Jan. 6, 1953 V. R. SCHMIDT 2,624,476

LIFTING DOLLY

Filed June 9, 1950 2 SHEETS—SHEET 1

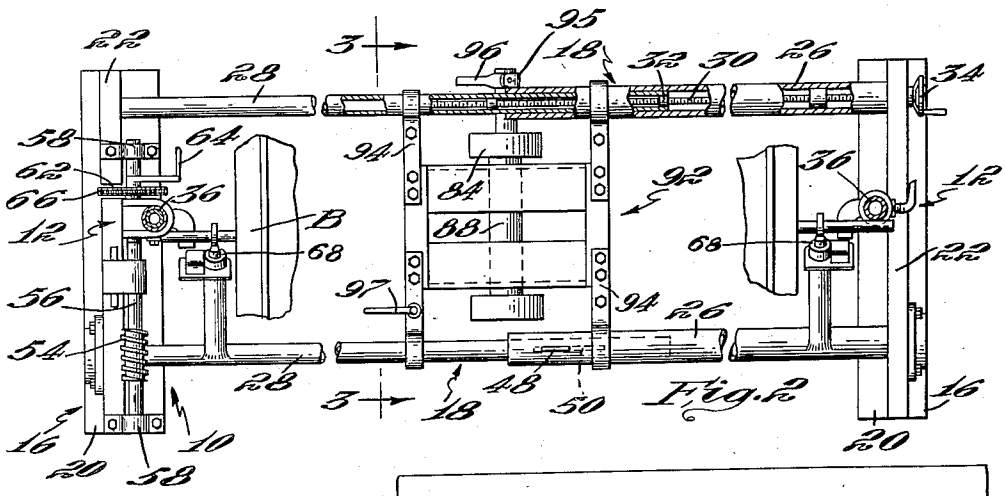

Fig. 2

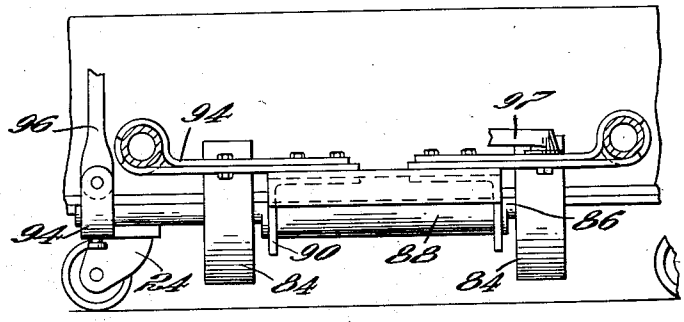

Fig. 3

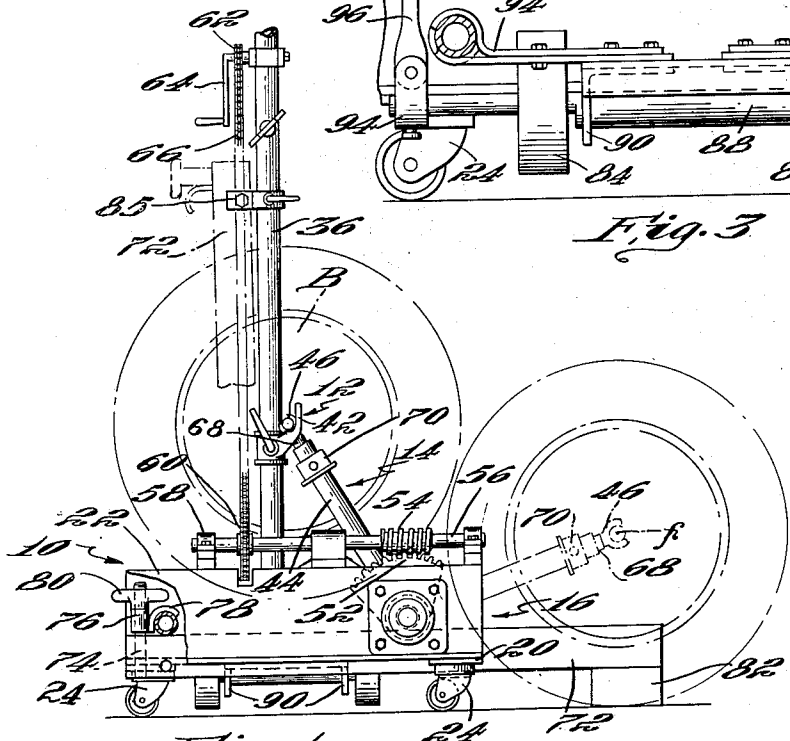

Fig. 1

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LIFTING DOLLY

Filed June 9, 1950 2 SHEETS—SHEET 2

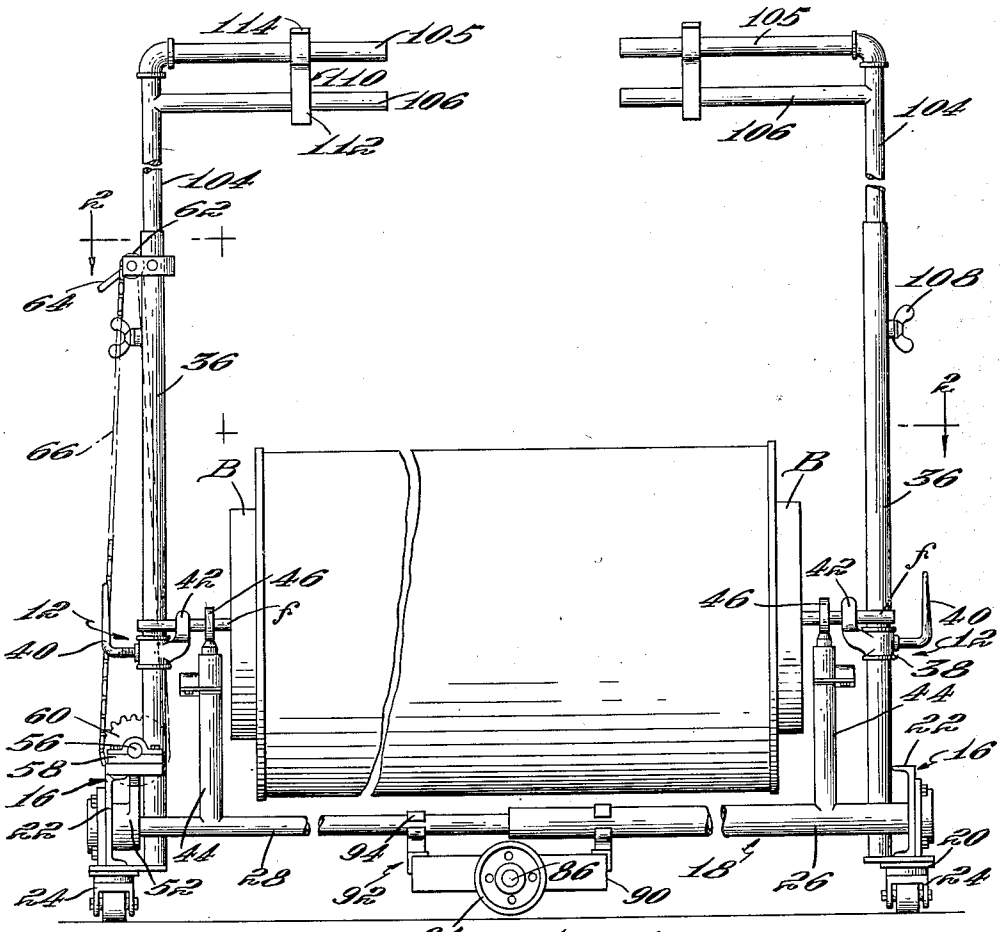

Fig. 4

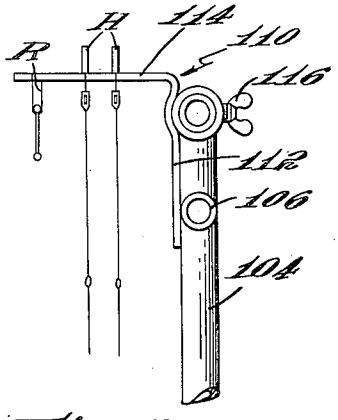

Fig. 5

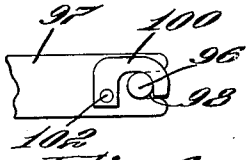

Fig. 6

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UNITED STATES PATENT OFFICE

2,624,476

LIFTING DOLLY

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17 Claims. (Cl. 214—77)

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This invention relates to a lifting-dolly for lifting and trundling the fully wound warp-beam into position to be mounted on a loom.

