

No. 636,533.

Patented Nov. 7, 1899.

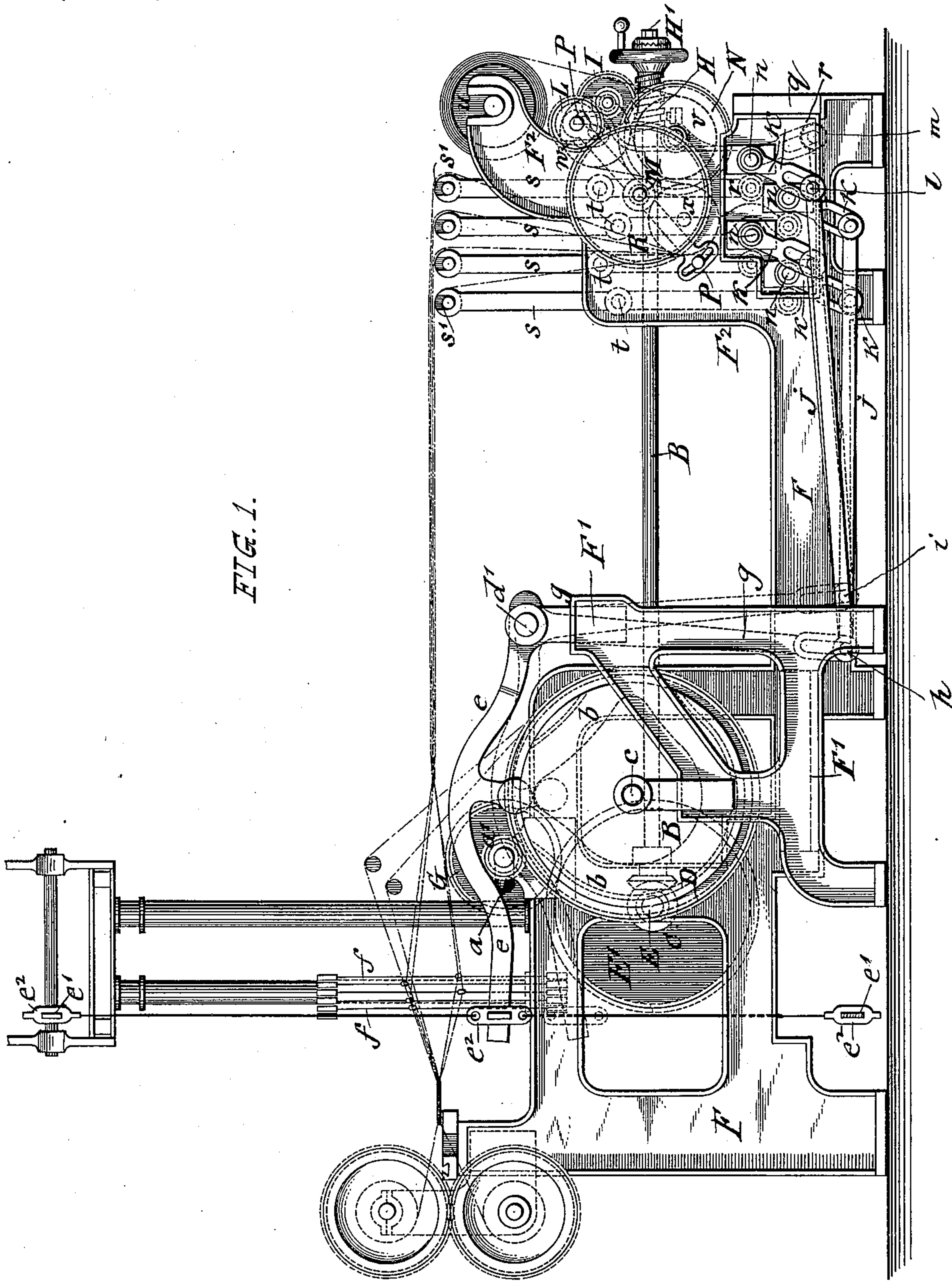
J. KILLARS.

LOOM FOR WEAVING DOUBLE PILE FABRICS.

(Application filed Dec. 29, 1898.)

(No Model.)

