4 Sheets—Sheet 1.

H. D. DAVIS.

Loom.

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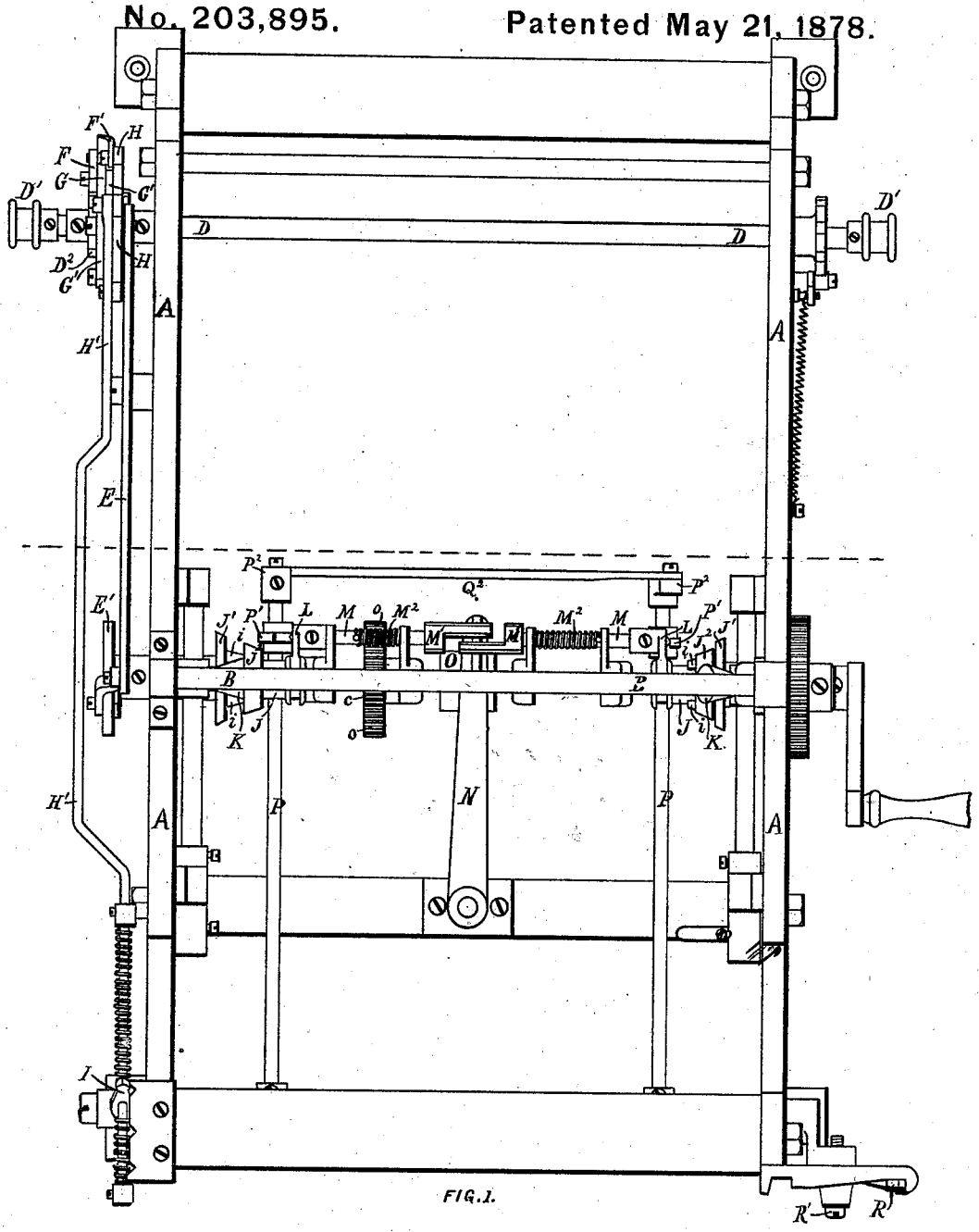

FIG. 1.

