July 9, 1957 E. NADEAU 2,798,512

PORTABLE HAND LOOM

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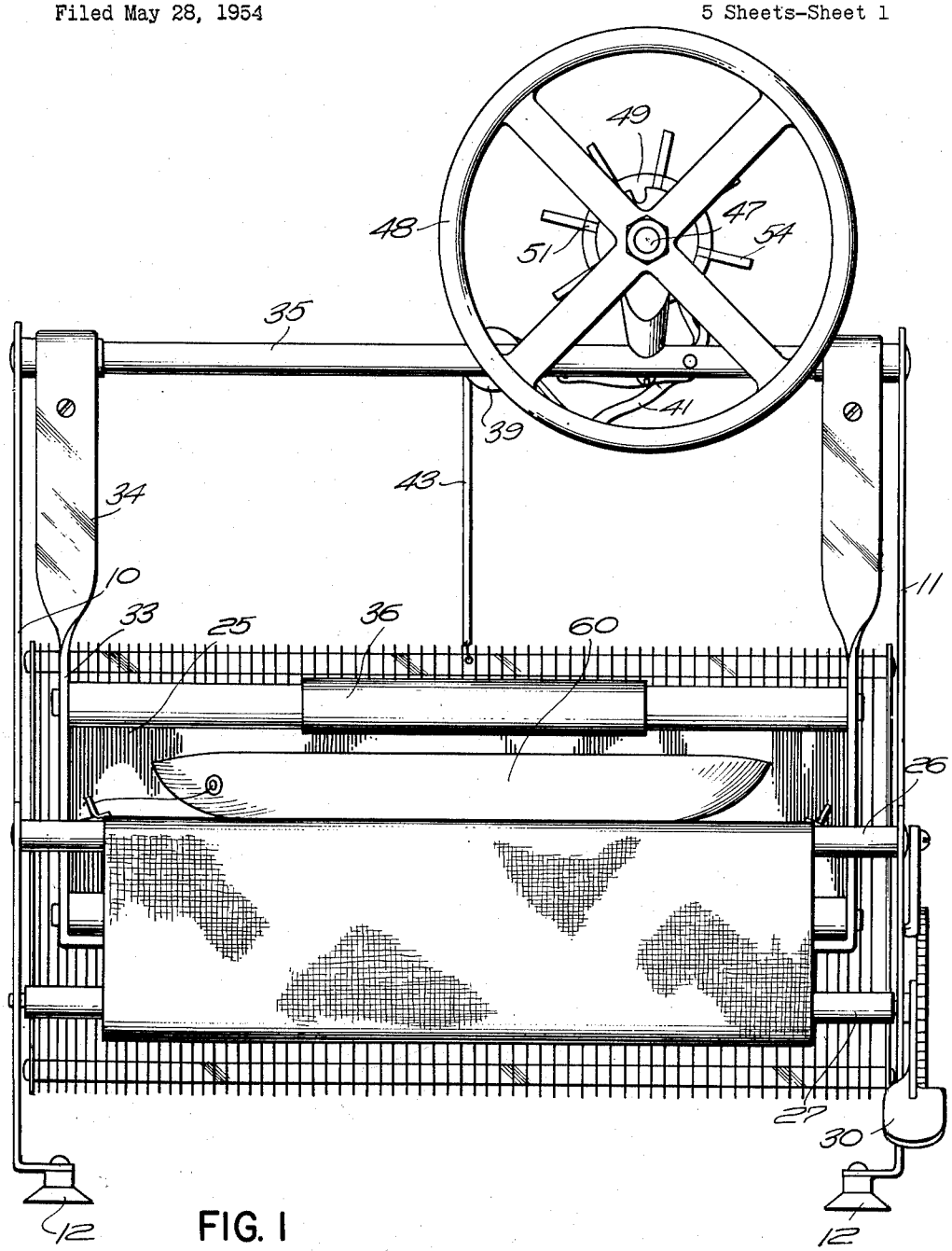