4 Sheets—Sheet 1.



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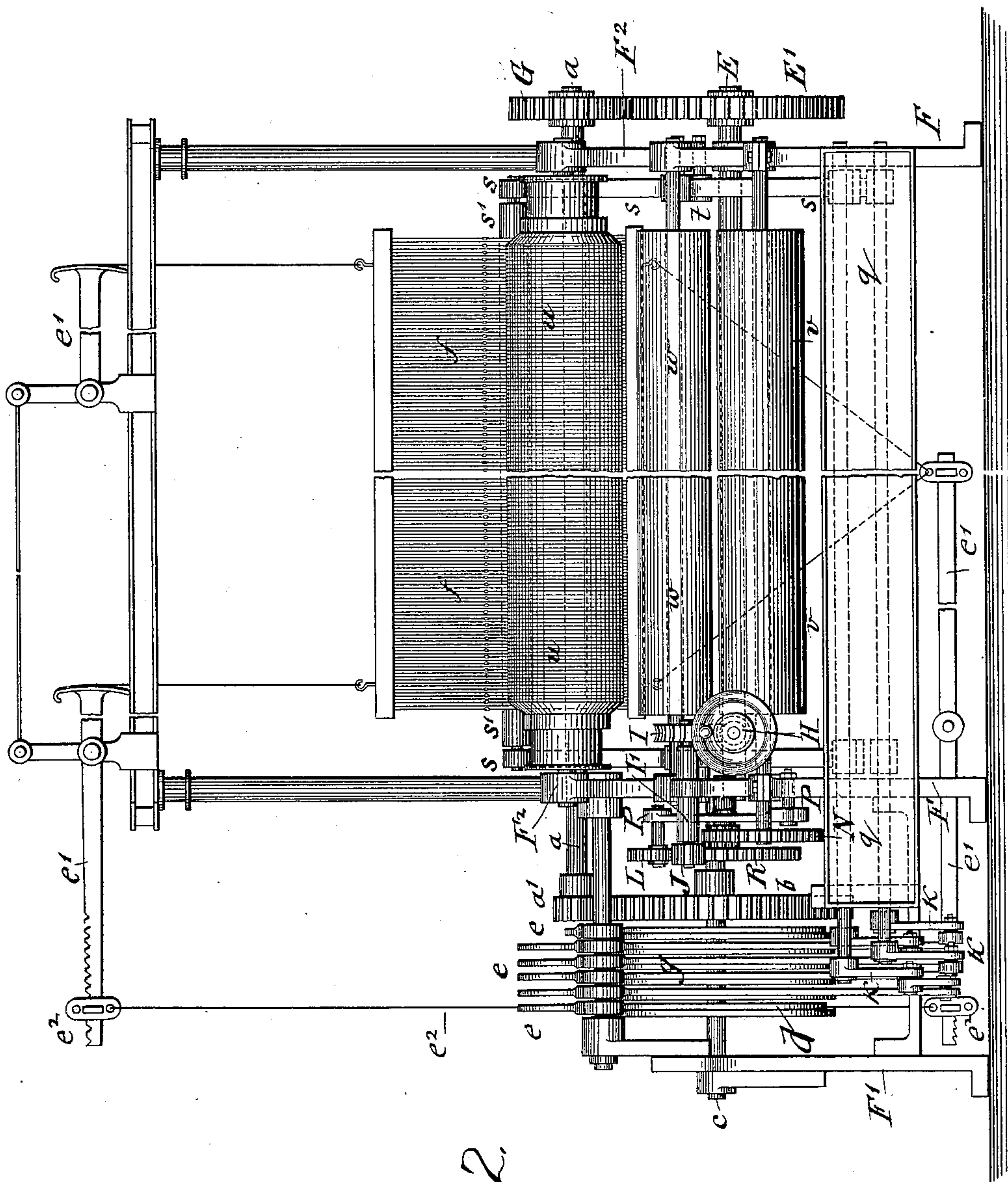
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Fig. 2.