The principal objects of the invention are to provide a device which is very narrow and easily movable in the relatively narrow aisles between successive rows of looms and along end aisles, which can be turned in a very small radius, in which means is provided for raising the beams directly from the floor without first placing them on a stand or partially lifting them with a hoist, which will not become unbalanced by the weight of the fully wound beam, and which can be pushed into position beneath the rear side of the loom for unloading the beam onto the loom. Other objects are to provide a device which can be adjusted to accommodate warp-beams of different lengths, which is fitted to draw the threads up into the heddles and reeds preparatory to mounting the beam on the loom and which is durable construction.

As herein illustrated the device has a rigid base supported from the floor by casters so as to be readily moved therealong, the base being about as narrow as the warp-beam which is to be supported thereby and there are mounted on the base brackets for receiving the ends of the warp-beam shaft and elevating means operable to engage the ends of the warp-beam shaft when the latter is resting on the floor, lift the beam from the floor and deposit it with the shaft ends on the brackets. The elevating means consists of a pair of spaced arms pivoted at their lower ends to the base for movement about their pivoted ends in an arc to lift the warp-beam resting at one side of the base upwardly onto the brackets. To prevent upsetting the device due to the off-center weight of the loaded beam as it is lifted from the floor an auxiliary foot in the form of a bar is attached to the under side of the base so as to project from beneath it laterally at the side of the lifting arms and to have its ends substantially coextensive with the ends of the lifting arms when the latter are near their lowermost position. The journal brackets for supporting the beam on the base are mounted for vertical movement on spaced stanchions fixed at their lower ends to the base and there are clamps for fixing the heightwise position of the brackets along the stanchions. The elevating or lifting arms are adjustable in length so that the beam when elevated to the height of the brackets may be shortened to let the beam down into the journal brackets or may be lengthened to lift the beam from the journal brackets and raise it

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up to the bearings of the loom when the device is pushed beneath it. The base has in addition to the casters auxiliary wheels normally elevated out of contact with the floor which when occasion demands may be depressed into contact with the floor to lift the casters just clear of the floor, the wheels being mounted to turn on an axis at right angles to the axis of the beam and being closely spaced so as the base can be turned in a very short radius. The base itself has end members joined by side rails which may be manipulated to change the length of the base between the ends and hence to change the position of the journal brackets for different lengths of beam.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

Fig. 1 is an end elevation of the device showing the elevating arm in a partly depressed position and in fully elevated position;

Fig. 2 is a top plan view of the device showing the warp-beam elevated into position on the brackets but with most of the warp-beam omitted so as to show the structure below it;

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2;

Fig. 4 is a front elevation of the machine showing a warp-beam supported on the brackets;

Fig. 5 is a detail of a hanger for supporting heddle and reeds on the device to assist in drawing the threads; and

Fig. 6 is a detail of a latch.

Referring to the figures the device comprises essentially a base 10, brackets 12 for supporting a warp-beam B above the base and elevating means 14 for raising the beam from a position resting on the floor at one side of the device onto the brackets 12 so that the beam may be trundled into a position beneath the loom for use.

The base is comprised of a pair of end members 16 between which are stretched side rails 18 with their ends fixed to the end members. Each end member includes a flat plate 20 to the upper side of which is fastened a channel beam 22 to which the ends of the side rails 18 are fixed. The under side of the plates 20 have at opposite ends casters 24 so that the device is supported by four casters one at each corner. The side rails 18 each consist of telescoping tubular elements 26 and 28 which may be moved to distend or contract the frame as a whole and hence to change the spacing of the end members for reasons that will appear hereinafter. To effect distention or

contraction there is mounted within the rear tubular element **26** Fig. 2 a screw **30** the inner part of which engages with a threaded nut **32** fixed to the inside of the tubular element **28**. The screw has an outboard portion which extends through the web of the channel beam **22** and has fixed thereto a hand wheel **34** which may be turned to draw the tubular element **28** into the tubular element **26** or to eject it therefrom.