FIG. 1

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PORTABLE HAND LOOM

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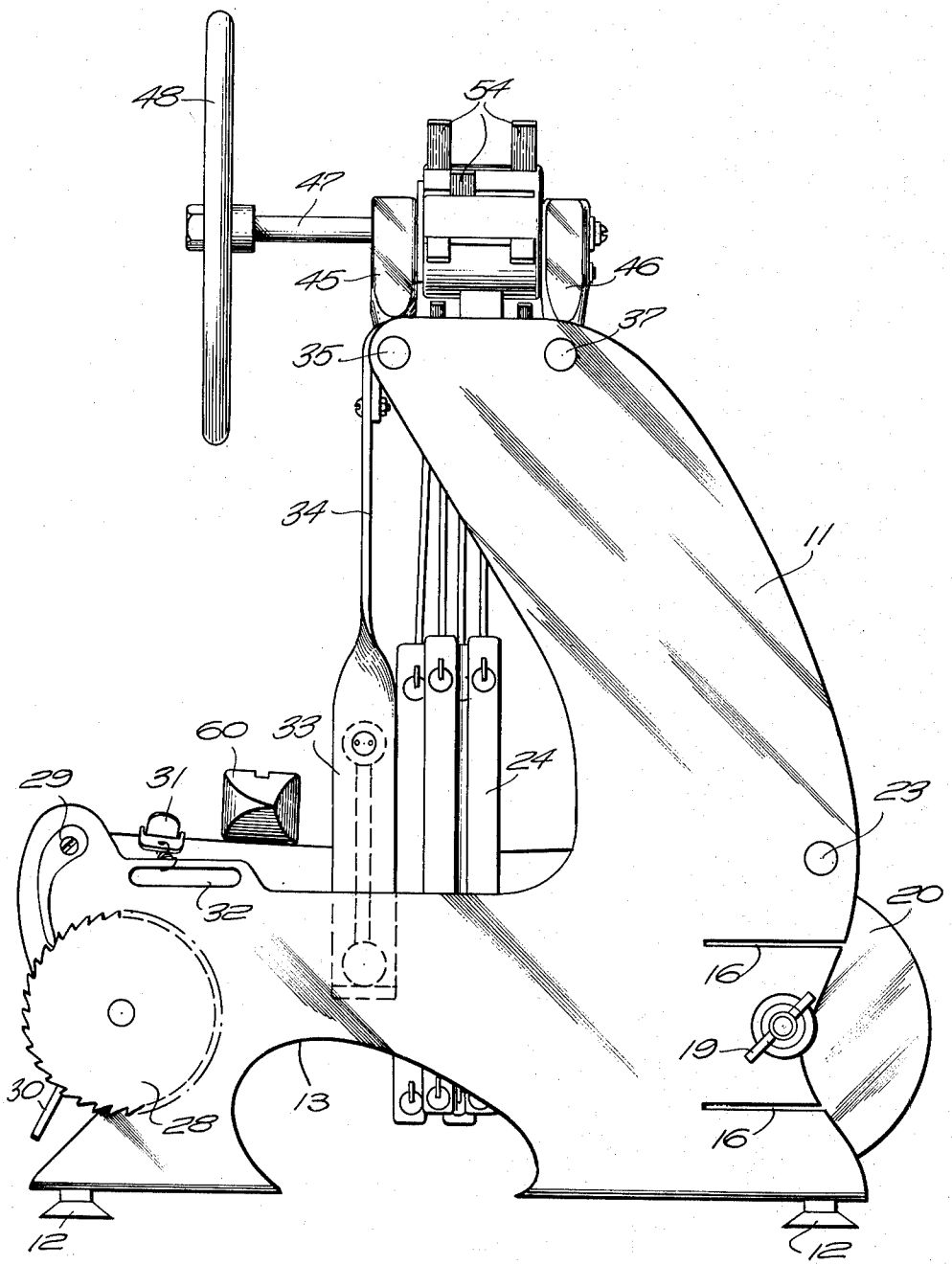


