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W. G. TILLOU & J. W. CLAPP.

NARROW WARE LOOM.

No. 306,190. Patented Oct. 7, 1884.

Fig 1.

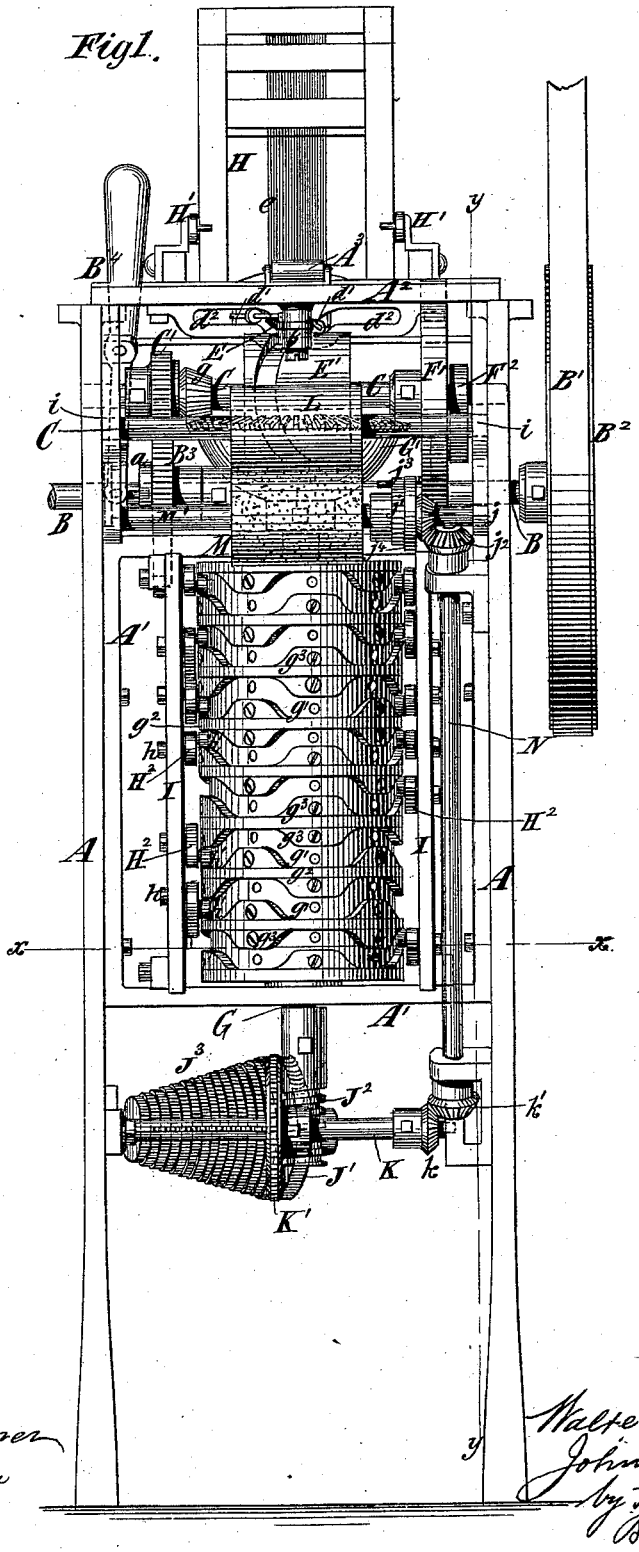

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Fig2.