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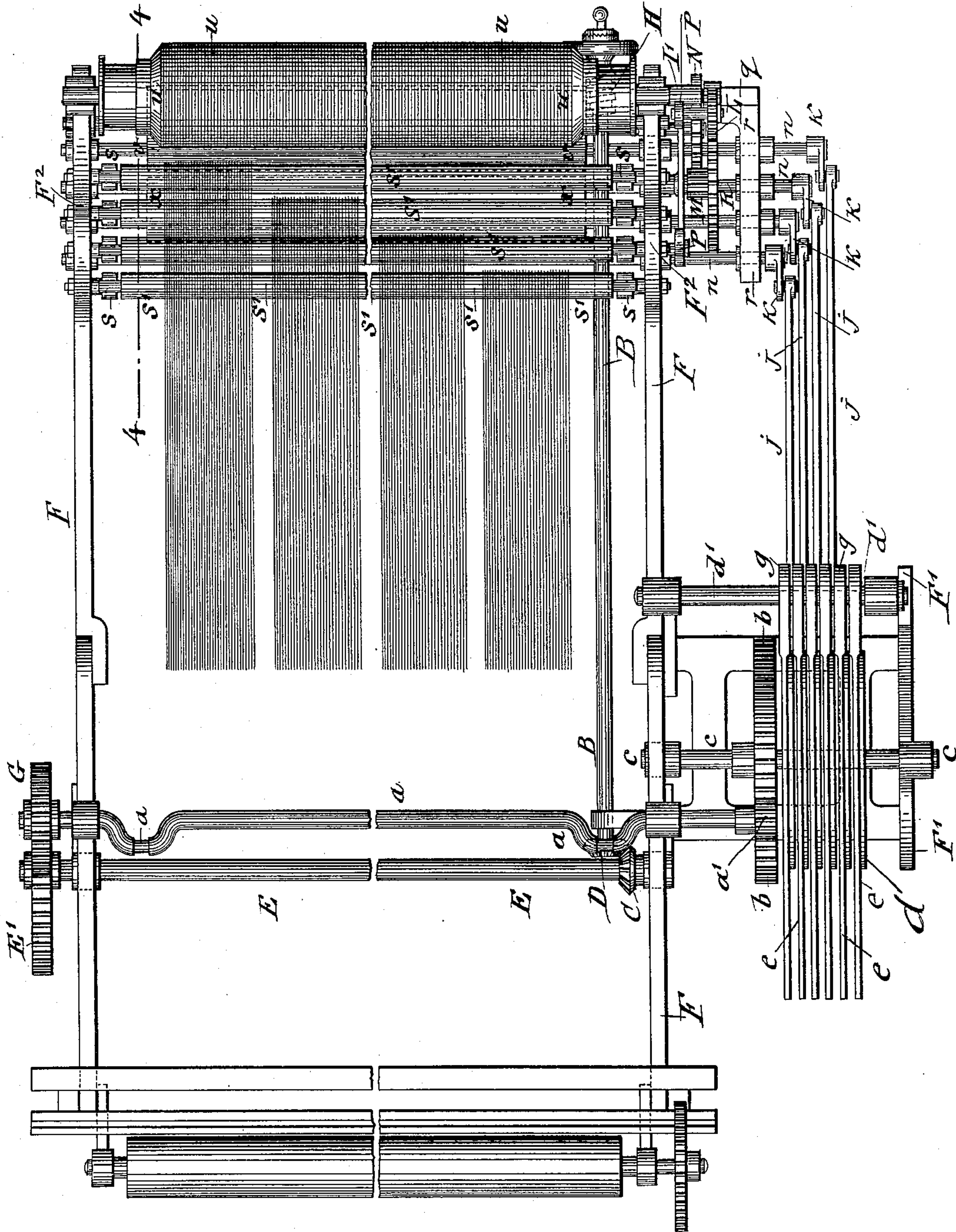
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Fig. 3.