FIG. 2

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PORTABLE HAND LOOM

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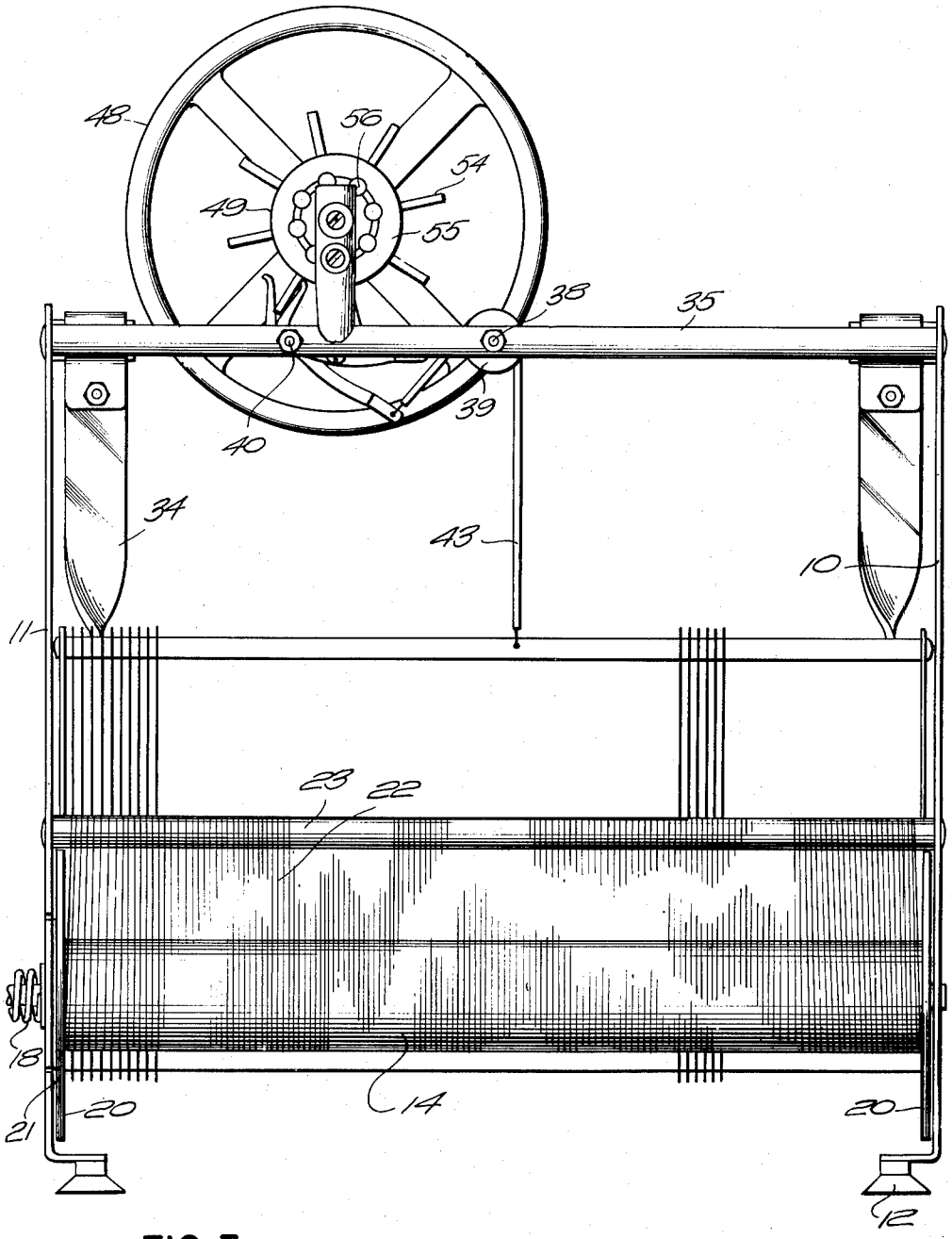


FIG. 3

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PORTABLE HAND LOOM

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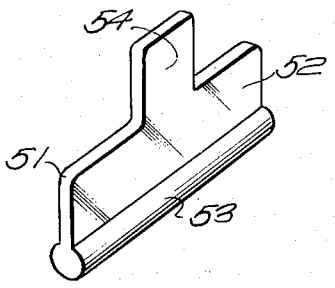


FIG. 5

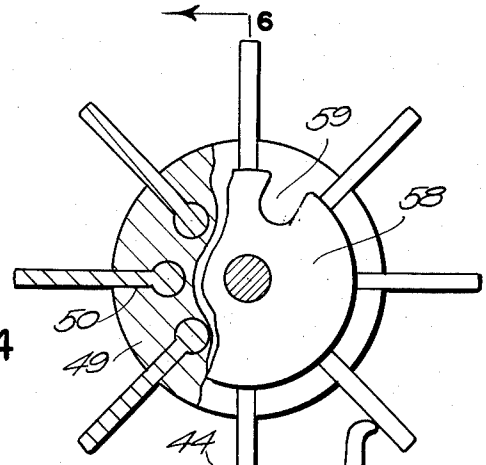
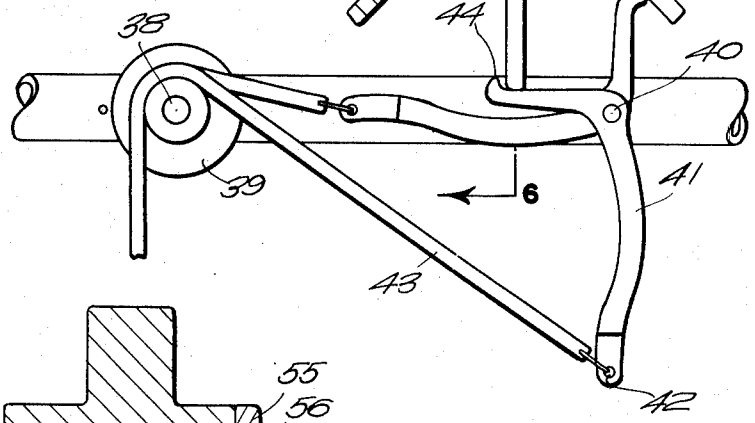


