

(No Model.)

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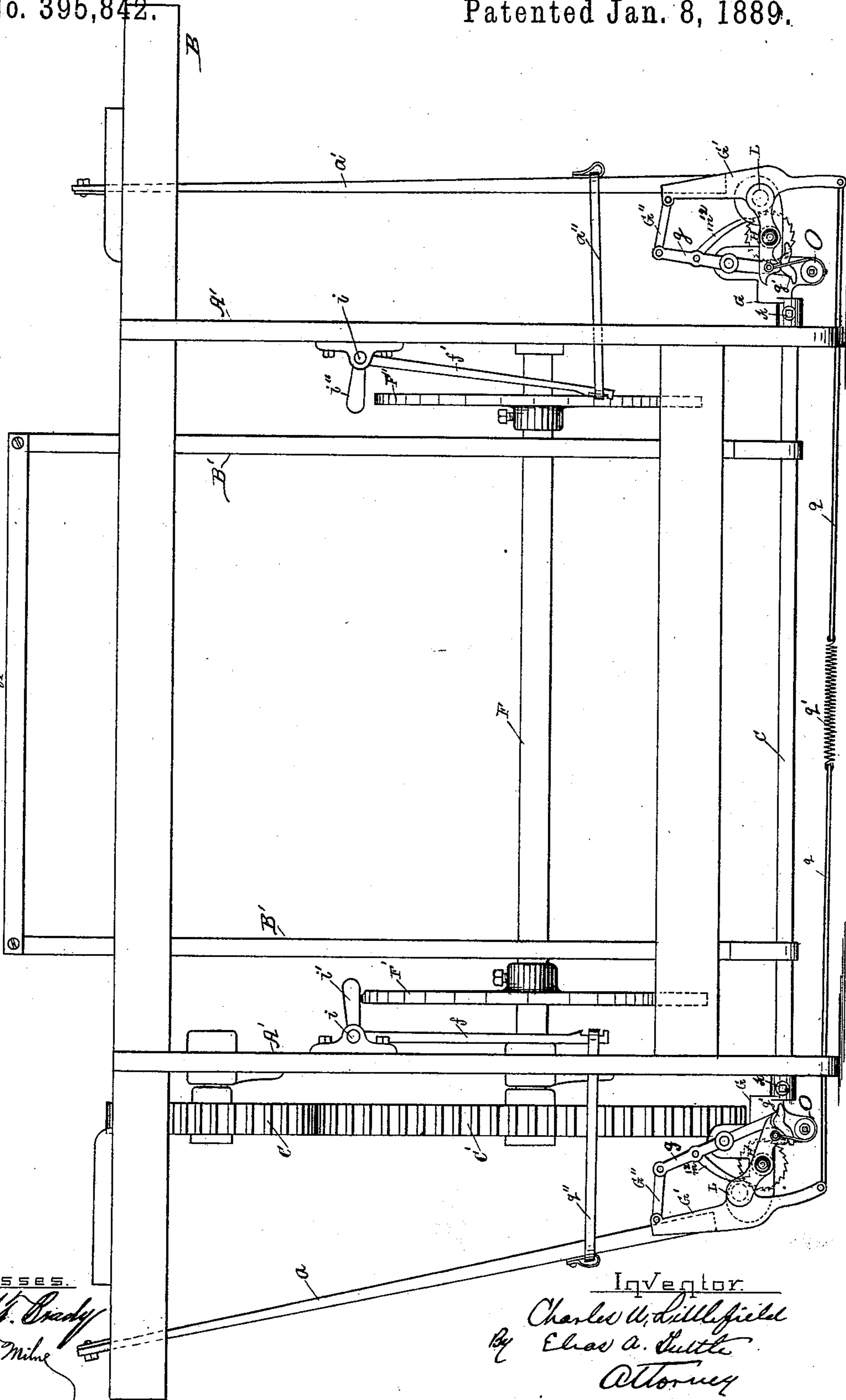
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SHUTTLE OPERATING MECHANISM FOR LOOMS.

No. 395,842.

Patented Jan. 8, 1889.

Fig. 1.



Witnesses.