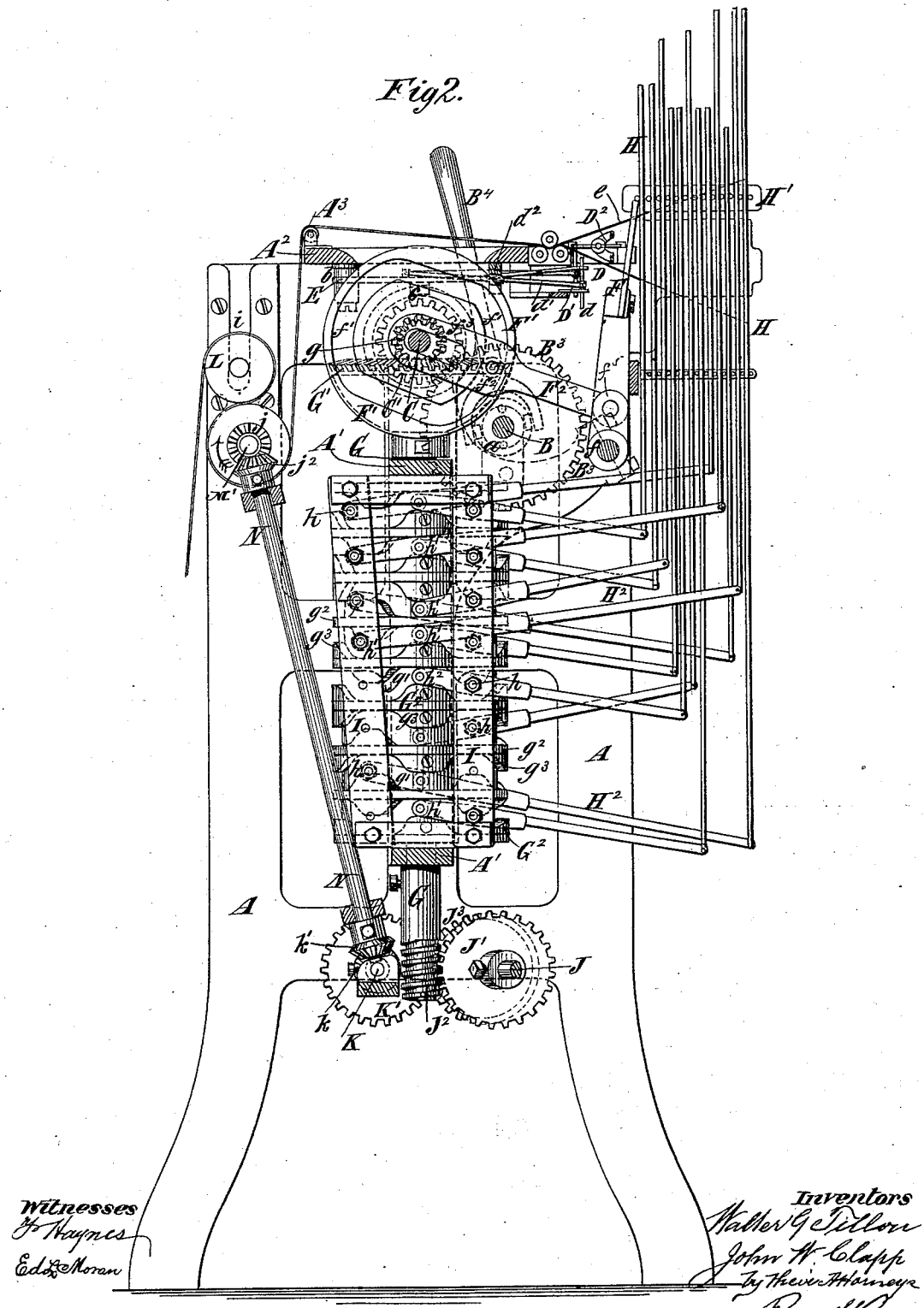

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Fig 3.

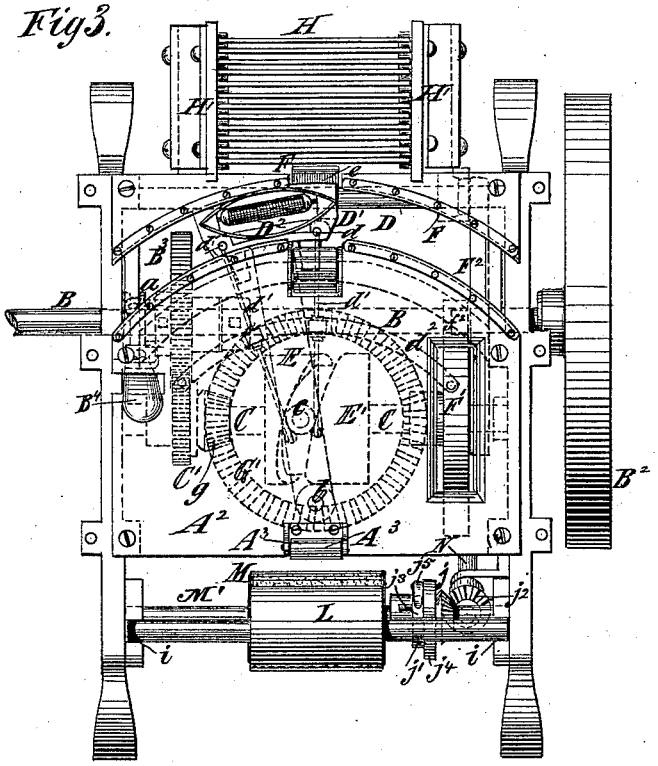

Fig 4.