WITNESSES.

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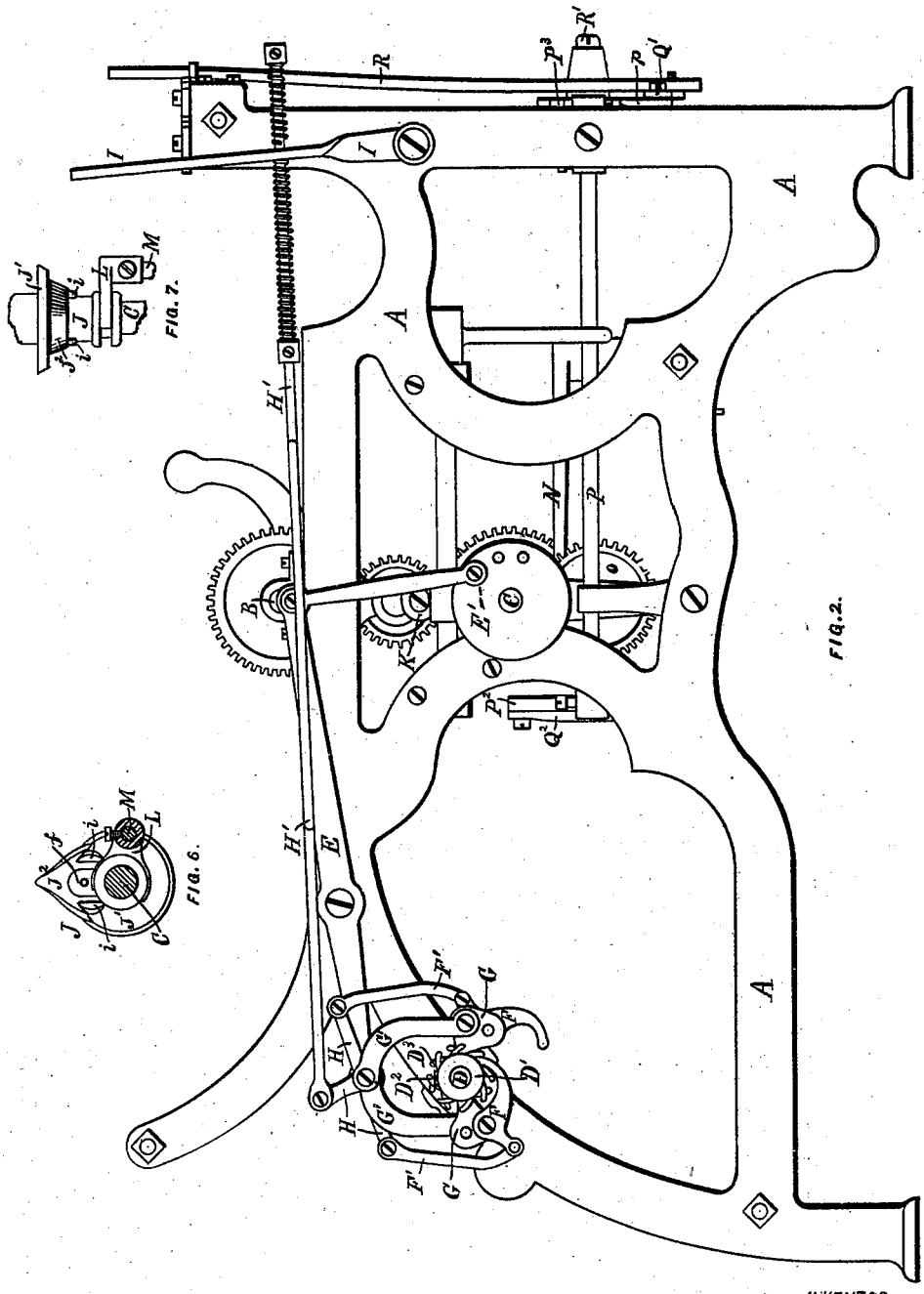

FIG. 2.