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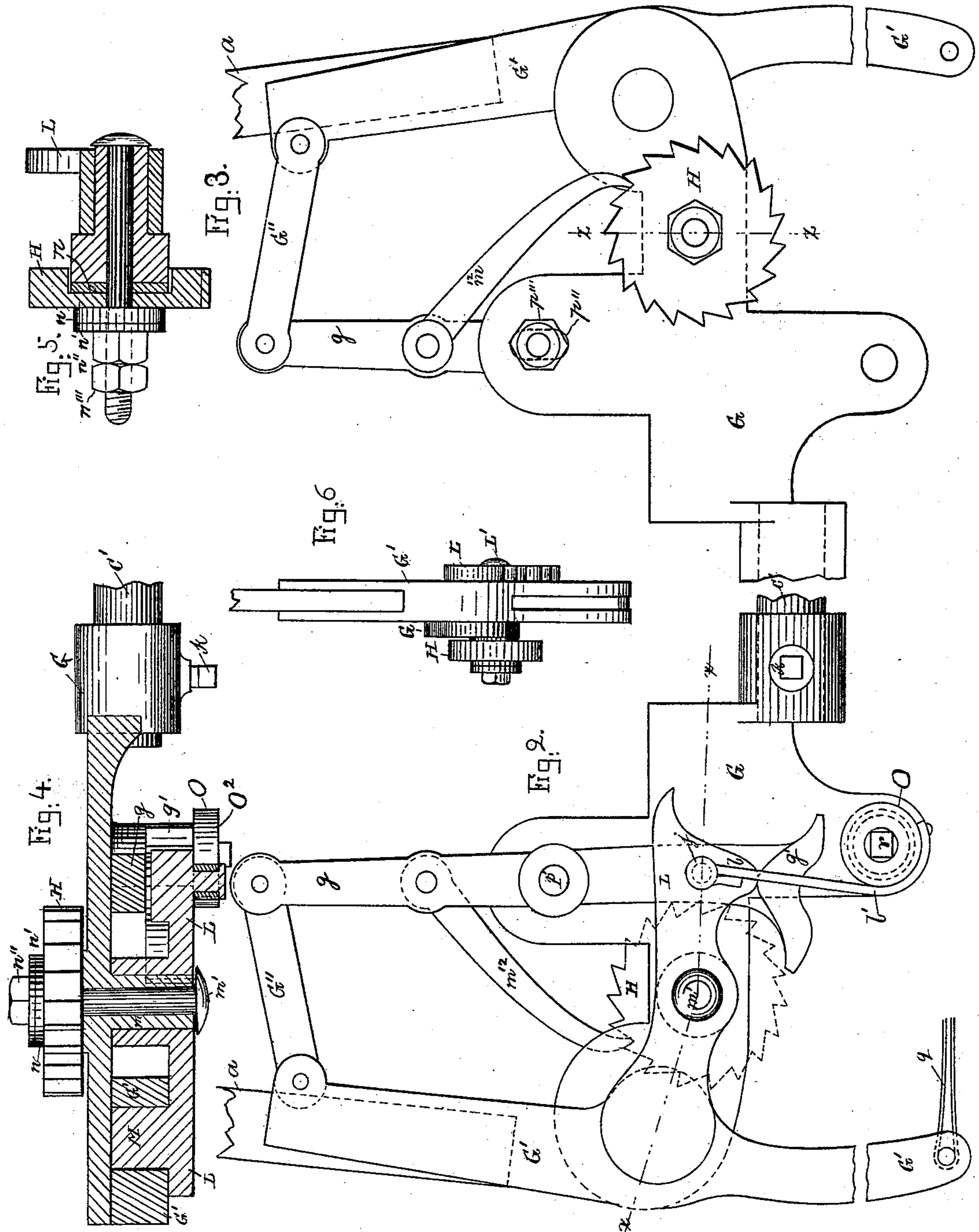
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SHUTTLE OPERATING MECHANISM FOR LOOMS.

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Patented Jan. 8, 1889.



Witnesses

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UNITED STATES PATENT OFFICE.

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SHUTTLE-OPERATING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 395,842, dated January 8, 1889.