There is fastened to the plate **20** of each end member substantially midway between its ends in a vertical position a stanchion **36** in the form of a hollow post each of which has on it one of the brackets **12**. The brackets **12** are vertically slidable on the stanchions and each has a threaded clamp screw **40** by which it may be fixed at any desired heightwise position on the stanchion. Each bracket also has on it a crotch bearing **42** for receiving an end of the warp-beam shaft *f*.

The elevating means **14** for lifting the warp-beam B into a position to be deposited in the bearings **42** takes the form of a pair of spaced arms **44** fixed at their lower ends to the forward side rail **18**, one to the tubular element **28** and the other to the tubular element **26**. The free end of each of the arms **44** has a crotch bearing **46** for engagement with the shaft ends of the warp-beam and is movable from a prone position close to the floor to an elevated position close to the brackets as follows. The telescoping side elements **26** and **28** at the forward side of the machine while fixed to the end members are free to rotate about a longitudinal axis and are caused to rotate in unison by a key **48** welded or otherwise fastened to the element **28** and projecting through a slot **50** in the wall of the tubular element **26**. The slot **50** is long enough to permit lengthwise adjustment of the base as heretofore described. To effect rotation of the tubular elements **26** and **28** there is fastened near the end of the element **28** inside of the channel beam **22** a gear sector **52** with which meshes a worm **54** mounted on a horizontal shaft **56** journaled in bearings **58** fastened to the upper edge of the channel member **22**. There is also mounted on the shaft **56** a sprocket **60** and directly above this on the stanchion **36** a second sprocket **62** which has fastened to it a crank arm **64**. A chain **66** embraces the sprocket **62** and by rotation of the crank **64** rotation may be imparted to the worm **54**, the sector **52** and hence the elements **28** and **26**. By rotation of the crank **64** the lifting arms **44** may be moved from prone to erect position and vice versa to lift the beam from the floor to the journal brackets **12** or to hold the beam at some intermediate position.

As recited heretofore the brackets **12** may be adjusted to different heightwise positions on the stanchions to accommodate beams of different diameter. For this reason the arms **14** are made adjustable in length. To this end the crotch bearings **46** are fixed to the ends of screws **68** threaded into the free ends of the arms **14** which are hollow and are movable therein by means of suitable driving means **70** mounted on the arms for example according to the conventional construction of a lifting jack. Normally the arms are adjusted so that when they are raised to an elevated position the ends of the warp-beam shaft will just clear the bearings **42** whereupon the arms are shortened by adjustment of the nuts **70** to lower the ends of the shaft ends into the bearings **42**. When the device is moved into position behind the loom for mounting the warp-beam in place if the warp-beam is not quite high enough the arms **14** are lengthened by actuating the driving means **70** to raise the beam out of the bearings **42** and then further lengthened to set the shaft ends into the bearings on the loom itself.

As the warp-beam is lifted from the floor its weight and the length of the lifting arms create a powerful overturning moment which as heretofore indicated was made especially narrow so as to be readily maneuverable in the limited space available between machines. To prevent overturning there is provided an auxiliary stabilizing element or support in the form of a bar **72** arranged to be disposed beneath the base that is below the side rails **18** with one end connected to the side rail at the rear of the machine and the other member extending beyond the side rail at the front of the machine to a point which is substantially coextensive with the ends of the lifting arms when they are near their depressed or prone positions. The extremity of the bar has contact with the floor at such a point that a line drawn through it and the point of contact of the caster at the opposite end of the base at the same side lies outside of the center of gravity of the fully loaded arms when in their prone positions thus stabilizing the device against the overturning moment. The bar is connected to the rear side rail by a bolt **74** the shank of which extends through the bar from bottom to top and has on its upper end a sleeve **76** with which there is integrally formed a hanger **78** for engagement with the top of the tubular element **28**. A thumb-nut **80** placed on the bolt above the sleeve **76** provides for heightwise adjustment for this end of the bar with reference to the base. The forward extremity of the bar has a foot **82** which is of substantially the same height as the underside of the base from the floor and by proper adjustment of the anchored end of the bar the device may be stabilized on uneven surfaces.