FIG. 7.

FIG. 6.

WITNESSES.

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No. 203,895. Patented May ~~21, 1878.~~

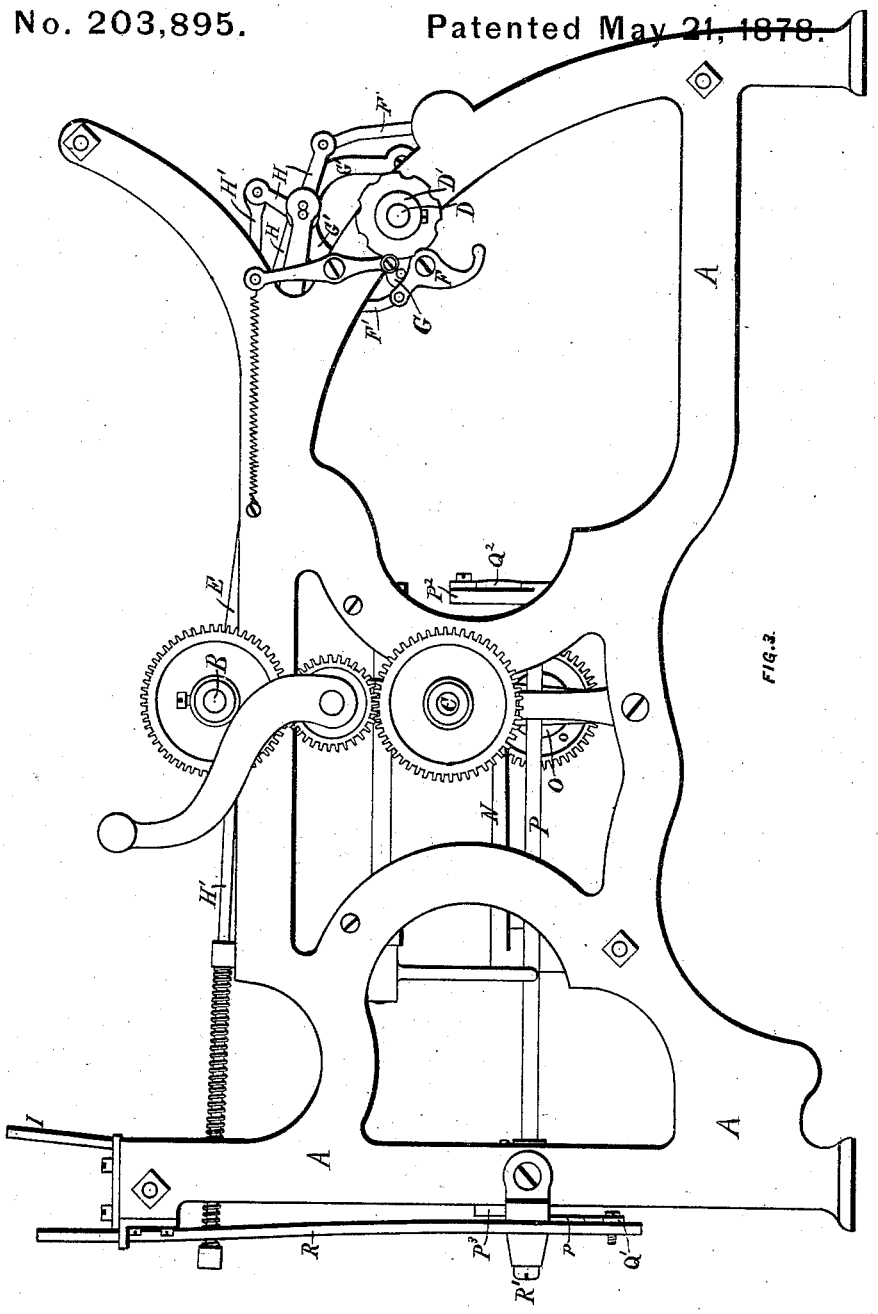

FIG. 3.

