of sectional boxes, which boxes were stationary.

By means of "turn-outs" applied to the grooves in the boxes, and by a complex arrangement for working these turn-outs, the changes were effected. This contrivance is different in its construction and operation from the circumferentially-grooved cam-hubs, and could not be practically used in the manner and for the purposes required for the latter.

The invention and improvement which I have made consists, mainly, in so constructing sliding and rotary cam-hubs which are circumferentially grooved, and the shaft which receives such cam-hubs, that the cams and hubs shall be supported at different points around the axis of said shaft, so that the resistance of the swivel-dogs, in sliding the cams laterally, shall not cause undue friction nor binding, as will be hereinafter explained.

The invention further consists in improving the said cams and hubs, by providing each cam-hub with a circumferentially-grooved shell, which is constructed of

segments or halves, and so applied to the cam-hub that the entire shell can be readily removed at pleasure, for effecting an interchange of segments for operating different numbers or combinations of treadles, as will be hereinafter explained.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

The cam-shaft A, which I have shown in the drawings, is constructed with enlargements, *a b b*, upon it, which, in cross-section, may be of a rectangular or other prismatic shape, so as to present flat surfaces; or these enlargements may be of any other shape differing from a right cylinder.

In a loom, this shaft is located transversely over the treadles which operate the heddles, and has its end bearings in the sides of the loom-frame.

The central enlargement, *a*, is designed to receive two cams and their hubs, and this enlargement should be of suitable length to allow said cams to receive the proper length of movement to operate upon the required number of treadles.

The enlargements *b b* are designed for receiving upon them the picking-dogs C C, and these enlargements should be of such length as will allow the proper amount of endwise adjustment or play to be given to said arms or dogs.

These arms or dogs C C are provided with eyes through them, of a form corresponding to the form in cross-section of the enlargements upon which they are placed. In other respects these arms or dogs may be constructed in the usual well-known manner.

The cams B are made of an elliptical or other shape, with holes, *g*, eccentrically through them, which holes are adapted for receiving through them lugs *f*, shown in figs. 5 and 6, which are formed on one end of each segment or half of the grooved shells D D. By means of the clamp-screws *h*, the segments or halves are secured rigidly to the said cam.

The cam-hub *c* is a smooth-surface cylinder of proper diameter, which is cast with a hole centrally through it, of a size and shape corresponding to the size and shape of the enlargement *a* upon which it is put. An end view of this cylindrical hub is shown in fig. 3, with its cam attached. Its hole should be made truly in its centre, and the sides dressed so that it will slide smoothly, and with as little friction as possible, upon the enlargement *a* of the shaft A.

In casting this cylinder, recesses *d d* are formed in that end which is farthest from the cam B, which recesses are diametrically opposite each other, and of a size and shape adapted to receive lugs *e*, which are formed upon the ends of the semi-cylindrical portions D D, one of which is shown in fig. 7.

The semi-cylindrical portions D D are made of such diameter internally, as to adapt them to fit snugly around the hub *c*, and when secured to it by means of the lugs *e f* and screws *h h*, to form a shell which can be removed at pleasure, without removing the cam or its hub from the cam-shaft.

One of the sections D is constructed with straight grooves in its periphery, or grooves running at right angles to its axis. The other section is constructed with oblique grooves in its periphery, which communicate with the straight grooves in the opposite section.

The grooved shells, represented in figs. 5 and 6, are designed for operating eight treadles, and the shell shown in fig. 8 is grooved for operating two, four, or six treadles.

It will be seen that by removing screws *h*, the segments or halves D D can be readily detached from the cam and its hub, and other grooved segments or halves, having a greater or less number of grooves, can be substituted in their places; thus an interchange of shells may at any time be made, to suit the number of treadles

to be operated, without removing either the cam-shaft or its cam and hub.