FIG. 4



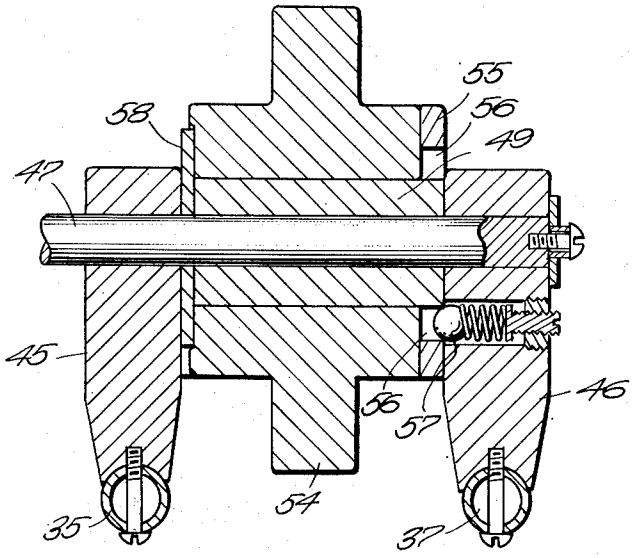


FIG. 6

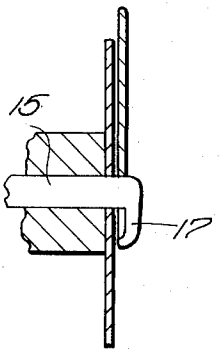


FIG. 7

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PORTABLE HAND LOOM

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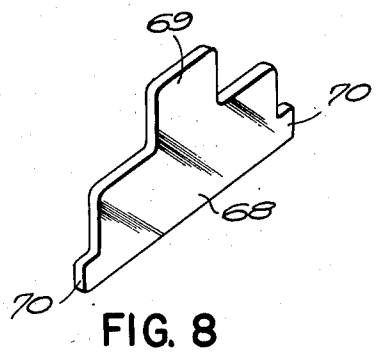


FIG. 8

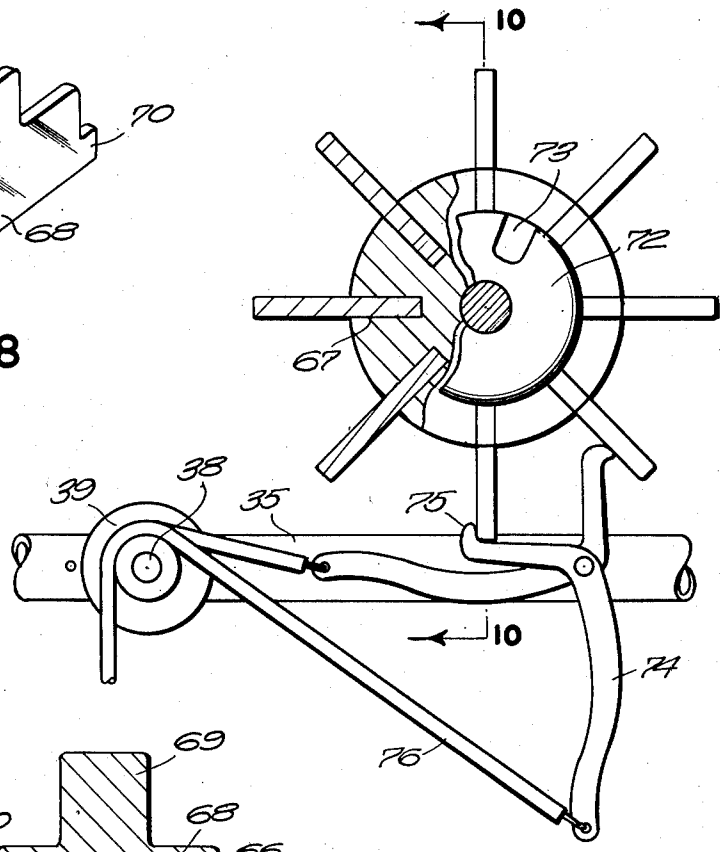


FIG. 9

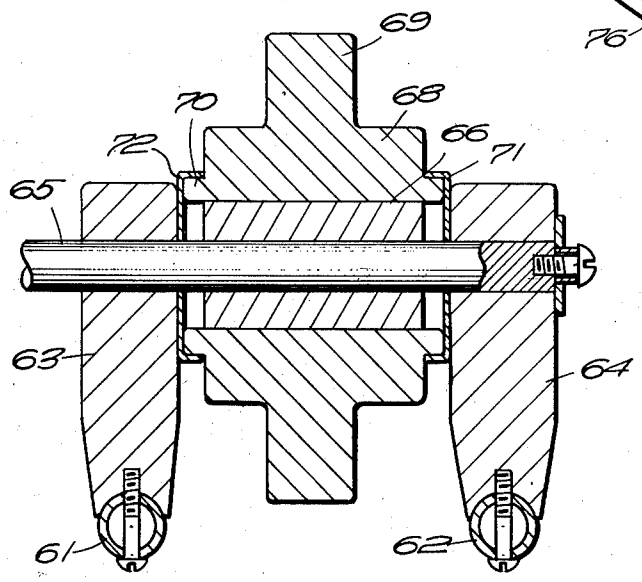


FIG. 10

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PORTABLE HAND LOOM

Elphege Nadeau, Blackstone, Mass.