WITNESSES.

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Loom.

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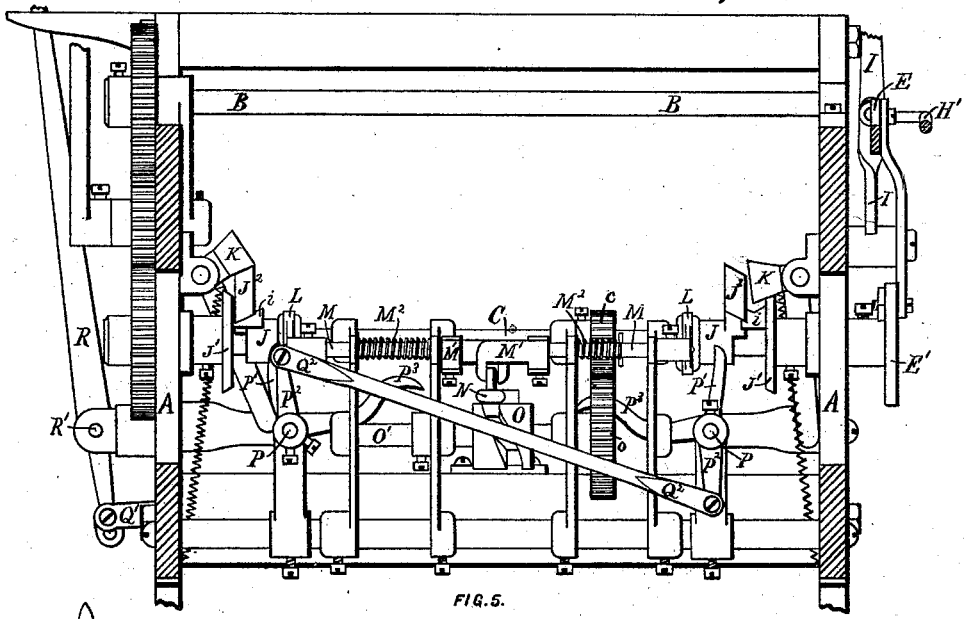

FIG. 5.