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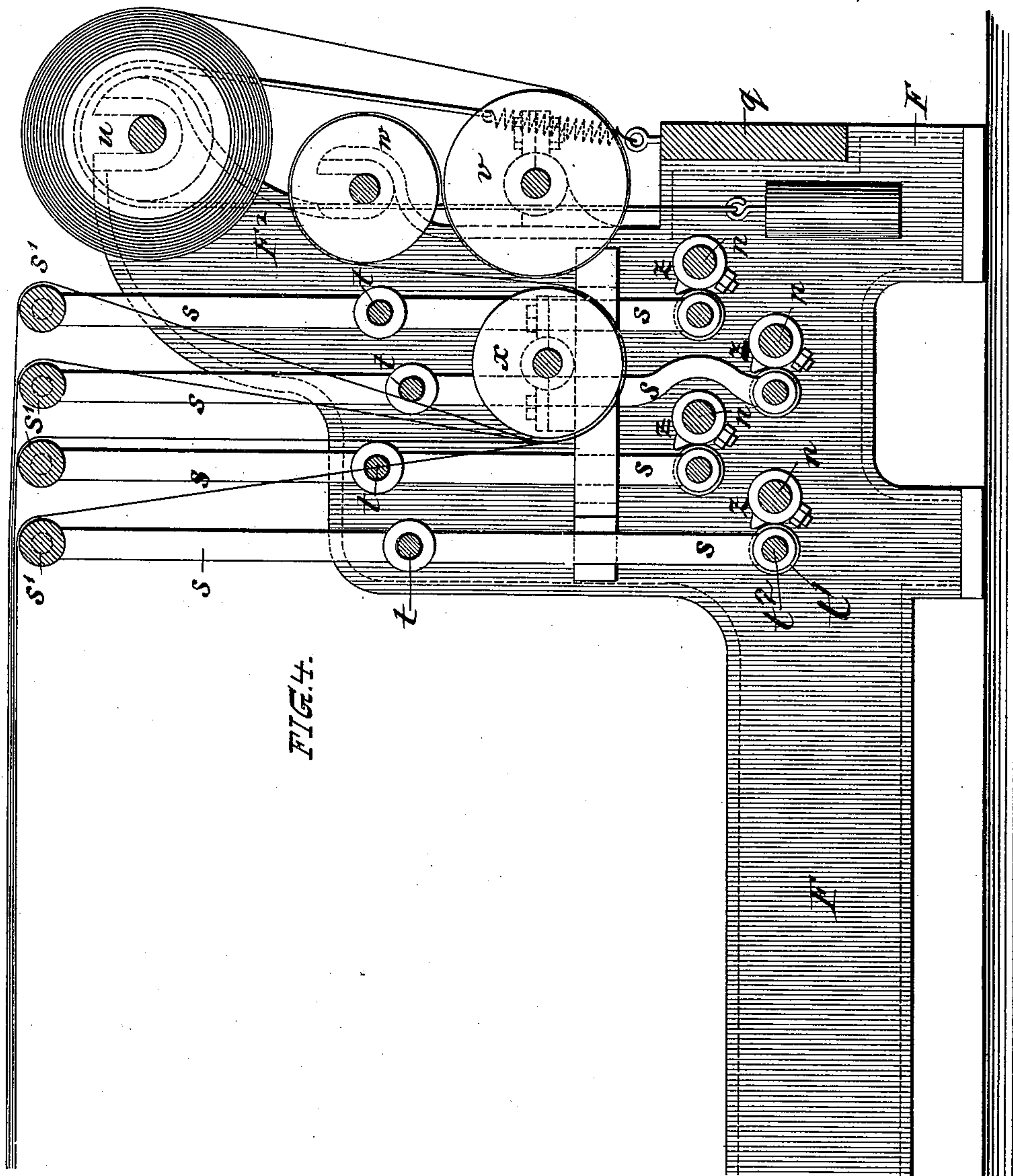
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(No Model.)

4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

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LOOM FOR WEAVING DOUBLE-PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 636,533, dated November 7, 1899.

Application filed December 29, 1898. Serial No. 700,585. (No model.)

To all whom it may concern:

Be it known that I, JOHN KILLARS, a citizen of the United States, residing at Stonington, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Looms for Weaving Double-Pile Fabrics, of which the following is a specification.

This invention relates to certain improvements in looms for weaving double-pile fabrics, and has for its object to provide means for the accurate control and uniform tension of the ground-warps during their up-and-down motion in weaving velvet and other double-pile fabrics, so that a regular formation of the pile is obtained; and for this purpose the invention consists of an improved loom for weaving double-pile fabrics in which a positive tension-regulating mechanism for taking up the slack and controlling the uniform tension of the ground-warps of each fabric in connection with the up-and-down motion of the harness is provided.