Application May 28, 1954, Serial No. 433,012

6 Claims. (Cl. 139—33)

My present invention relates to the weaving art and more particularly to a small portable hand loom.

The principal object of the present invention is to provide a small hand loom that is light and readily portable and may be rested on any convenient table or other support and easily stored away.

Another object of the present invention is to provide a light, portable hand loom that can be used in homes, hospitals, elementary schools, and by the handicapped.

A further object of the present invention is to provide a small hand loom of simple construction but having all the necessary elements for weaving, including the weaving of complex designs in different types of fabric.

Another object of the present invention is to provide a small hand loom having a novel means for manipulating the harnesses with a single motion.

A further object of the present invention is to provide a small hand loom which can easily be operated by an amateur at relatively high speed due to the small number of steps necessary to weave.

Another object of the present invention is to provide a small, light and portable hand loom that can weave fine silk thread as well as coarse cottons and woolens.

A further object of the present invention is to provide a small hand loom which is simple in construction and comprises a minimum number of easily assembled parts.

With the above and other objects and advantageous features in view, my invention consists of a novel arrangement of parts, more fully disclosed in the detailed description following, in conjunction with the accompanying drawings, and more particularly defined in the appended claims.

In the drawings:

Fig. 1 is a front view of a hand loom embodying my invention.

Fig. 2 is a side elevation thereof.

Fig. 3 is a rear view thereof.

Fig. 4 is an enlarged view, partly in section of the harness selector mechanism.

Fig. 5 is a perspective view of one of the actuating tabs.

Fig. 6 is a section taken on line 6—6 on Fig. 4.

Fig. 7 is a detailed section of one end of the warp beam suspension.

Fig. 8 is a perspective view of another form of actuating tab.

Fig. 9 is a view similar to Fig. 4 showing another form of harness selector mechanism.

Fig. 10 is a section taken on line 10—10 on Fig. 9.

The conventional hand loom is a large, clumsy two harness affair having a limited capacity. While hand looms have been constructed capable of weaving intricate patterns, these are usually comparatively large and must be operated by an adult. The hand loom of the present

invention has reduced the number of necessary parts and operations to an absolute minimum. The result is a small hand loom approximately 16" wide and weighing approximately 12 pounds. The resultant loom is easily portable and can be operated by a child as an educational toy or by a handicapped person. In spite of its small size and weight it will weave any type of yarn, fine silk thread as well as coarse cottons or woolens, in either plain or fancy weaves, and in a variety of color combinations. The loom may be used for physical therapy, educational purposes, and its speedy operation permits the weaving of samples in mills having large automatic looms.

Referring more in detail to the drawings illustrating my invention the hand loom is supported by side plates 10 and 11 preferably made of light weight, stamped sheet aluminum in a general L-shape having a horizontal portion and an integral forwardly curved vertical portion as shown in Fig. 2. The supporting plates 10 and 11 are each provided at each end with suction cup supports 12 for holding the loom on a flat surface without slipping. To save weight and simplify assembly operations the plates may be cut out as at 13.

As in a conventional loom, the yarn to be woven is wound on a warp beam 14 mounted in the lower rear portion of the loom between the plates 10 and 11 on a shaft 15. The plates 10 and 11 are each provided with spaced parallel horizontal slots 16 which form a resilient portion between the slots as shown in Fig. 2. The warp beam shaft 15 is mounted in these resilient portions. One end 17 is hooked over as shown in Fig. 7 to prevent rotation of the shaft. The other end of the shaft 15 extends through the side plate 11 and is provided with a coil spring 18 and a wing nut 19 so that turning movement of the nut 19 will cause the spring 18 to push against the resilient portion of the plate 11. The warp beam 14 is provided with end plates or disks 20 at each end and the side plates 10 and 11 are provided with friction disks 21 bearing against the end disks 20. This provides a friction let-off device for the warp beam in which the tension can be controlled by the wing nut 19.