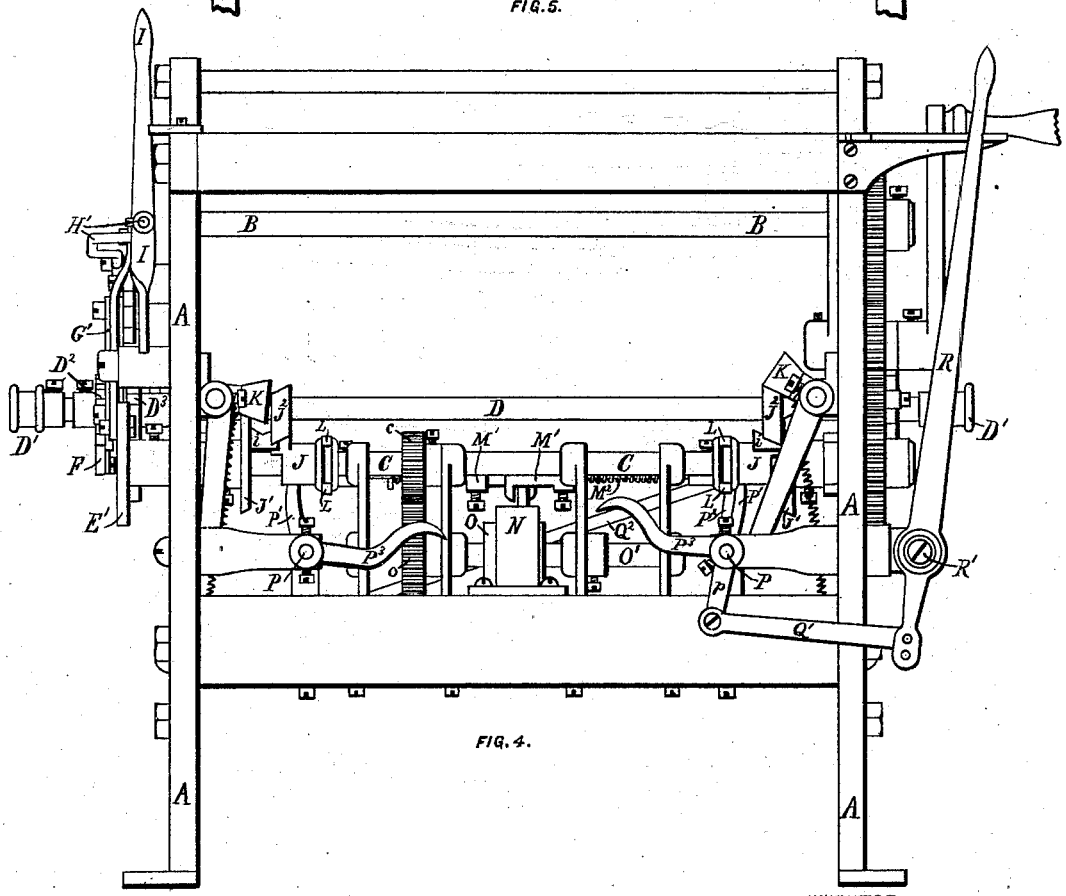

FIG. 4.

WITNESSES.

E. A. Hemmenway

Wm. C. Hibbard

INVENTOR.

Elias D. Davis

UNITED STATES PATENT OFFICE.

HILAS D. DAVIS, OF NORTH ANDOVER, MASSACHUSETTS, ASSIGNOR TO GEORGE L. DAVIS, JOHN A. WILEY, JOSEPH M. STONE, GEORGE G. DAVIS, JOSEPH H. STONE, AND JAMES H. DAVIS, OF SAME PLACE.

IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. **203,895**, dated May 21, 1878; application filed May 15, 1876.

To all whom it may concern:

Be it known that I, HILAS D. DAVIS, of North Andover, in the county of Essex and State of Massachusetts, have invented certain Improvements in Looms, of which the following is a specification:

My improvements relate to that part of the mechanism of a loom by which the weft is placed in the sheds of the warp when several shuttles are used simultaneously, as is the case in fancy and figure weaving. In such case, if the loom has made several movements after either of the weft-threads has failed, it is necessary to turn the pattern chain or chains backward, removing such weft-threads as have been wrongly inserted, until the proper shuttle is brought to the proper shed of the warp. As this is liable to occur frequently, I have devised a method of constructing and arranging the picking mechanism by which this result is more readily accomplished than by the modes of construction and arrangement heretofore used.

In the present case, the shaft which carries the picker-cams revolves just as fast as the lay-shaft, and each picker-cam has but one "picking-point," so called, so that the inclines of the cam can occupy a much larger portion of the circumference of the circle than if this cam-shaft revolved with but half of the velocity of the lay-shaft, as is usual. The cam is also made in two parts. One part is fixed upon the shaft, and the other part, which carries the picking-point, embraces the shaft, and also slides axially upon it and between lateral guides or jaws upon the fixed part, which thus support the picking-point while doing its work. This movable part of the cam is also provided with means for sliding it axially upon the shaft to arrest its picking operation, either by automatic means or by a treadle or other device which is controlled by the operator.