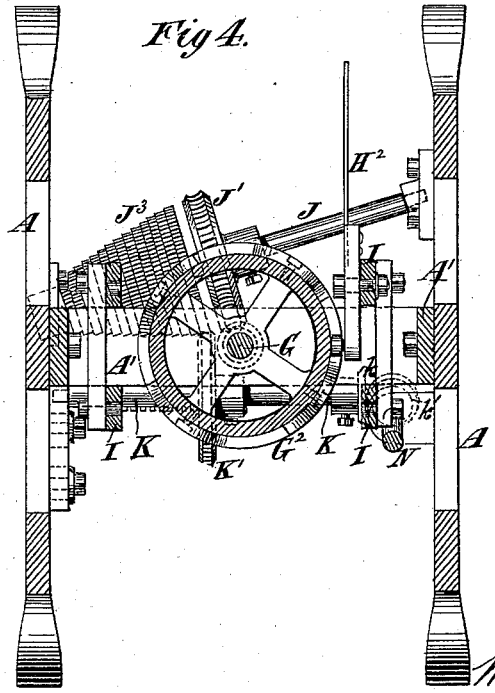

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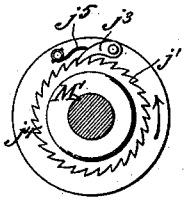
Fig. 5.



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UNITED STATES PATENT OFFICE.

WALTER G. TILLOU AND JOHN W. CLAPP, OF NEW HAVEN, CONNECTICUT.

NARROW-WARE LOOM.

SPECIFICATION forming part of Letters Patent No. 306,190, dated October 7, 1884.

Application filed June 11, 1883. (No model.)

To all whom it may concern:

Be it known that we, WALTER G. TILLOU and JOHN W. CLAPP, both of the city and county of New Haven, in the State of Connecticut, have invented a new and useful Improvement in Narrow-Ware Looms, of which the following is a specification.

This invention more particularly relates to looms for weaving "narrow ware;" but the invention is also applicable to looms for other purposes.

An important object of our invention is to provide a loom which, although adapted for a great variety of work, is simple in construction and very compact, so that a number of looms arranged side by side may be advantageously operated from a single driving-shaft.

The invention consists in various combinations of parts for operating the heddles, the shuttle, and the take-up roll, and in novel details of construction, all of said features being fully hereinafter described, and referred to in the claims.

In the accompanying drawings, Figure 1 is a front elevation of a loom embodying our invention. Fig. 2 is a vertical section thereof on the dotted line *y y*, Fig. 1. Fig. 3 is a plan thereof; and Fig. 4 is a horizontal section thereof on the dotted line *x x*, Fig. 1. Fig. 5 is a view, on a larger scale, of part of the take-up mechanism, which will be hereinafter described.

Similar letters of reference designate corresponding parts in all the figures.

A designates the side frames, which are connected by an intermediate rectangular frame, A′, and a top plate or frame, A^2, to which is fixed the breast beam or roller A^3.

B designates the main driving-shaft, which receives constant rotary motion from a belt, B′, running over its pulley B^2. This shaft may extend through and drive a number of looms similar to that herein shown, arranged in line side by side, the said shaft being furnished with a spur-driving wheel, B^3, for each loom. In order to provide for driving or stopping each loom independently of the others, its driving-wheel B^3, instead of being fast on the shaft, is loose thereon, and is thrown into and out of gear by means of a clutch, *a*, on the shaft B, operated by a hand-lever, B^4. This clutch may be of any ordinary or known kind suitable for engaging a wheel or pulley with a shaft on which such wheel or pulley is loosely placed—that is to say, it may comprise a simple disk having pins on one face and fitted to the shaft with a feather, so as to be compelled to turn therewith, but to be capable of sliding thereon for engagement with and disengagement from the loose wheel. Instead, however, of such ordinary clutch, we may employ a compound clutch of the construction shown and described in our Letters Patent for "warp stop-motion," No. 289,871, dated December 11, 1883; and we may employ in connection with such a clutch the warp-stop mechanism which is fully described in said patent; or we may employ any other suitable warp stop-motion to shift a clutch to stop the loom when any one of the warps breaks or gives out.

