

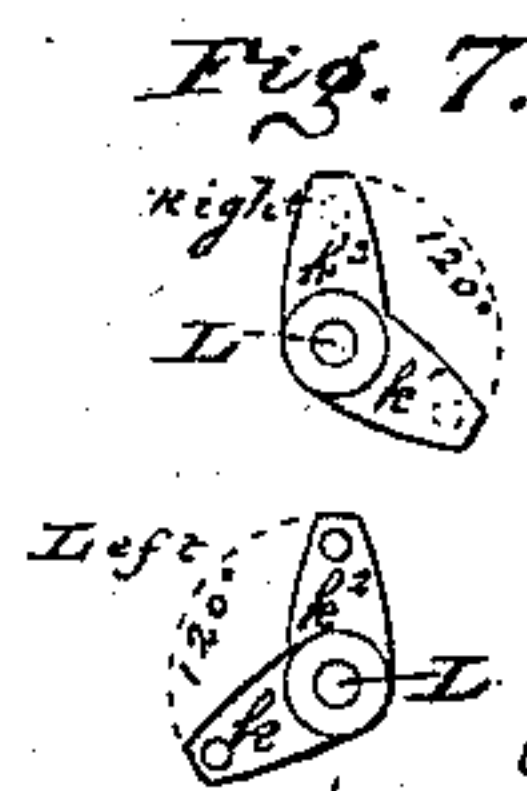
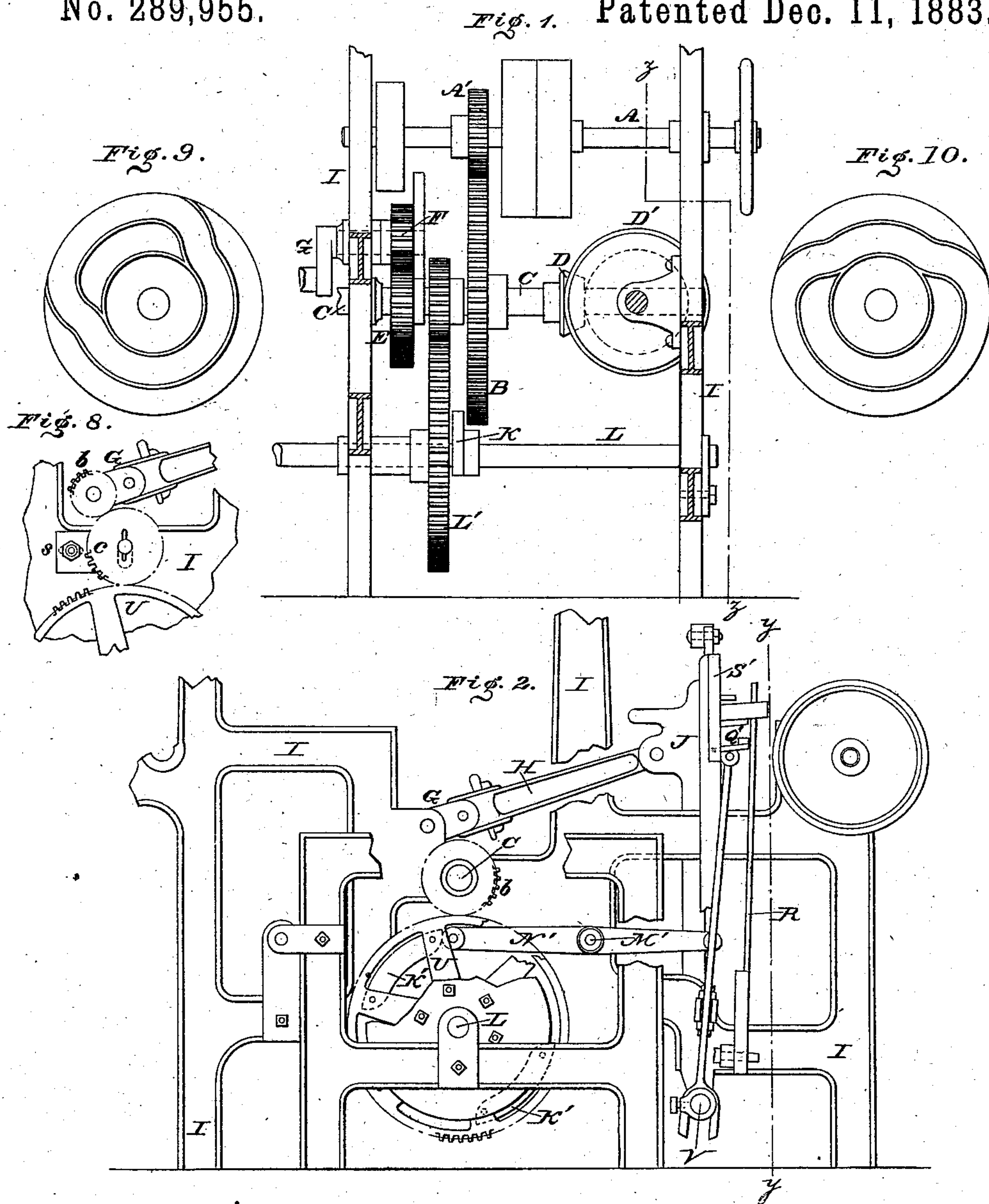
(No Model.)

3 Sheets—Sheet 1.

W. H. BAIRSTOW.  
LOOM FOR WEAVING CARPETS.

No. 289,955.

Patented Dec. 11, 1883.