It will be seen, from the above description, that I have an angular or prismatic shaft, presenting flat surfaces, instead of a shaft of a cylindrical form, with a single narrow feather inserted into it; also a cylindrical cam-hub, which is cast with a hole through it, of such shape and size as to adapt it to fit the angular shaft, and to slide steadily upon it in a longitudinal direction; also two grooved semi-cylindrical portions, which are adapted to fit upon and be secured rigidly to said cylindrical hub, thereby forming a removable grooved shell, by means of which, and a swivel-dog, the cam can be caused to reciprocate longitudinally, while it is turning around with its shaft.

These parts I have constructed and combined in such manner as to preserve the general principle of operation of the circumferentially-grooved cam-hubs hitherto used, and at the same time to so improve this kind of cam-hub, that it is of more practical value, and of greater usefulness.

Another great advantage attending the combination of the cam-hubs with a prismatic cam-shaft for looms is, that the cams can be adjusted and set at different angles with respect to each other, and these cams can be adjusted and set at different angles with respect to the picking-dogs, which cannot be done with cylindrical shafts having feathers applied to them.

Another advantage attending the improved combination is, that the cam-hubs and cams, as well as the dogs, will be supported at different points around the axis of the shaft, and the friction will be uniformly distributed around the shaft, instead of being concentrated upon a single point, as with the feathered shafts.

By thus distributing the points of resistance to the turning of the cam-hub around its shaft, the wearing of the shaft and hub will be uniform, and there will be no tendency of the cam-hub to tilt and bind upon its shaft; consequently there will be very little friction upon the swivel-dog in the act of moving the cam-hub.

I am aware that square and other-shaped shafts have been long known and used in various kinds of machinery, for receiving wheels, arms, and cams, and therefore I lay no claim broadly to an angular shaft. Nor do I lay claim broadly to a circumferentially-grooved cam-hub for loom-cams. Nor do I claim broadly such cam-hub, with one portion of its grooved surface removable.

I have described a shell-cam which is circumferentially grooved, and fitted to a sleeve or hub-extension, *c*, of the treadle-cam B, the said shell-cam being made in two sections or segments, fitted around said hub-extension *c*, so as to be removable at will, without disturbing the cam-shaft or the cam B.

This construction I deem the best, and I desire to be protected in it, under my patent, whether the shaft A be angular or other shape, and the hub *c*, with its cam B, be keyed to it.

I always prefer an angular shaft, A, however, for the reasons before stated; but while this is the fact, I also desire to be protected in a hub-cam, D, grooved substantially as described, and connected to a treadle-cam, B, when the shaft A presents a flat surface or surfaces against the interior or eye of the grooved shell D, to prevent the cam-hub from slipping around and working with "backlash," or being strained out of position, such flat surface or surfaces dispensing with the use of a "key." And it is only when such a shaft, A, is used, in combination with a vibrating shell or hub-cam, D, carrying a treadle-cam, both of which revolving with the shaft, that I desire protection.

Having described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The circumferentially-grooved removable seg-

ments D D, constructed and applied to the hub *c* of the treadle-cam B, substantially as described, and for the purposes set forth.

2. An angular cam-shaft, carrying a sliding cam, having a grooved and removable shell, the shell being constructed and combined with the cam and its hub, substantially as described, and for the purpose of changing from one twill to another.

3. The combination of longitudinally-adjustable dogs C, which actuate the pick-motion of looms, an angular shaft, A, and a longitudinally-reciprocating treadle-cam, and a circumferentially-grooved hub-cam, all con-

structed substantially as and for the purpose described.

4. A treadle-cam, B, with a circumferentially-grooved sectional shell, D D, which is wholly removable, independently of the cam B, from the cam-shaft, and without disturbing said shaft, substantially as described.

In testimony that the above is my invention, I have hereunto set my hand, and affixed my seal, this 29th day of January, 1868.

Witnesses:

WM. T. FLINN. [L. s.]

STEPHEN USTICK,
JOHN WHITE.