My invention consists in the combination, with the picking cam or cams, or such other part of the picking mechanism as will arrest or put in operation the picking action, of a shipper or other suitable means which is under the control of the operator, whereby the picking operation can be arrested or put in action at any time; and it also consists in so constructing the means for sliding the picking mechanisms into or out of action that each may be operated independently of the other and in any order that may be desired; and it also consists in the combination of the treadle which operates upon the cam at one side of the loom with the treadle that operates the cam at the other side of the loom, so that the same movement by the operator will simultaneously operate both picking mechanisms, so as to arrest the action of both at the same time.

In the drawings only the frame of the loom and so much of the mechanism as embodies the present improvements are represented, the other parts of the loom being supposed to be of any usual construction.

Figure 1 is a plan. Fig. 2 is a side elevation. Fig. 3 is an elevation of the opposite side from that shown in Fig. 2. Fig. 4 is an end elevation. Fig. 5 is a transverse sectional elevation across the loom near the middle; and Figs. 6 and 7 are details, showing the construction of one of the picker-cams.

A is the frame of the loom, and B shows the position of the lay-shaft. C is the picker-cam shaft, which is geared with the lay-shaft, so as to revolve with the same velocity.

D represents the shaft upon which are placed the drums or cylinders which carry the pattern chain or chains which control the positions of the shuttle-boxes. This shaft is represented as made to extend across the loom, and to carry a pattern-chain at either side of the loom, if desired; or it may be made to carry only one pattern-chain at one side of the loom, as is shown in Fig. 2.

The pattern-chain is not represented, but is to be made in the usual way—that is, by a series of transverse bars, which are jointed together by two series of links at either side, which bars are furnished with bolls and spools to make the elevations and depressions of the chain which work the pattern-levers that put in operation the mechanism which effects the changes of the shuttle-boxes. The chain is supported upon the wheel D^1. The chain-shaft D is driven with an intermittent motion from a lever, E, which receives a reciprocating

motion from the crank-wrist E′ on the cam-shaft C.

The shaft D is provided with two ratchets, D^2 and D^3, having their teeth inclined in opposite directions. Each of these ratchets is operated by a driving-pawl, F, and each pawl is jointed to one of the rocking levers G G, which have their axes on the shaft D. Each of the levers G is connected by the curved rod G′ with the lever E, which thus imparts motion to the pawls F F simultaneously. The outer arms of the pawls are connected by the jointed rods F′ F′ to two of the arms of the three-armed lever H, which has its fulcrum on the end of the lever E, as is shown.

To the third arm of the lever H is jointed a long rod, H′, which reaches a lever, I, at the front side of the loom, near the operator, and to which the rod H′ is attached by a yielding connection, as shown in Fig. 2.

By this means the lever H can be inclined in either direction, and thereby throw one of the pawls F into engagement with its ratchet D^2 or D^3, and at the same time throw the other pawl out of engagement, and vice versa, or, by placing the levers H and I midway, disengage both of the pawls. By this arrangement the chains can be worked in either direction, or stopped, at all times under the control of the operator.

Upon the picker-cam shaft C, and near each side of the loom, are the picker-cams J J, each composed of a stationary disk, J^1, which is fixed upon the shaft, and the movable part J^2, which slides axially upon the shaft. The disks J^1 are each made with a pair of jaws or guides, *i*, near the periphery of the disk, which embrace the picking-points J^2, and hold them firmly in their proper positions while in action upon the picking-levers, and at the same time permit the picking-points J^2 to be slid axially upon the shaft C, so as to act upon the rollers K on the picking mechanism, or revolve clear of them, as may be required.

The part J of the cam which embraces the shaft C is provided with collars, with which is adapted to engage a fork, L, of the usual construction for such purpose, by which the cam is slid upon the shaft. The fork L is fixed upon the outer end of the sliding rod or shipper M, which works in guides parallel to the shaft, and is provided at its inner end with a hook, M^1, by which it is drawn inward against the action of the coiled spring M^2, which is coiled around the rod M, and forces it outward. These hooks M^1 both hook upon or over a projection which extends upward from the lever N, which vibrates horizontally, and, by its action, alternately draws the cams J out of action upon the picking mechanism.