Application filed November 1, 1887. Serial No. 253,954. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. LITTLEFIELD, a citizen of the United States, residing at Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Shuttle-Operating Mechanism for Looms; 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.

The so-called "parallel foot-motions" for looms in common use at the present time with which I am acquainted in their practical working do not move the picker in a fixed line. The reason of this is that the foot or rocker resting upon the pedestal upon which it works as the picking-stick moves back and forth in its movement to drive the shuttle and its return has no direct and positive connection therewith, thus permitting the foot and stick to rise or jump from the foot-rest upon the pedestal when the picking-cam strikes the blow which drives the shuttle across to the opposite shuttle-box. It is well known that the speed at which a loom may be run is more or less decreased by the lack of means to properly receive and check the shuttle in its rapid flight from box to box, thereby fixing a limit of speed lower than desirable at which it can be safely run. In running at high speed there is frequent and continuous trouble encountered in what is known as "throwing" or "stripping" filling from the shuttle-spindle, thereby causing serious loss in prepared yarns, stoppage of looms, &c. This results from the too sudden checking of the shuttle in its flight. It is a well-known fact that the power required to run a loom is not continuously consumed while it is in motion, the larger part of the power being consumed while the loom is in the act of starting and driving the shuttle from the box.

The object of this invention is, first, to provide a foot-motion that shall always, when made in accordance with these specifications, move the picker in a fixed line when driving the shuttle; second, to provide a friction-check that can be so adjusted as to hold the picker in position to receive the shuttle at

some distance from the end of the box and that shall offer such resistance to the movement of the shuttle as shall bring the shuttle to a state of rest when it has fully entered the box, thereby saving in a great measure sudden shocks to the shuttle and the picker, with which it comes in contact, and affording an effective substitute for the check-straps and other checking devices now in use; third, to provide means whereby the shuttle in its flight is brought to a stop by degrees, so that the filling will not be thrown or stripped from the spindle; fourth, to provide shuttle-checking devices that shall allow the loom to be run with a comparatively open box, thereby doing away with a large amount of power now required to start the shuttle when closely wedged therein.

I have illustrated my invention by the accompanying drawings, in which—

Figure 1 is a front view of a loom-frame with my invention placed thereon, other and unnecessary parts being omitted. Fig. 2 is a face view of my improved foot-motion and shuttle-check. Fig. 3 is a rear view of the same, showing the ratchet and pawl when in position to receive the shuttle. Fig. 4 is a section on line *xx* of Fig. 2 of the drawings, parts being shown in elevation. Fig. 5 is a sectional view on line *zz* of Fig. 3, parts being shown in elevation. Fig. 6 is an outside end view of the parts shown in Fig. 2.

Like letters refer to similar parts throughout the several drawings.

In Fig. 1 the loom-frame A, with its sides A' A', lay B, lay-swords B' B', picking-sticks *a* and *a'*, lay rock-shaft *c'*, meshing-gears C C', cam-shaft F, cams F' and F'', picking-arms *f* and *f'*, rock-shafts *i i*, picking-bowls *i'* and *i''*, are all such as are common to many different kinds of looms, and are arranged in the usual well-known manner.

At each end of the lay rock-shaft *c'* is secured a stock, G, by means of a socket or sleeve upon the said stock fitting upon the end of the lay rock-shaft and clamped in place by a set-screw, *k*, or the stock may be applied and secured in place upon the said rock-shaft in any other suitable and convenient manner. Upon one side of the stock G is formed a hub

or sleeve, *m*, upon which fits the hub or sleeve *m*⁹ of a lever, *L*, formed at its outer end with a stud, *M*, upon which is pivoted the stock *G*', carrying the picker-stick *a*. The lower ends

5 of the stocks *G*' on the two sides of the loom are connected by the straps *q q* and intermediate spring, *q'*, the latter serving to assist in effecting the outward movement of the picker-sticks after they have thrown the shuttle.