WITNESSES:

L. Douville  
W. T. Kircher

INVENTOR:

William Henry Bairstow

BY

John G. Diersheim

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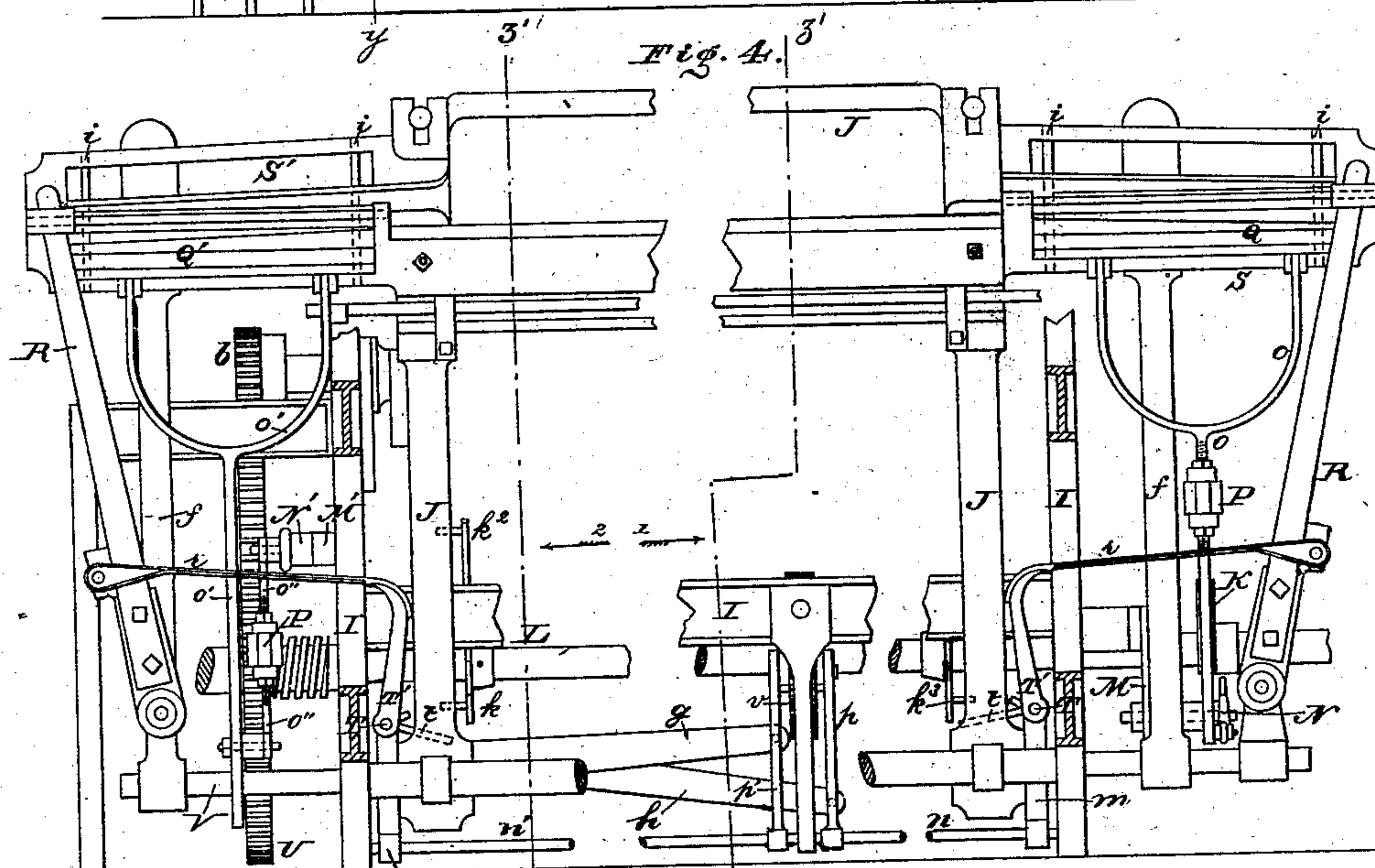
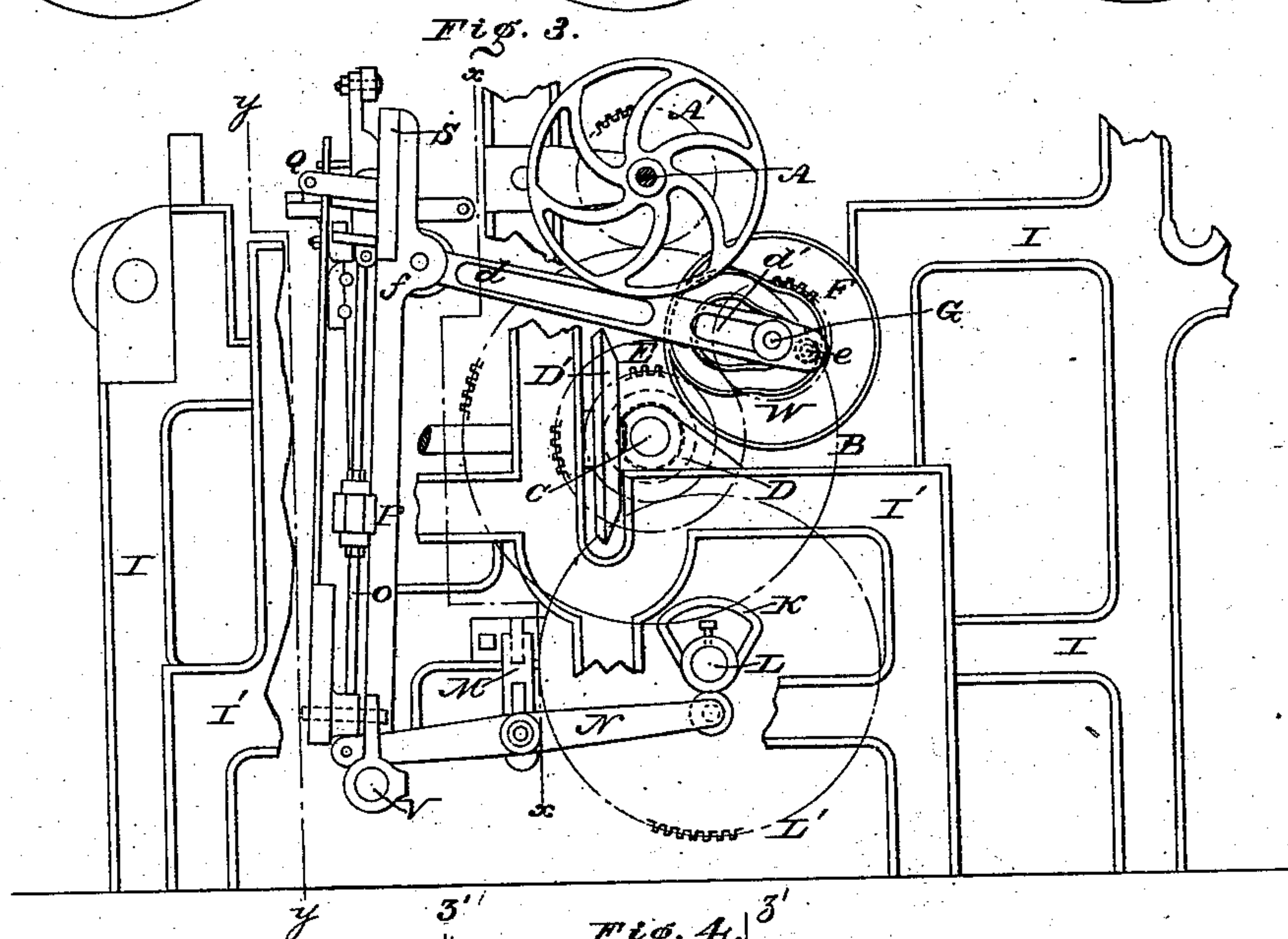