The warp threads 22 pass from the warp beam 14 over a bar 23 mounted between the side plates 10 and 11 directly above the warp beam as shown in Figs. 2 and 3. The threads pass through the harnesses 24, through the reed 25 and the finished cloth passes over a bar 26 mounted in the upper front portion of the machine and is wound on the cloth roll 27 mounted below the bar 26. The cloth roll 27 is provided with a suitable take-up mechanism which comprises an enlarged ratchet gear 28 mounted at one end of the cloth roll shaft beyond the side plate 11. A pawl 29 is pivotally mounted on the side plate and adapted to engage the teeth on the ratchet 28. A handle 30 is also mounted on the shaft 27 behind the ratchet gear 28 and is provided with a pawl for manually moving the ratchet gear and rotating the cloth roll as the cloth is wound thereon. Tension on the finished cloth may be provided by the conventional clips 31 riding in slots 32 on each side.

The reed 25 is mounted in a frame 33 suspended from side straps 34 which are pivoted on a bar 35 mounted in the upper forward portion of the side plates 10 and 11. The reed frame is operated by means of a bar 36 which can be grasped manually as shown in Fig. 1.

The loom of the present invention can be equipped with a plurality of harnesses 24 and for purposes of illustration four (4) are shown. The selector mechanism for controlling the raising of the harnesses is

mounted on the shaft **35** and a spaced parallel shaft **37**. The selector mechanism is manually movable intermittently to raise the desired harnesses to form selected sheds and thus vary the pattern. It comprises a pulley shaft **38** mounted substantially centrally between the bars **35** and **37**. A pulley **39** is independently rotatably mounted on the shaft **38** immediately above each harness **24**.

A harness lever shaft **40** is also mounted between the bars **35** and **37** in spaced parallel relation to the pulley shaft **38**. A harness lever **41** in a general L-shape is pivotally mounted on the shaft **40** one for each harness. The long arm of each lever **41** is provided at the outer end with an opening **42** to which a flexible leather strap **43** is attached. The strap **43** extends over one of the pulleys **39** and then vertically downwardly to substantially the center portion of its respective harness as shown in Figs. 1 and 3. As can readily be seen in Fig. 4, when the long arm of the harness lever is in horizontal position the harness is in lowered position. When the harness lever is pivoted counterclockwise so that the long arm is in vertical position the harness will be pulled upwardly, by the strap **43**. The shorter arm of the lever **41** is provided with an enlarged tip end **44** which acts as a stop element.

The selector mechanism is mounted on a pair of vertical posts **45** and **46** extending upwardly from the bars **35** and **37**. A shaft **47** is rotatably mounted adjacent the upper ends of the post and extending outwardly towards the front of the loom. The forward end of the shaft **47** is provided with an operating wheel **48** as shown in Figs. 1, 2, and 3. Mounted on the shaft **47** between the posts **45** and **46** is a cylinder **49** which is keyed or fixed to the shaft to rotate therewith. The cylinder **49** is provided with a plurality of slots or keyways **50** extending radially outwardly from adjacent the center. As illustrated in Fig. 4, eight (8) keyways are shown. Each inner end of the keyways **50** is provided with a rounded enlarged portion.

A selector tab **51** is shown in Fig. 5. It comprises a flat body portion **52** having an integral enlarged bottom edge **53** adapted to fit into the enlarged portion of the keyways **50**. The selector portion of the tab **51** comprises an upwardly extending portion **54** which may be varied from tab to tab depending on the number of harnesses to be raised at a particular time. Since the portions **54** are designed to engage the harness levers **41**, the number and position of the tab portions **54** will be varied accordingly. For example, in Fig. 2, a tab is provided with two (2) portions **54** one at each end adapted to engage the first and last harness levers. The next tab is provided with only one (1) member **54** moved inwardly to engage the second harness lever. The tabs shown in Fig. 6 are sufficiently wide to engage the second and third harness levers simultaneously.

After the pattern has been determined, the tabs **51** are slipped into their respective keyways **50** in proper order as shown in Fig. 4. The inner end of the cylinder **49** is provided with a plate **55** having a plurality of openings **56** as shown in Figs. 3 and 6 each corresponding to a keyway. An adjustable spring pressed ball **57** extends through post **46** to engage the openings **56** to yieldingly hold the selector mechanism in any given position. The front end of the cylinder **49** is covered by a plate or washer **58** shown in Fig. 4 which is provided with a U-shaped slot **59** for locking the tabs in the keyways. Any or all of the tabs can be removed or replaced by turning the plate **58** until the opening **59** is in register with the keyway thus enabling the tab to be slipped out.

Referring to Fig. 4, the cylinder **49** and tabs **51** are so mounted that the lowermost tabs will engage the short arms of the levers **41** and push them into horizontal position. The operation is simple. The wheel **48** is manually rotated lockwise until one (1) of the tabs **51** engages the short arms of the lever or levers **41** up to the point **44** at the end of the lever as shown in Fig. 4. At this point the ball **57** will have snapped into its corresponding opening **56** to hold the parts in position. The movement of the levers **41** will serve to raise one or more of the frames **24** to form a shed through which the shuttle **60** can be passed manually.