The invention consists, further, of a loom in which a positive tension-regulating mechanism for the ground-warps is operated in conjunction with the harness for the same and with a tension-regulator of any approved construction, both the tension-regulating mechanism and the feed-regulator for the ground-warps being operated from the driving-shaft of the loom; and the invention consists, lastly, of certain details of construction in the tension attachment and its combination with a tension-regulator for the warp-threads, as will be fully described hereinafter and finally set forth in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of my improved loom for weaving velvet or other double-pile fabrics. Fig. 2 is a rear elevation of the same. Fig. 3 is a plan view; and Fig. 4 is a vertical longitudinal section through the rear part of the loom on line 4 4, Fig. 3.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, *a* represents the driving-crank axle of my improved velvet-loom, which makes one rotation for each pick. To the end of the crank-axle *a* is applied a pinion *a'*, which meshes with a comparatively larger gear-wheel *b* on a shaft *c*, the teeth of

the pinion *a'* and gear-wheel *b* being so proportioned that for every eight picks the latter makes one full rotation. The shaft *c* is supported in bearings of the main frame *F* and side frame *F'* of the loom and provided with a number of cam-disks *d*, such as are used in ordinary looms, on which cam-disks rest, by means of antifriction-rollers, a corresponding number of levers *e*, which are pivoted at the rear ends to a stationary pivot-shaft *d'* and which are moved up or down during the rotation of the cam-disks. The front ends of the levers *e* are connected by stirrups *e²* with fulcrumed cam-levers *e'* at the upper and lower parts of the loom, said cam-levers governing the up-and-down motion of the harness for the ground-warps, as shown in Figs. 1 and 2.

In weaving double-pile fabrics the harnesses for the upper and lower ground-warps are respectively at the upper and lower parts of the loom. Also all the ground-warps are usually wound up on one and the same beam, where the tension is regulated by means of suitable weights or special regulating mechanism. It follows, therefore, that during the upward and downward motion of the harness the ground-warps as they are caused to approach the intermediate or horizontal position have a less tension than when moving toward their upper or lower positions, and they get loose in the harness. The object of this invention is to prevent this objectionable feature and to keep the ground-warps at a uniform tension throughout the upward-and-downward motion of their harness. For this purpose each lever *e* is provided at its pivoted end with a downwardly-extending arm *g*, which during the up-and-down motion imparted by the cam-disks makes an oscillating motion from the position *h* to the position *i*, as shown in Fig. 1. To the lower end of each arm *g* is applied a connecting-rod *j*, the rear end of which is connected with a crank-arm *k*, so that the latter follows the motion of the lever-arm *g* from the position *l* to the position *m*, Fig. 1. The oscillating motion of the crank-arm *k* produces a partial rotation of the shaft *n*, to which the arm *k* is applied. All the shafts *n* extend from one side of the frame to the other and are supported in three bearings, each of which is supported on the

rear part of the frame F of the loom, which rear part is connected by the frame-piece *q*. This frame-piece *q* is extended beyond the right-hand side of the loom and supports a casting *r*, in which the outer bearings for the shafts *n* are arranged.