The lever N is vibrated by the helical cam O beneath it, mounted upon shaft O′, which cam-shaft O′, in this case, is, by the gears *c o*, so connected with the shaft C as to revolve with one-half the velocity of the latter, and produces the effect of picking alternately from each side of the loom; but as each picking-cam is independent in its action of the other cam, other methods of operating the hooks M^1 may be employed instead of that shown, which will put the picking-cams in action in any order desired.

P P are two treadle-shafts, one to each picker-cam, and below the same, and near the inner end of each, is attached an arm, P^1, which extends upward and opposite to the outer end of one of the sliding rods or shippers M. At the inner ends of each shaft P is fixed a rocker-arm, P^2, projecting upward on one of the shafts and downward on the other shaft, and the outer ends of these arms P^2 are connected by a diagonal jointed rod, Q^2, by which the treadle-shafts may be caused to rock at the same time in opposite directions.

On the front ends of each of the shafts P is fixed a treadle, P^3, which is designed to be operated by the foot of the operator, so that, whichever of the two treadles is depressed, both picking mechanisms will be thrown out of action. The treadle at the right hand is provided with an arm, *p*, which is connected by the rod Q^1 with the lower end of the lever R, which hangs upon the fulcrum R′ just outside of the frame, and extends upward to a little above the breast-beam, and is provided with a handle and suitable catches to hold the lever in position. By this means the picking mechanism can also be thrown in or out of gear and held in position by the hand of the operator, in an obvious manner.

By this arrangement it is seen that both of the picker-cams can be moved inward at the same time, and, as the sliding rod or shipper that slides one of them is not directly connected with the sliding rod or shipper which slides the other, they can be moved in opposite directions at the same time, and thus both can be put out of action at the same time.

In Figs. 6 and 7 one of the picker-cams is shown separately in two views, to more clearly explain its construction.

J^1 is a disk, which is fast upon the picking-cam shaft C. It is provided with two jaws, *i i*, cast upon the disk, between which, as guides, the picking-point J^2 is fitted, so as to slide axially. These jaws take the greater part of the strain upon the picking-point J^2 in working. The picking-point is connected with the central part of the cam J, which embraces the shaft C by a radial arm, *f*, which is fitted to a socket or recess in the picking-point, and the two are secured together by a bolt or screw, as is shown in Fig. 6. The picking-point, as before stated, is moved axially by the fork L, which is fixed upon the sliding-rod M, and which works in the groove in the hub of the cam J. By this construction the operative cam-surface of the picking-point is made with a more gentle incline by extending over a large portion of the circumference, and has a direct and firm support upon the fixed part of the cam, and yet preserves its movability in an axial direction.

In using this arrangement for the purpose

of finding the "pick," as it is called, the operation is this: The picking mechanism is thrown out of operation by the treadle P^3 or the lever R, and the driving mechanism of the pattern-chain is reversed by means of the lever I. Then the loom is put in operation by the power, the other parts of the loom moving in the usual way until the proper shed is found, when the shuttle-boxes will also be found to be in the correct position. After supplying the proper weft, the picking mechanism is again put in gear, and the driving mechanism of the pattern-chain is restored to its normal condition, when the loom is again ready for operation.

What I claim is—

1. The combination, with each of the movable picking-cams, of a shipper and mechanism, substantially as specified, for operating the shipper, whereby either of said cams may be operated independently of the other cam, substantially as described.

2. The combination, with the sliding-cams, rocking-shafts, and devices for rocking the same, of mechanism, such as described, for connecting the cams and rocking-shafts, whereby the two cams may be thrown out of action simultaneously in opposite directions, substantially as described.

Executed May 5, A. D. 1876.

HILAS D. DAVIS.

Witnesses:

E. A. HEMMENWAY,

WM. C. HIBBARD.