The beating operation is simple. The bar **36** is grasped with one hand and pulled forwardly causing the reed frame to swing forwardly and beat the yarn tight. The wheel **48** is then again turned until the next succeeding tab **51** is in vertical downward position and the shuttle is passed back through the new shed. As the weaving continues the finished cloth can be wound on the cloth roll **27** by using the lever **30** and the take-up ratchet wheel **28**.

The above construction thus permits a large variety of patterns to be woven by the use of the simple selector mechanism. A single movement of the wheel changes the shed to the selected harnesses, and a pass of the shuttle and the beating of the yarn are all that is necessary for the weaving operation. Once the selector mechanism has been set and the warp put in place, a child could easily operate the loom.

Referring to Figs. 8, 9, and 10, I have there illustrated a simpler modification of the selector mechanism. The parallel shafts **61** and **62** correspond to the shafts **35** and **37**. The posts **63** and **64** correspond to the posts **45** and **46**. The shaft **65**, corresponding to the shaft **47**, is mounted in the posts and is also provided with the wheel for manual operation (not shown). In this form the cylinder **66** is provided with flat radial slots **67** for holding the tabs **68**. The tabs **68** are entirely flat and are provided with the usual tab portions **69** identical with the portions **54** in the tab **51**. However, a small integral lug **70** extends from each end of the bottom portion of the tabs **68** so that when the tabs are positioned in the slots **67** the lugs **70** will extend laterally from each end of the cylinder **66** as shown in Fig. 10. The tabs are locked in the cylinder by means of cup shaped washers **71** and **72**. The washer **71** is at the rear and engages the lugs **70** as shown in Fig. 10. The front washer **72** is similar to the washer **71** but is provided with a U-shaped slot **73** for inserting and removing the tabs.

Now referring to Fig. 9 the harness levers **74** are provided with enlarged ends **75** which act as a stop for the tab. As the wheel is manually rotated a point of resistance will be reached when the lowermost tab rides against the enlarged end **75** of the lever **74**. This can be "felt" and the shuttle can then be passed through the shed. The weight of the frame on the straps **76** and the lever **74** will cause a locking engagement with the selector mechanism to hold it in position. The beating of the yarn is done as in the first form. When this operation has been completed the wheel is forced around so that the tab will ride over the enlarged end **75** and the next succeeding tab turns into position.

In this second form the selector mechanism is much simpler. The spring ball has been eliminated and the use of flat tabs permits their manufacture by an economical stamping operation. The method of operation, however, is the same in both forms of selector mechanisms.

I have thus provided a simple, compact and extremely small hand loom containing all the elements necessary for the weaving of intricate patterns. The construction is simple and easy to manufacture and assemble. Furthermore, the loom is easy to operate speedily and efficiently; yet it is capable of producing the types of fabrics normally produced on large automatic looms. In addition, the loom will operate efficiently with any type of yarn, whether fine silk or coarse cotton or woolens.

Other advantages of the present invention will be readily apparent to a person skilled in the art.

I claim:

1. In a portable hand loom having spaced vertical supports, a warp beam and a take-up roll mounted in the lower portion of said supports, a reed frame pivotally suspended between said warp beam and take-up roll, and a plurality of harnesses positioned between said warp beam and take-up roll, means for selectively raising and lowering said harnesses comprising a plurality of levers pivotally mounted in the upper ends of said supports, each of said levers having a strap connected to one of said harnesses, a manually operable selector mechanism mounted in the upper ends of said supports, means extending from said selector mechanism for selectively raising and lowering said harnesses, and integral portions extending from said levers in the path of movement of said selector means, said selector mechanism comprising a manually rotatable shaft, a cylinder mounted on said shaft and keyed thereto, said cylinder having a plurality of radial slots extending inwardly from the surface thereof, a tab member in each slot having radially extending tab portions adapted to engage said levers, and means for removably locking said tab members in said slots, said locking means including an enlarged portion at the bottom edge of each tab member resting in an enlarged portion at the bottom of each slot, and a lock washer at each end of said cylinder.

2. In a portable hand loom having spaced vertical supports, a warp beam and a take-up roll mounted in the lower portion of said supports, a reed frame pivotally suspended between said warp beam and take-up roll, and a plurality of harnesses positioned between said warp beam and take-up roll, means for selectively raising and lowering said harnesses comprising a plurality of levers pivotally mounted in the upper ends of said supports, each of said levers having a strap connected to one of said harnesses, a manually operable selector mechanism mounted in the upper ends of said supports, means extending from said selector mechanism for selectively raising and lowering said harnesses, and integral portions extending from said levers in the path of movement of said selector means, said selector mechanism comprising a manually rotatable shaft, a cylinder mounted on said shaft and keyed thereto, said cylinder having a plurality of radial slots extending inwardly from the surface thereof, a tab member in each slot having radially extending tab portions adapted to engage said levers, and means for removably locking said tab members in said slots, said locking means including an integral lug extending from each lower end of each tab member, and a lock washer at each end of said cylinder having a rim portion engaging said lugs.