To the rear part of the frame F are fulcrumed at each side four lever-arms *s*, which oscillate on pins *t*, as shown in Fig. 4. Each lever-arm *s* is provided at its lower end with a roller *t'*, which turns on a pin *t*². These rollers are in a horizontal line with the shafts *n* and form contact with small cams *z* on the same. The size of the projecting portions of the cams *z* are in proportion with the eccentricity of the cam-disks *d*. The four oscillating lever-arms *s* at each side of the loom-frame are arranged in one place, one back of the other. They carry at their forked upper ends transverse iron tension-rollers *s'*, which turn freely in the same. The warp-beam *u*, on which the ground-warps are wound, is supported in bearings of upwardly-extending standards F² of the loom-frame, back of the tension-rollers *s'*. The threads for the ground-warps of the upper as well as for the ground-warps of the lower fabric are conducted from the beam *u* first below a roller *v*, then around a roller *w*, then below a roller *x*, after which they are divided up into four parts, one for each harness, and conducted over the tension-rollers *s'* to the heddle-eyes of their respective harness *f*. The rollers *v*, *w*, and *x* are likewise supported in bearings in the rear part F² of the frame of the loom, the latter two rollers being covered with closely-meshed cloth. When the loom is set in motion, the rotation of the cam-disks *d* moves the levers *e* up and down and oscillates simultaneously the arms *g*, which by the connecting-rods *j* oscillate the crank-arms *k* on the shafts *n*, so as to operate thereby the eight cams *z*, which latter act on the rollers at the lower ends of the eight lever-arms *s*. This imparts an oscillating motion to the arms *s* and to the tension-rollers *s'* at the upper ends of the same to such an extent that the warp-threads of each harness are tightly stretched at that point of the weaving operation when they arrive at the intermediate positions in the up-and-down motions of the harness, so that the slack of the warp-threads is entirely obviated and a positive tension imparted to the same. A yielding of the ground-warps or a greater tension on the warp-threads of the non-operating harness is prevented by the guiding of the same around the rollers *x*, *v*, and *w*. The proper feed of the ground-warps for the upper as well as the lower fabric is accomplished in the usual manner by any well-known regulating mechanism. Such a regulator, for instance, is shown in the drawings in connection with the rollers *v*, *w*, and *x* and is operated from the crank-shaft *a* by an intermediate shaft E, which receives motion by the gear-wheels G and E' from the crank-shaft *a* and which transmits by the bevel gear-

wheels C D motion to a longitudinal shaft B, that extends to the rear part of the loom. On the rear end of shaft B is placed loosely a worm H, which is connected to the shaft B by means of toothed disks and a clamping-nut H', so that it turns with the shaft B when velvet is to be woven in the loom. The worm H meshes with a worm-gear I, which is located above the worm H and on the shaft of which is located a pinion J. The axle of the worm-gear I is supported in a sleeve I'. The pinion J meshes with a gear-wheel L, which again meshes with a large gear-wheel R, the shaft of which carries a pinion M, which meshes with a gear-wheel N, that is located on the shaft of the roller *v*, as shown in Fig. 1. The gear-wheels R and L are supported in bearings of a shiftable arm P, having a segmental slot at its lower end, so as to permit the interchanging of the said gear-wheels for others of different size whenever a looser or tighter weaving of the fabric is desired. By the regulator described the feed of the ground-warps is kept within accurate control, so that the uniform weaving of the double-pile fabric takes place in connection with the regular cutting of the pile.

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

1. In a loom for weaving double-pile fabrics, the combination, with the harness and driving-shaft, of cam-disks actuated by the driving-shaft, oscillating levers operated by the cam-disks and connected with the harness for raising and lowering it, fulcrumed lever-arms, extending in upward direction and provided with tension-rollers, at their upper ends, over which the ground-warps are conducted, rock-shafts provided with cams formed relatively to aforesaid cam-disks, and acting on the lower ends of said lever-arms, and means between said oscillating levers and the rock-shafts, whereby the latter are operated, substantially as set forth.

2. In a loom for weaving double-pile fabrics, the combination with the harness and driving-shaft, of cam-disks actuated by said driving-shaft, oscillating levers, operated by said cams, and connected with the harness, upwardly-extending parallel lever-arms, pivoted intermediately of their ends, and provided at their upper ends with tension-rollers over which the ground-warps are led, rock-shafts provided with cams, formed relatively to the said cam-disks, and acting on the lower ends of said lever-arms, crank-arms on said rock-shafts, and connecting-rods between the said oscillating levers and said crank-arms, substantially as set forth.

3. In a loom for weaving double-pile fabrics, the combination, with the harness and driving-shaft, of tension-regulating mechanism consisting of fulcrumed and upwardly-extending lever-arms, provided at their upper ends with tension-rollers, over which the ground-warps are conducted, rock-shafts pro-

vided with cams acting on the lower ends of
said lever-arms and means between said driv-
ing-shaft and the rock-shaft, whereby the
latter are operated, a beam for the ground-
5 warps, guide-rollers between said beam and
the tension-regulating mechanism, and a
feed-regulator for the ground-warps, sub-
stantially as set forth.

In testimony that I claim the foregoing as
my invention I have signed my name in pres-
ence of two subscribing witnesses.

JOHN KILLARS.

Witnesses:

HENRY G. PALMER,
JOHN H. RYAN.