C designates a shaft arranged parallel with the shaft B, and serving to impart the necessary motion to the shuttle and take-up roll or beam. Upon this shaft is fixed a spur-gear wheel, C′, meshing with the loose wheel B^3, and which receives motion from said wheel B^3 when the latter is locked to its shaft by the clutch *a*.

D designates the shuttle-raceway, (here shown as open at the top and bottom,) and D′ designates the shuttle-driver, which is movable in said raceway, and which imparts motion to the shuttle D^2, which may be of any suitable construction.

E designates a lever fulcrumed at one end, *b*, and engaging with the shuttle-driver D′. This lever carries a roller or bowl, *c*, which engages with a groove in the periphery of the cam E′, fixed on the shaft C. By means of this cam the lever E′ is reciprocated in a horizontal plane and imparts a curvilinear reciprocating motion to the shuttle-driver D′. The said shuttle-driver is provided with vertically-movable pins *d*, which engage with the shuttle D^2, and which must rise and fall at the proper times to enable them to clear the warps *e*. Upon the lever E are mounted two levers or rods, *d′*, the ends of which are connected with said pins *d*, and said levers or rods extend through and are operated by a stationary cam, d^2, whereby they are given a rising and falling motion to raise and lower the pins *d* at the proper intervals.

The construction and mode of operation of this shuttle-driving mechanism is fully described in our Letters Patent for shuttle-mo-

tion, No. 290,285, dated December 18, 1883, and we do not consider any further description necessary here.

F designates the lay, which is mounted on a rock-shaft, *f*, working in fixed bearings, and to an arm, f^5, of which is connected a rod, F^2, through which the lay receives motion from a cam, F′, on the shaft C, the said rod being furnished with a roller, f^2, working in a groove, *f′*, in the cam, as shown in Fig. 2. The said rod F^2 is also formed with a yoke, f^6, which rides upon the shaft C and keeps the said rod in proper relation to the cam.

G designates a vertical shaft, which, as here shown, is arranged centrally below the shaft C, and which carries at its upper end a bevel gear-wheel, G′, which is made concave or bowl-shaped, so as to receive the cam E′ and economize space. Upon the shaft C is fixed a bevel-pinion, *g*, which engages with the wheel G′, and so rotates the shaft G. Upon the shaft G are secured a number of cams, G^2, which have each a groove, *g′*. In the present example of our invention each cam consists of a cylindric body, with flanges g^2 at opposite sides, and sections or blocks g^3 secured between said flanges. These sections or blocks g^3 are detachably secured in place by screws, and by changing their positions the character of the cam-grooves *g′* may be changed, to adapt the loom for different kinds of weaving.

H designates the leaves of heddles or heddle-frames, which are movable upward and downward in guides H′, and to their lower ends are connected treadles or levers H^2, whereby they are operated. The ends of the treadles or levers may be pivoted to the heddle-frames, as here shown, or they may enter slots in said frames, or they may be otherwise connected with said frames in any suitable manner.

I designates upright bars, which are carried by or form a part of the intermediate frame, A′, and to which the treadles or levers are fulcrumed at *h*. The treadles or levers H^2 also carry rollers *h′*, which engage with the cam-grooves *g′*, and as the shaft G and its cams are rotated the desired rising and falling motion is imparted to the treadles or levers and to the heddles H.

The construction of the cams G^2 herein represented and the method of effecting the changes therein for different kinds of weaving are fully described in our Patent No. 290,286, dated December 18, 1883, in which such construction is claimed.