10 The inner end of lever *L* is shown formed with a nose, *l*, which rests upon the upper side of the cam-formed portion *g'* on one arm of a lever, *g*, pivoted to a pin, *p'*, on an upward extension or arm, *p*, of the stock *G*. The upper

15 arm of the lever *g* has pivoted to it one end of a link, *G''*, which at its opposite end is pivoted to the stock *G*'. The nose *l* of the lever *L* is held in contact with the cam-formed portion *g'* of the lever *g* by means of a strap, *l'*, fast-

20 ened at one end to a stud, *j*, adjustably secured in a slot, *j'*, in the lever *L*, and secured at the other end to a barrel, *o*², mounted on a pin, *r*, on the stock *G*, and containing a spring, *o*, which tends to rotate the barrel and wind

25 the strap *l'* upon its exterior.

If desired, a spring of any other convenient form may be connected with the lever *L* to hold its nose *l* against the cam-formed portion *g'*.

30 The operation of the devices so far described is simple and obvious, and is as follows: As the picker-stick is drawn inward to throw the shuttle, motion is imparted to the lever *g* through the link *G''*, causing the cam-formed

35 portion *g'* to act upon the nose *l* and move the lever *L*. The cam-formed portion *g'* is formed, as shown, with a rise at its middle portion and a fall or downward incline on each side thereof, and as it moves against the nose *l* it serves

40 to gradually depress the outer end of the lever *L* and the picker-stick during the first portion of the movement of the picker-stick, while during the remainder of the movement of the

45 picker-stick the latter is permitted gradually to rise. By this means I positively insure a movement of the upper end of the picker-stick and the picker carried thereby in a horizontal straight line, it being impossible for the parts to jump or otherwise move, so as to

50 cause a departure from the said line.

A highly important advantage of the construction shown is that during the movement of the picker-stick while driving the shuttle, after the apex of the cam-formed portion *g'*

55 has passed the point of the nose *l*, and the latter has reached one of the downgrades of the cam-formed portion, the spring *o* assists the action of the picking-cam, imparting an additional and gradually-increasing impulse

60 to the picker-stick just before the shuttle leaves the picker and flies from its box. At the same time the action of the spring *o* in causing the nose *l* to bear upon the downgrade of the cam-formed portion *g'* of the lever *g* is such as to neutralize the increased

65 tension of the spring *q'*, occasioned by the stretching thereof as the upper end of the

picker-stick moves inward. I arrest the outward movement of the picker-stick before the picker-stick has entirely reached the outer

70 limit of such movement, and hold it in a yielding manner, so as to cause it to receive the shuttle in its flight across the loom from the box on the opposite side and gradually check and destroy its movement. This en-

75 ables me to dispense with the great pressure ordinarily applied to the sides of the shuttle to check its momentum as it enters the shuttle-box, and prevents the stripping of the cop, heretofore frequently occasioned by the sud-

80 den arrest of the shuttle at the end of its flight across the loom. The reduction in the pressure applied to the shuttle in the box enables the shuttle to be thrown with a much

85 less expenditure of power, and renders unnecessary the employment of the relief mechanism heretofore devised and employed for the purpose of removing the pressure of the usual swell or binder of the shuttle-box from the shuttle just prior to effecting the pick.

90

My devices for stopping the picker-stick and holding it in the yielding manner are as follows: The bolt *m'*, which passes through the hub or sleeve *m* on the stock *G*, receives

95 upon it on the rear side of the stock *G* a ratchet-wheel, *H*, on each side of which is placed a disk or washer, *n*, of cloth, leather, or other friction-creating material. Against the outer washer or disk, *n*, is applied a metallic washer, *n'*, and upon the threaded end

100 of the bolt is turned a nut, *n''*, serving to press the wheel *H* and washers *n* into close contact, a lock-nut, *n'''*, preferably being employed in addition, as shown in Fig. 5. Prefer-

105 ably, the side of the wheel *H* is recessed, as shown in Fig. 5, to receive one of the washers *n* and a circular enlargement or hub on the stock *G*. A pawl, *m*¹², is pivoted upon the side of the lever *g*. The length of the teeth upon

110 the wheel *H* and the point at which the pawl *m*¹² is pivoted to the lever *g* are such that as the picker-stick is moved inward to throw the shuttle the pawl *m*¹² is moved a distance such as to carry it over one tooth upon the wheel

115 *H*, but not quite to the end of the following tooth.