To prevent the use of the device when lifting a beam from the floor to its elevated position without first stabilizing it with the aforesaid bar there is fixed to one of the stanchions **36** namely the one on which there is mounted the sprockets **62** a supporting bracket **85** on which the bar is hung when the device is being trundled along between machines or when there is no beam on the machine. The bracket **85** is adjusted heightwise to such a position that when the bar is hung on it and supported thereby the chain **66** cannot be turned and hence the arms cannot be raised or lowered for loading a beam resting on the floor onto the device.

As heretofore indicated the base is normally supported by casters **24** one at each corner and while these afford suitable rolling support for the device on the straight away and where there is adequate room to turn and otherwise manipulate the device, when sharp turns are to be made in a limited space or where relatively small adjustments of the device beneath the loom are necessary to align the shaft ends with the loom bearings a shorter wheel base to turn on is desirable. Accordingly there is provided a pair of auxiliary wheels **84**. The wheels **84** are journaled on the ends on stub shafts **86**, Fig. 3 formed eccentrically on a shaft **88** arranged horizontally, transversely of the base and are journaled in the walls **90** of a carriage **92** fixed to the tubular side rails **28** and **26**. As illustrated the carriage **92** is fastened to the tubular elements by means of split clamps **94** three of which embrace the tubu-

lar elements slidably so as to permit free movement of the tubular elements during adjustment of the base lengthwise. The fourth split clamping element is arranged to be fixed to one of the tubular elements 26 by a clamp handle 97 which when screwed down against the clamp draws it tight about the tubular elements 26 and hence prevents displacement of the carriage. Normally the wheels 84 are held elevated out of contact with the floor but may by rotation of the shaft 88 be lowered and forced into engagement with the floor to lift the casters 24 just free of the floor. To this end one of the stub shafts 86 is extended laterally beyond the rail 18 and has fixed to its end by means of a thumb screw a collar 94 to which is pivoted the lower end of a handle 95. The handle 95 extends vertically upward along the back side of the base and may be manipulated to turn the shaft 88 and hence to lower the wheels 84 into operative position. In order to fix the wheels 84 in their operative positions after being lowered a latch plate 97 is fastened to the base and has an open slot 98 formed therein into which the rod 96 may be entered when the wheels 84 have been lowered into contact with the floor. A latch 100 pivoted to the plate 97 at 102 may be swung to close the open side of the slot 98.

It is frequently desirable to draw the warp-beam thread into the heddles and reeds prior to mounting the beam on the loom. Accordingly this device is provided with means for supporting the heddles and reeds so that the thread ends may be drawn through them in proper order for hanging in the harness. To accomplish this the upper ends of the stanchions 36 which are hollow have telescopically mounted therein tubular members 104 which extend upwardly from the upper ends of the stanchions and have fixed near their upper ends inwardly extending horizontal spaced parallel arms 105 and 106. The lower ends of the tubular members 104 may be fixed at any desired heightwise position by means of thumb screws 108. The arms 105 and 106 are parallel to the axis of the warp-beam and there are fastened to the arms a plurality of hangers 110 having vertical legs 112, clamped to the upper arm 105 and resting against the lower arm 106 and horizontal portions 114 on which may be hung the heddles H and reeds R. Clamp screws 116 are provided for clamping the hangers at any given spacing along the arms. This eliminates the need for a drawing-in frame.

In using the device the frame that is the base is first adjusted to the proper length for the warp-beam to be lifted by rotation of the hand wheel 34, the auxiliary footing 72 is removed from its supporting bracket and placed beneath the machine with its free end extending forwardly and in contact with the floor and then the elevating arms are lowered to the level of the warp-beam shaft resting on the floor. The warp-beam is then rolled toward the device so as to enter the ends of the shaft into the journals 48 at the ends of the lifting arms. The handle 64 is now turned to elevate the arms and hence lift the warp-beam to a position near the brackets 12.

The lifting arms 14 should be adjusted so that when elevated the ends of the shaft *f* of the warp-beam will be moved in above the journals 42 carried by the brackets 12 which are fixed to the stanchions. When the warp-beam has been moved into position the arms 14 are shortened by rotation of the driving means 70 to lower the shaft *f* into the bearings 42. The footing may now be removed, replaced on its support and the device trundled along to a position behind the loom on which it is to be mounted. At this position the footing is moved to an out of the way position, the arms 14 are lengthened to raise the beam from the bearings 42 and the handle 64 is rotated to move the beam forwardly into position for deposit into the bearings of the loom. Since the forward position of the beam will not be greatly out of line with the center of gravity of the device the footing need not be used at this time.