The treadles H^2 are herein represented as connected with the heddle-frames H by simple pivots; but we prefer to connect them by connections such as are fully shown and described in the last-abovementioned patent. In the lower part of the loom are two shafts, J K, arranged obliquely to each other and supported in bearings in the frames A, for operating the take-up motion. Upon the shaft J is secured a worm-wheel, J′, and on the lower end of the shaft G is formed or secured a worm or screw, J^2. Upon the shaft J are also a number of gear-wheels, J^3, of different diameters, arranged in the form of a cone, and the shafts J and K are placed at such a degree of obliquity that the face of the cone formed by the series of wheels will be approximately parallel with the shaft K. Upon the shaft K is a spur-gear wheel, K′, which engages with and receives motion from either of the wheels J^3, according to the speed at which the take-up mechanism is required to be driven. The said wheel K′ is fitted to the shaft K with a feather, so that it may turn the said shaft, and it is adjustable thereon longitudinally to bring it opposite to either wheel J^3; and in order to secure it opposite to either wheel it may either have a set-screw inserted through its hub, as indicated in Fig. 4, or may have a sliding bolt or catch, as shown in our Letters Patent No. 290,287, dated December 18, 1883, for take-up motion for looms, to engage with either of a series of notches in the shaft K.

L designates the take-up roll, which is arranged in slotted bearings *i*, so that it may rise and fall, and which rests upon a friction-roll or driving-roll, M. Upon the shaft M′ of said driving-roll is loosely fitted a bevel gear-wheel, *j*, which is shown in Figs. 1 and 2. This bevel gear-wheel engages with the shaft M′, for turning the latter only in the direction of the arrows (shown near it in Figs. 2 and 5) by means of a pawl, j^3, and ratchet-wheel *j′*, which are shown in Fig. 1, but better in Fig. 5, which exhibits a section of the shaft M′ of the roll M between the said roll and the ratchet-wheel, as viewed from the left of Fig. 1. The ratchet-wheel *j′* is fast on the shaft, and the pawl j^3 is attached to a flange, j^4, on the bevel gear-wheel, and kept in contact with the ratchet-wheel by a spring, j^5, also attached to the said flange. The bevel gear-wheel *j* might be connected with the shaft M′ by any other clutch or device which will permit the roll M to be turned ahead independently of said wheel, but which will prevent backward movement of the roll.

Upon the shaft K is a bevel-wheel, *k;* and N designates an inclined shaft, which is provided with bevel-wheels j^2 *k′*, engaging with their companion wheels *j* and *k*, and transmitting motion to the friction or driving roll M.

We do not consider any of the parts employed in this loom as new individually; nor do we hereby desire to claim separately the several combinations of parts whereby the desired motions are imparted to the shuttle, the heddle-frames, and the take-up roller.

By our present invention we have produced a loom which is very desirable because of its simplicity, compactness, and efficiency, and all we now seek to claim are the arrangement and combinations of parts whereby we attain the desired results.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with the shuttle-driv-

ing lever, a horizontal shaft, and a cam thereon, for actuating said lever, and the heddles and the treadles or levers for operating them, of an upright shaft arranged below and geared with said horizontal shaft, and carrying cams, whereby said treadles or levers are operated, substantially as described.

2. The combination of the shaft C and the upright shaft G, geared therewith, with the shuttle-driving lever E and the cam E′ on the shaft C, for operating said lever, the heddle-frames H, and treadles or levers H^2, connected with them, cams on the shaft G, for operating said treadles or levers, the take-up roll, and mechanism for operating said shaft C and for imparting motion to said take-up roll from the upright shaft G, all substantially as described.

3. The combination of the heddle-frames H and the take-up roll L with the vertical shaft G, provided with cams G^2, and a worm, J^2, the treadles or levers H^2, the shafts J K, arranged obliquely to each other, the worm-wheel J′, and cone-wheels J^3 on the shaft J, the sliding gear-wheel K′, and mechanism for connecting the take-up roller with the shaft K, and for operating the vertical shaft G, all substantially as described.

4. The combination of the vertical shaft G and worm J^2, the shafts J K, arranged obliquely to each other, the cone of wheels J^3, and worm-wheel J′ on the shaft J, the sliding wheel K′, and bevel-wheel *k* on the shaft K, the friction or driving roll M and its bevel-wheel *j*, the inclined shaft N and its wheels j^2 *k*′, and mechanism for rotating said vertical shaft G, all substantially as described.

5. The combination of the shaft C and mechanism for rotating it, with the shuttle-driving lever E, the cam E′ for operating it, the vertical shaft G, the pinion *g* on the shaft C, and the bowl-shaped wheel G′, receiving within it the cam E′, the heddle-frames H, the treadles or levers H^2, and the cams G^2, for operating said treadles or levers, all substantially as described.

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