3. In a portable hand loom having spaced vertical supports, a warp beam and a take-up roll mounted in the lower portion of said supports, a reed frame pivotally suspended between said warp beam and take-up roll, and a plurality of harnesses positioned between said warp beam and take-up roll, means for selectively raising and lowering said harnesses comprising a plurality of levers pivotally mounted in the upper ends of said supports, each of said levers having a strap connected to one of said harnesses, a manually operable selector mechanism mounted in the upper ends of said supports, means extending from said selector mechanism for selectively raising and lowering said harnesses, and integral portions extending from said levers in the path of movement of said selector means, said selector mechanism comprising a manually rotatable shaft, a cylinder mounted on said shaft and keyed thereto, said cylinder having a plurality of radial slots extending inwardly from the surface thereof, a tab member in each slot having radially extending tab portions adapted to engage said levers, means for removably locking said tab members in said slots, said locking means including an enlarged portion at the bottom edge of each tab member resting in an enlarged portion at the bottom of each slot, and a lock washer at each end of said cylinder, and means for releasably retaining said cylinder in position when one of said tab portions engages said levers.

4. In a portable hand loom having spaced vertical supports, a warp beam and a take-up roll mounted in the lower portion of said supports, a reed frame pivotally suspended between said warp beam and take-up roll, and a plurality of harnesses positioned between said warp beam and take-up roll, means for selectively raising and lowering said harnesses comprising a plurality of levers pivotally mounted in the upper ends of said supports, each of said levers having a strap connected to one of said harnesses, a manually operable selector mechanism mounted in the upper ends of said supports, means extending from said selector mechanism for selectively raising and lowering said harnesses, and integral portions extending from said levers in the path of movement of said selector means, said selector mechanism comprising a manually rotatable shaft, a cylinder mounted on said shaft and keyed thereto, said cylinder having a plurality of radial slots extending inwardly from the surface thereof, a tab member in each slot having radially extending tab portions adapted to engage said levers, means for removably locking said tab members in said slots, said locking means including an integral lug extending from each lower end of each tab member, and a lock washer at each end of said cylinder having a rim portion engaging said lugs, and means for releasably retaining said cylinder in position when one of said tab portions engages said levers.

5. In a portable hand loom having spaced vertical supports, a warp beam and a take-up roll mounted in the lower portion of said supports, a reed frame pivotally suspended between said warp beam and take-up roll, and a plurality of harnesses positioned between said warp beam and take-up roll, means for selectively raising and lowering said harnesses comprising a plurality of levers pivotally mounted in the upper ends of said supports, each of said levers having a strap connected to one of said harnesses, a manually operable selector mechanism mounted in the upper ends of said supports, means extending from said selector mechanism for selectively raising and lowering said harnesses, and integral portions extending from said levers in the path of movement of said selector means, said selector mechanism comprising a manually rotatable shaft, a cylinder mounted on said shaft and keyed thereto, said cylinder having a plurality of radial slots extending inwardly from the surface thereof, a tab member in each slot having radially extending tab portions adapted to engage said levers, means for removably locking said tab members in said slots, said locking means including an enlarged portion at the bottom edge of each tab member resting in an enlarged portion at the bottom of each slot, and a lock washer at each end of said cylinder, and means for releasably retaining said cylinder in position when one of said tab portions engages said levers, said retaining means including an enlarged end on said levers engageable by said tab members.

6. In a portable hand loom having spaced vertical supports, a warp beam and a take-up roll mounted in the lower portion of said supports, a reed frame pivotally suspended between said warp beam and take-up roll, and a plurality of harnesses positioned between said warp beam and take-up roll, means for selectively raising and lowering said harnesses comprising a plurality of levers pivotally mounted in the upper ends of said supports, each of said levers having a strap connected to one of said harnesses, a manually operable selector mechanism mounted in the upper ends of said supports, means extending from said selector mechanism for selectively raising and lowering said harnesses, and integral portions extending from said levers in the path of movement of said selector means, said selector mechanism comprising a manually rotatable shaft, a cylinder mounted on said

shaft and keyed thereto, said cylinder having a plurality of radial slots extending inwardly from the surface thereof, a tab member in each slot having radially extending tab portions adapted to engage said levers, means for removably locking said tab members in said slots, and means for releasably retaining said cylinder in position when one of said tab portions engages said levers, said retaining means including an enlarged end on said levers engageable by said tab members, and a spring-pressed ball in said cylinder mounting engaging successive openings in said cylinder.

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