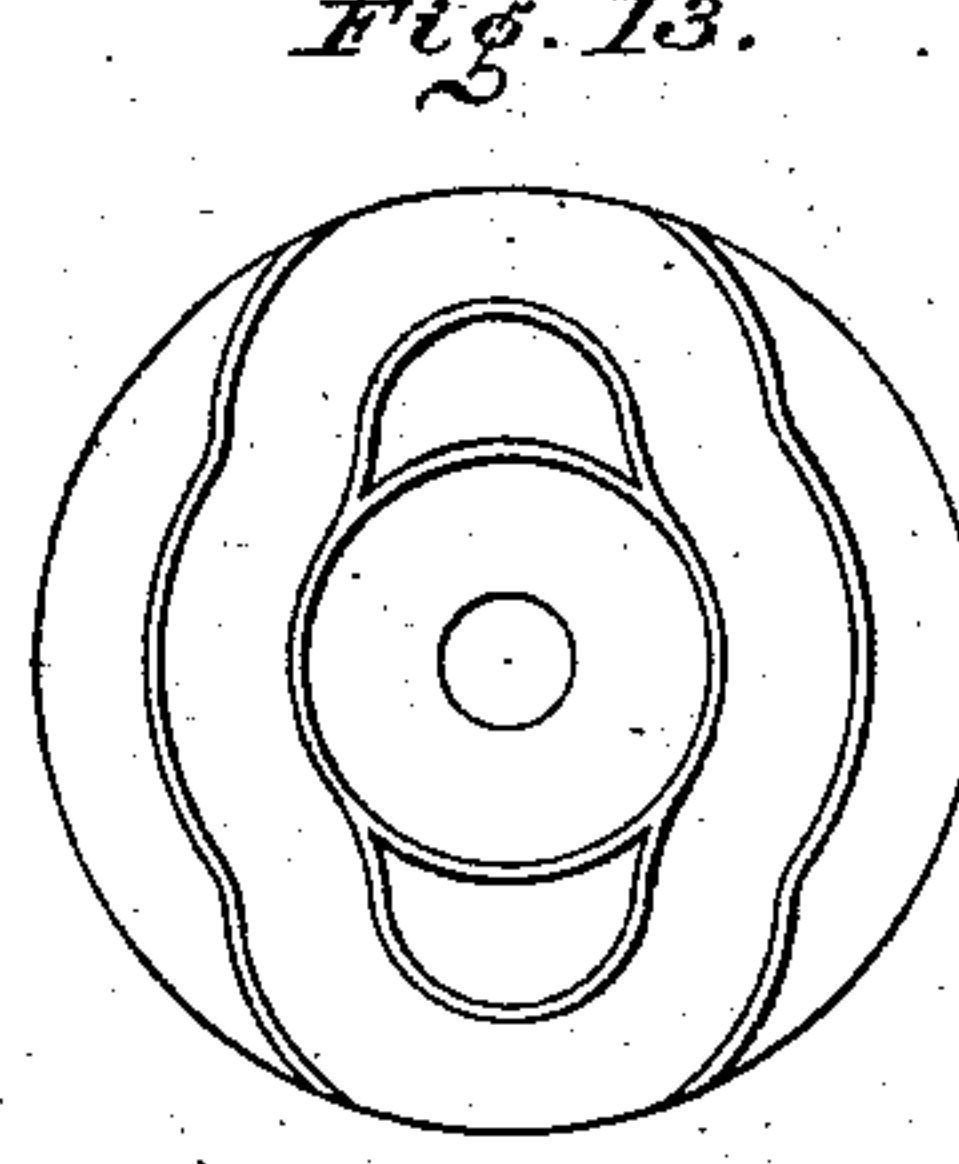
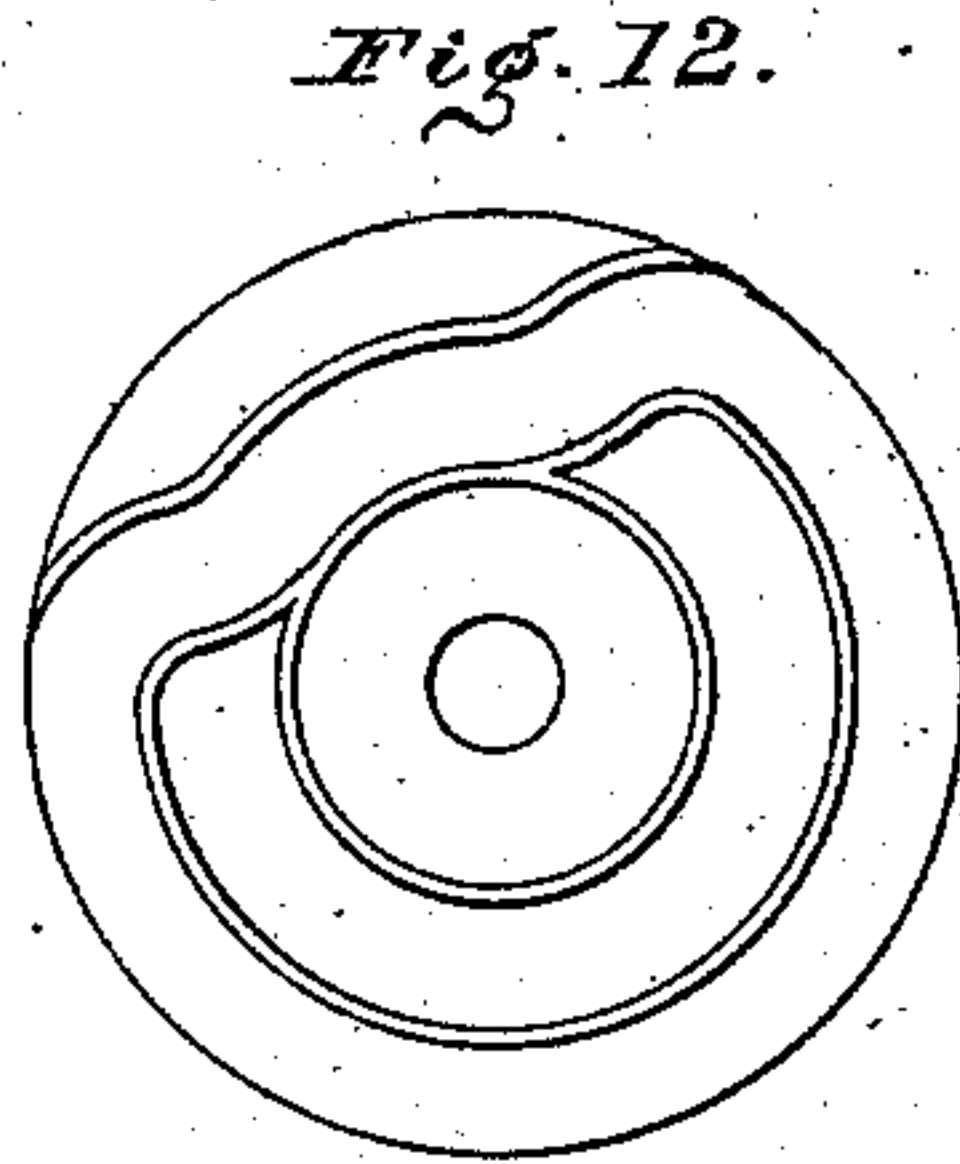
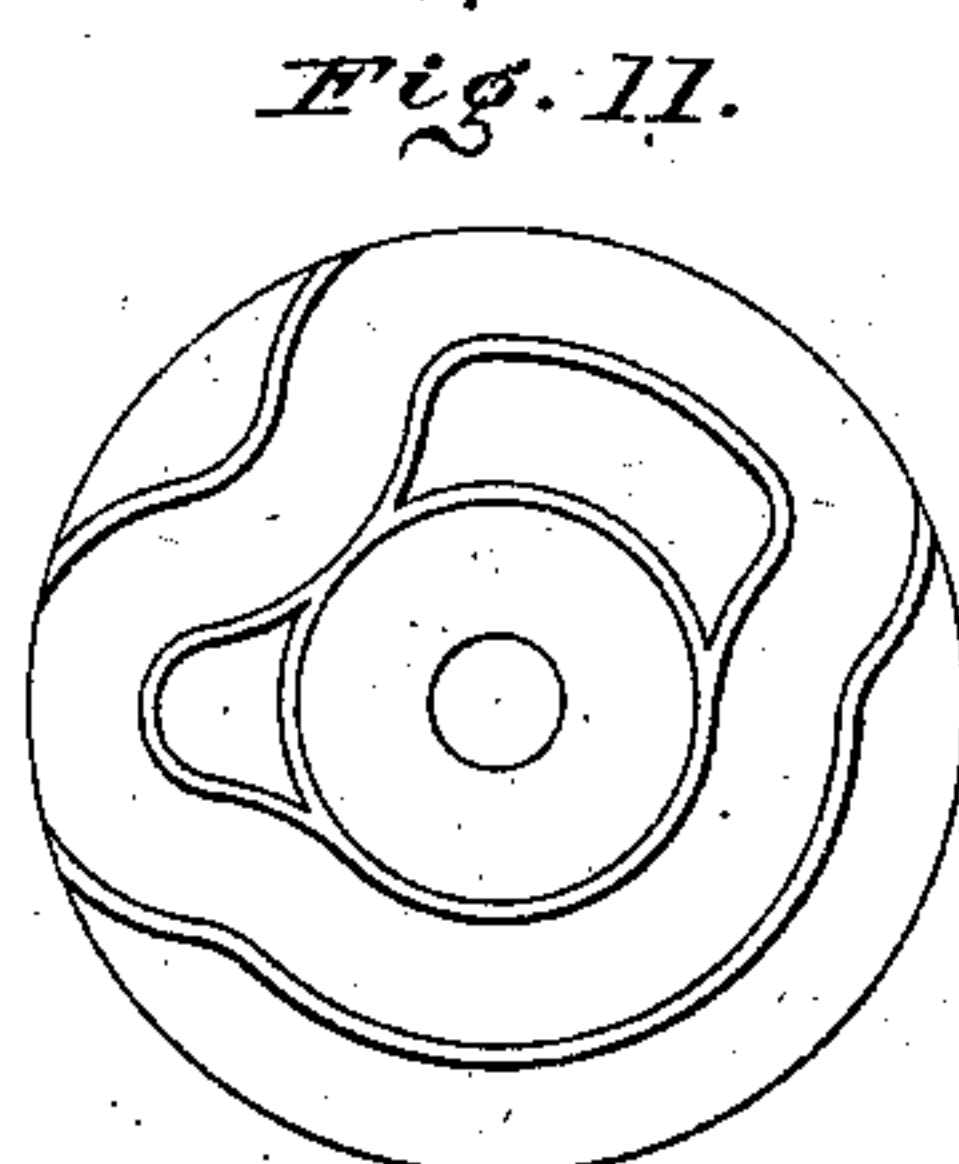