In practice I have found it expedient to so construct and adjust the parts as to occasion a movement of the pawl upon the wheel *H* a distance equal to the length of one tooth and

120 three-fourths of the length of the following tooth.

The enlarged head of the pin or bolt *m'* serves to hold the lever *L* in place upon the hub or sleeve *m*. The pin *p'* passes through

125 a vertical slot, *p''*, in the arm *p* of the stock *G*, and is adjustably secured in position by the nut *p'''*. In operation after the throw of the shuttle the picker-stick will be arrested in its movement toward the outward ex-

130 tremity of the shuttle-box by the engagement of the pawl with a tooth of the ratchet-wheel and will be held thereby at a short distance from the end of the box. After the shuttle

has entered the box at the end of its flight from the box on the opposite side of the loom it will strike against the picker and carry the latter and the upper end of the picker-stick outward with it. The retardation of the rotation of the ratchet-wheel occasioned by the friction-creating devices, however, will cause the stick to resist the advance of the shuttle and thus bring the latter to a state of rest without undue shock.

Having described my invention and the best means with which I am acquainted for reducing it to practice, I claim as my invention—

1. The combination, with the picker-stick, a wheel, and devices for frictionally retarding the rotation of said wheel, of a pawl connected with the said picker-stick and adapted to engage with the wheel in the outward movement of the picker-stick, the picker-stick being thereby stopped in the outward movement and held at a slight distance from the extreme end of the said movement and in position to receive the shuttle and check it in its flight from the opposite box, substantially as described.

2. The combination, with the picker-stick, of a wheel, devices for retarding the rotation thereof, and a pawl connected with the said picker-stick, the said pawl during the inward movement of the picker-stick moving over more than one tooth on the said wheel, but not far enough to engage with the following tooth, and the combination being and operating substantially as described, whereby the outward movement of the picker-stick is arrested by the engagement of the pawl with the tooth of the wheel passed over by the pawl, and the picker-stick is held in position to receive the shuttle.

3. The combination, with the picker-stick, of the pawl-carrying lever connected thereto, a wheel and devices for retarding the rotation thereof, the combination being and operating substantially as described, whereby during the increased movement of the picker-stick the pawl is moved a distance sufficient to carry it over more than one tooth on the wheel, but not far enough to engage with the following tooth, and whereby the outward movement of the picker-stick is arrested by the engagement of the pawl with the tooth of the

wheel passed over by the pawl, and the picker-stick is held in position to receive the shuttle.

4. The combination, with the picker-stick, of the link G'' , the lever g , pawl m^{12} , wheel H , and devices for frictionally retarding the rotation of said wheel, the said pawl during the inward movement of the picker-stick moving over more than one tooth on the said wheel, but not far enough to engage with the following tooth, and the outward movement of the picker-stick being arrested by engagement of the pawl with the tooth passed over by the pawl, and the picker-stick held in position to receive the shuttle, substantially as described.

5. The combination, with the picker-stick and its holder or stock, of the lever on one end of which said holder or stock is pivoted, and a lever connected with the stock or holder and having a cam-formed portion engaging with the said lever, substantially as described, whereby the upper end of the picker-stick is caused to move in a horizontal straight line.

6. The combination, with the picker-stick and its holder or stock, of a supporting-lever on which said holder or stock is pivoted, a second lever connected with the holder or stock and provided with a cam-formed portion acting upon said supporting-lever, and a spring for holding the supporting-lever in contact with the cam portion of the second lever, substantially as described, whereby the upper end of the picker-stick is caused to move in a horizontal straight line.

7. The combination, with the stock G' and the lever L , of the lever g , connected with said stock and provided with the cam portion g' , and the spring o , connected with the said lever L , substantially as described.

8. The combination, with the stock G' and the supporting-lever L , of the lever g , connected with the said stock and provided with the cam-formed portion g' , the spring o , connected with the supporting-lever L , the pawl m^{12} , the ratchet-wheel H , and devices for frictionally retarding the rotation of the said wheel, substantially as described.

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

CHARLES A. LITTLEFIELD.

Witnesses:

THOS. T. BRADY,
JAMES T. MILNE.