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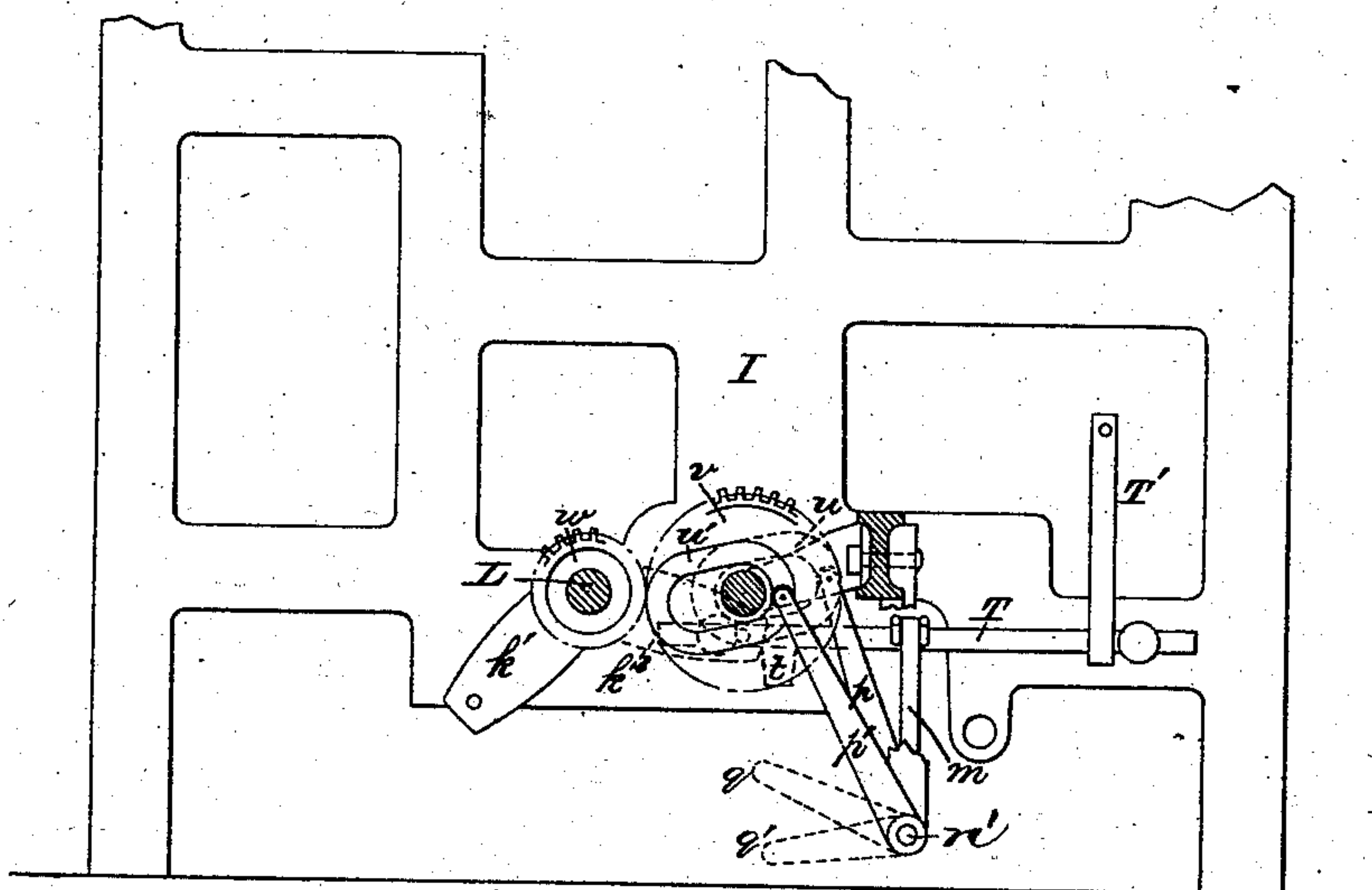
3 Sheets—Sheet 3.

W. H. BAIRSTOW.  
LOOM FOR WEAVING CARPETS.

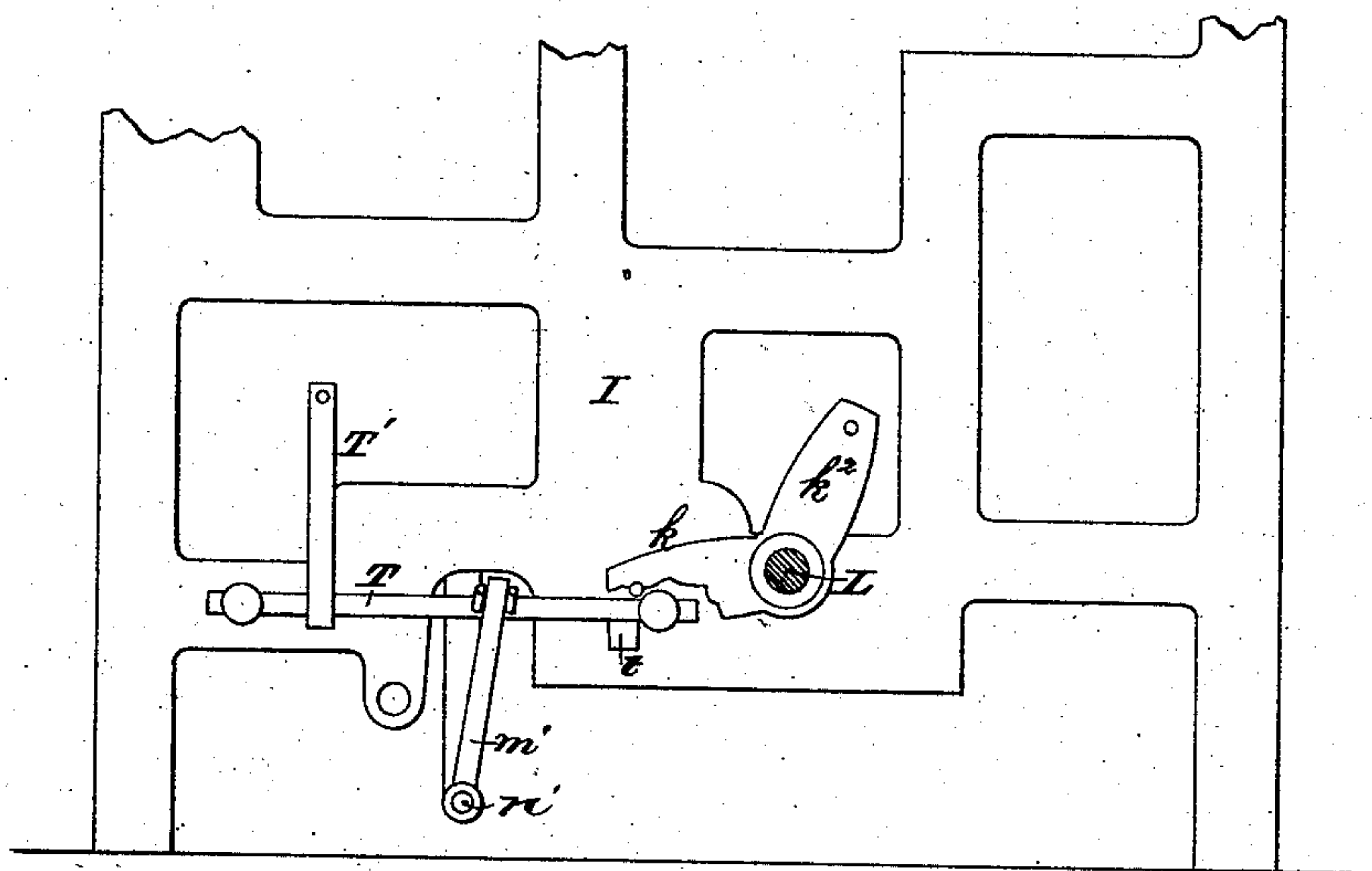
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*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

WILLIAM H. BAIRSTOW, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
HORNER BROTHERS, OF SAME PLACE.

## LOOM FOR WEAVING CARPETS.

SPECIFICATION forming part of Letters Patent No. 289,955, dated December 11, 1883.

Application filed December 30, 1881. (No model.) Patented in England March 29, 1879, No. 1,252.

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY BAIRSTOW, a subject of Great Britain, residing at the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Looms for Weaving Carpets, &c., which improvement is fully set forth in the following specification and accompanying drawings, in which—

10 Figure 1 is a vertical section on line *xx*, Fig. 3, of the parts at the right-hand end of my loom. Figs. 2 and 3 are views of opposite sides of the loom, partly broken away, Fig. 3 being partly sectional on line *zz* of Fig. 1.  
15 Fig. 4 is a vertical section of the loom on line *yy*, Figs. 2 and 3. Fig. 5 is a vertical section of the loom from back to front on line *z'z'*, Fig. 4, looking in the direction indicated by arrow 1. Fig. 6 is a vertical section of the  
20 loom from front to back on line *z''z''*, Fig. 4, looking in the direction indicated by arrow 2. Fig. 7 is a detached view of the picking-hammers in side elevation, and illustrating their respective positions. Fig. 8 is a side view of  
25 a modification, to be hereinafter referred to. Figs. 9, 10, 11, 12, and 13 show different forms of cams or tappet-wheels.

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

30 My invention consists of a loom more particularly adapted for weaving carpets, having an independent or additional back, which, when worn out or cut, will not release the front or upper surface of the carpet, the construction  
35 and operation of the loom being hereinafter fully set forth.

Referring to the drawings, A represents the driving-shaft, to which power is applied in any suitable manner, and which carries a pin-  
40 ion, A', meshing with a toothed wheel, B, keyed or otherwise secured to a shaft, C, the two shafts being suitably mounted on the frame of the loom.

On the shaft C is secured a bevel-pinion, D, which engages with the bevel-wheel D' of the wire-motion, the remaining portion of which  
45 motion is of the usual construction, and forms no part of the present invention.

E represents a change-wheel fixed to the shaft C, and F represents a change-wheel which meshes with the wheel E, and is secured to a

crank-shaft, G, which is properly mounted on the frame of the loom, and receives power from the shaft C through the medium of the wheels E F.

To the crank-shaft is attached one end of connecting-rods H, whose other ends are piv-  
50 oted or hinged to the lay J, whereby by the rotation of the crank-shaft the proper advancing and returning motions are imparted to said lay.

Q Q' represent the shuttle-boxes. The left-hand box Q' is carried by a frame, S', which is fixed to or is a continuation of the lay, and moves back and forth with it. The right-hand box  
65 Q is carried by a separate frame, S, sustained by a lever, f, which is fulcrumed at its lower end on the lay-sword shaft V. This frame S moves forward with and abreast of the lay for about two-thirds of the stroke of the latter,  
70 when it stops and remains stationary while the lay is completing its forward stroke and until the lay again comes abreast of it on its back stroke, when it again moves with and abreast of the lay. Thus the shuttle-box Q is kept  
75 abreast or in line with the shuttle-race during the picking; but in beating up it advances a less distance than the lay, so as to leave more room for the wire-motion. The movement of the frame S is derived from a cam-wheel, W,  
80 on the end of the shaft G, with which it is connected by means of a pitman, d, having a slot, d', which is fitted on the end of the shaft G, and also having a roller, e, which rides in the cam-groove of said wheel W.

The shuttle-boxes Q Q' are adapted for working two shuttles, one shuttle carrying a fine thread and the other shuttle a coarse thread, in order to weave the independent back of the carpet hereinbefore referred to. The boxes  
90 slide vertically on rods *ii* fixed to the frames S S'.

In order to lift and drop the right-hand box Q, there is jointed to the under side thereof a forked rod, o, which extends to near the shaft  
95 V, the length of the rod being adjustable by means of a right and left hand screw-threaded coupling P, whereby the box may be adjusted in a vertical direction. The lower end of the rod o is jointed to one end of a lever, N, which  
100 is mounted on a vertically-adjustable bracket, M, connected to the frame of the loom, the



other end of said lever having a roller or stud which is engaged by a cam, K, on a shaft, L, which is mounted on the frame of the loom and receives motion by means of a toothed wheel, L', meshing with a pinion on the shaft C. The cam K is connected to the shaft L by a set-screw, so that it may be adjusted or set on said shaft. In the position shown in Fig. 3 the shuttle-box Q is dropped so that its upper compartment stands opposite the shuttle-race; but when the shaft L has turned a half-revolution the box Q will be lifted, so that its lower compartment will coincide with the shuttle-race. The left-hand shuttle-box Q' slides on rods *i i* in the frame S', and has a forked rod, *o'*, Fig. 4, jointed to it, the same as the rod *o*, for the box Q, already described. The lower end of this rod is bifurcated, Fig. 2, and embraces the shaft V, to guide the rod in its vertical movement.

To the rod is jointed a link, *o''*, Fig. 4, whose length is adjusted by a coupling, P, similar to that provided for the rod *o*, already described. By turning the coupling P the box Q' may be adjusted vertically. The link *o''* connects the rod *o'* with one end of a lever, N', Figs. 2 and 4, which is fulcrumed at M', and whose other end bears a roller which is acted on by two cams, K' K', fixed to the face of the treadle-box wheel U, which wheel is mounted loosely on the shaft L and rotated by a pinion, *b*, fixed on the end of the shaft C.

In the position shown in Fig. 2 the upper compartment of the shuttle-box Q' is in coincidence with the shuttle-race. As soon as the nearest cam K' encounters the lever N', the box Q' will be lifted until its lower compartment coincides with the shuttle-race, and this lifting and dropping will occur twice to each revolution of the wheel U; or a cam, K', might be fixed on the shaft L instead of the cams on the wheel U, if desired.

I will now describe my picking-motion, by means of which the two shuttles are driven in the proper order. The order provided for in the construction shown in the drawings is as follows, starting with both shuttles in box Q at the right: first, upper shuttle from right; second, lower shuttle from right; third, upper shuttle from left; fourth, upper shuttle from right; fifth, lower shuttle from left; sixth, upper shuttle from left. These movements correspond to one revolution of the wheel U and to two revolutions of the shaft L.

R R are the two picker-sticks, and *r r* the picker-straps, Fig. 4, attached to arms 'T' T' on the picking-shafts T T, which shafts extend backward just inside of the side frames, I I.

Mounted on the shaft L are four picking-hammers, *k k' k<sup>2</sup> k<sup>3</sup>*. Each shaft T has a short projecting arm or tappet, *t*, which stands in the way of the picking-hammer at its side of the loom, so that as one of these hammers strikes it it is depressed, thereby quickly oscillating the shaft T and causing the arm T' to move correspondingly and jerk the picker-stick R, so as to throw the shuttle, all substan-

tially in the usual manner. I arrange the shafts T T to slide endwise slightly, so that their tappets *t t* may sometimes clear the picking-hammers, and thereby miss a pick; and I provide means for sliding them back and forth in a predetermined order. In the construction shown four hammers, *k k' k<sup>2</sup> k<sup>3</sup>*, (see Figs. 5, 6, and 7,) two at each side of the loom, are placed upon the shaft in three radial lines—that is to say, hammer *k* on the left-hand side on one radial line, hammer *k'* at the right-hand side at an angle of one hundred and twenty degrees to hammer *k*. Hammers *k<sup>2</sup>* and *k<sup>3</sup>* are placed on the same radial line upon opposite sides of the loom and at an angle of one hundred and twenty degrees to both hammers *k* and *k'*. The right-hand shaft T is engaged by an arm, *m*, on a shaft, *n*, the end of the arm entering between two projections on the shaft T. The shaft *n* extends to about the center of the loom, Fig. 4, and there bears an arm *p*, the end of which is engaged by a cam, *u*, on a gear-wheel, *v*, which is driven by a pinion, *w*, on the shaft L. On the left-hand side of the wheel *v* is another cam, *u'*, set oppositely to the cam *u*, and acting on another arm, *p'*, on a shaft, *n'*, extending to the left-hand side of the loom, where its arm *m'* engages the left-hand picking-shaft T. The wheel *v* makes one revolution to two of the shaft L, and the cams *u u'* are so set that as the two hammers *k<sup>2</sup> k<sup>3</sup>* descend one cam throws its arm *p* or *p'* forward, thereby sliding the corresponding shaft T forward until its tappet *t* clears its hammer *k<sup>2</sup>* or *k<sup>3</sup>*, while the hammer on the other side of the loom acts on the other tappet *t*. At the next revolution of the shaft L the other of the first two hammers will act, and the one which before acted will clear, thus causing the two hammers *k<sup>2</sup> k<sup>3</sup>* to affect alternate picks. The hammers *k k'* always act on the tappets.

Another way of working the shafts *n n'* is to provide horizontal arms *q q'*, as shown by dotted lines in Fig. 5, in place of the arms *p p'*, Fig. 5, and to link these to two of the heddle-levers *g* and *h*, whose ends are shown in Fig. 4, the arms *p p'* being removed or disconnected.

To adapt my loom for weaving Brussels carpets, the pinion *b* is not fixed to the shaft C, but is fixed to the end of the crank-shaft G, and gears with an idler, *c*, which meshes with the wheel U. In such case I prefer that the shaft C shall not project beyond the frame of the left-hand side of the loom, and that the pinion *b* be mounted on the crank-shaft and gear with the aforesaid idler, which is vertically adjustable on a plate, *s*, the latter being horizontally adjustable and fixed to the frame I, all as shown in Fig. 8, so that different-sized pinions may be accommodated.

Figs. 9 to 13, inclusive, show different forms of the cam-wheels or tappet-wheels in the treadle-box at the left-hand side of the loom, these wheels being those commonly used to actuate the treadle-levers used for manipulating the healds or heddles. By a proper ma-



nipulation of the heddles I effect an interlocking of the warp and weft, by which the independent back is woven.

5 Figs. 9 and 12 show the tappet-wheels used in weaving three-shot, and Figs. 10 and 11 are tappet-wheels for four-shot, velvet. The tappets shown in Figs. 9 and 11 work the gears containing the fine chain for three and four shot velvet, respectively, and Figs. 10 and 12 show the tappets for the back-chain. The fine chain which acts as a binding-chain for the worsted is free from the back when the shuttle containing the thick thread is thrown across, therefore the fine chain, being buried, cannot by any means come in contact with any surface to cut and chafe it, and thus release the worsted; hence this construction gives great strength and wearing quality to the fabric.

20 In Fig. 13 is shown a tappet-wheel for dividing the back-chains when weaving three-shot velvet. One-half the chain rises at the same time as the lash and remains up while the two shots across the front are woven, which makes an interlocking of chain and weft and holds the worsted fast.

The fabric having an independent or additional back is the subject-matter of another application for Letters Patent filed by me on the 30 8th day of May, 1882.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the following parts: 35 the lay J, shaft A, pinion A', crank-shaft G, rods H, change-wheels E F, shaft C and toothed pinion thereon, the wheel B, lever *f*, shuttle-box frames S S', pitman *d*, cam W, shuttle-

boxes Q Q', rods *o o'*, levers N N', cams K K', shaft L, toothed wheel L', link *o''*, wheel U, 40 and pinion *b*, all constructed and arranged to operate substantially as and for the purpose set forth.

2. The combination of the following parts: the lay J, shaft A, toothed pinion A', crank-shaft G, rods H, change-wheels E F, shaft C 45 and pinion thereon, wheel B, lever *f*, shuttle-box frames S S', pitman *d*, cam W, shuttle-boxes Q Q', rods *o o'*, levers N N', cams K K', shaft L, toothed wheel L', link *o''*, wheel U, 50 pinion *b*, picker-sticks R, picker-straps *r r*, picker-shafts T T, provided with arms T' T' and *t t*, picking-hammers *k k' k<sup>2</sup> k<sup>3</sup>*, shafts *n n'*, provided with arms *m m'* and *p p'*, gear-wheel *v*, provided with cams *u u'*, and the pinion *w*, 55 all arranged to operate substantially as and for the purpose set forth.

3. The combination of the shuttle-boxes Q Q', each arranged for two shuttles, the rods *o o'*, levers N N', cams K K', shaft L, toothed 60 wheel L', shaft C and pinion thereon, link *o''*, wheel U, pinion *b*, means for operating the shaft C and for supporting the shuttle-boxes, the picker-sticks R R, picker-straps *r r*, picker-shafts T T, provided with arms T' T' and *t* 65 *t*, picking-hammers, constructed as described, and mounted on the shaft L, the shafts *n n'*, provided with arms *m m'* and *p p'*, gear-wheel *v*, provided with the cams *u u'*, and the pinion *w*, all arranged to operate substantially as and 70 for the purpose set forth.

WILLIAM HENRY BAIRSTOW.

Witnesses:

JOHN A. WIEDERSHEIM,  
A. P. GRANT.