As heretofore indicated prior to movement of the beam into position for mounting on the loom the heddles and reeds of the loom may be removed from the harnesses hung on the hangers 114 and the threads entered through them so that when the beam is put in its journals the heddles and reeds may then be hung in the harness of the loom and the loom will be ready for operation.

In the event that the aisles are especially narrow and that it is difficult to make the turn into the aisles the auxiliary wheels 84 may be lowered to raise the base from the casters 24 so that the base may be pivoted substantially about its vertical axis on the wheels 84. This auxiliary support also makes it easy to turn the device to align the ends of the warp-beam shaft with the loom bearings because it is much easier to pivot the frame as a whole on the closely spaced wheels than it is to turn it on the casters 24.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A warp-beam dolly comprising a base, wheels supporting the base near its corners for movement along the floor, spaced arms, means pivotally supporting the arms at one end on the base for angular movement in a perpendicular plane through an obtuse angle to effect movement of the extremities of the arms in an arc from a pick-up position close to the floor outboard of the base to an elevated position above the base, means for effecting movement of the arms to lift a beam from the floor to an elevated position above the floor, said arms being extendable and retractable, means for effecting extension and retraction of the arms independently of the means for elevating the arms, a stabilizing member, means for fastening the stabilizing member to the base with an end of it extending outboard to at least the distance of the fully extended arms when the latter are in their horizontal positions, a pair of auxiliary wheels, means for supporting the auxiliary wheels intermediate the corner supporting wheel for movement from a retracted position above the plane of the corner supporting wheel to an operative position extended beyond the plane of the corner supporting wheel and eccentric means for effecting movement of the wheels from inoperative to operative position.

2. A warp-beam dolly comprising a base, casters supporting the base for movement along the floor, spaced brackets mounted on the base for receiving the ends of a warp-beam shaft, spaced arms on the base movable from a pick-up position close to the floor laterally of the base to an elevated deposit position close to the brackets, an auxiliary footing near one end of the base in the form of a rigid bar, means anchoring one

end of the bar to one side of the base, said beam extending from said point of anchorage beneath the frame and in contact therewith laterally beyond the base at the elevating side thereof the outer extremity of said beam having contact with the floor at such a point that a line drawn from said point to the point of contact of the caster at the opposite end of the base lies outside of the center of gravity of the fully loaded arms when the latter are fully depressed, a lift at the extremity of the bar for engagement with the floor said lift being approximately the height of the base from the floor and means for adjusting the heightwise position of the anchored end of the bar.

3. A warp-beam dolly comprising a base, spaced stanchions on the base, journal brackets mounted on the stanchions for vertical movement therealong, clamps for fixing the heightwise position of the brackets on the stanchions, elevating arms pivoted on the base for movement in an arc from a depressed position in which their outer ends are close to the floor to elevated positions in which their outer ends are close to the brackets, means for effecting movement of the arms on their pivots to lift a beam from the floor and deposit it on the brackets and means for changing the length of the arms in accordance with the elevation of the journal brackets so that in the elevated positions of the arms the ends of the warp-beam shaft will clear the tops of the brackets.

4. A warp-beam dolly comprising a base, spaced stanchions on the base, journal brackets mounted on the stanchions for vertical movement therealong, clamps for fixing the heightwise position of the brackets on the stanchions, a horizontal shaft journaled on said base for rotation about its horizontal axis, spaced arms fixed at one end to said shaft for rotation therewith about said fixed ends in an arc from a position in which their free ends are close to the floor to a position in which their free ends are close to the brackets, a gear sector fixed to one end of the shaft, a worm shaft on said base in mesh with the gear sector and means for rotating the worm shaft to elevate or depress the arms.

5. A warp-beam dolly comprising a base, spaced stanchions on the base, journal brackets mounted on the stanchions for vertical movement therealong, clamps for fixing the heightwise position of the brackets on the stanchions, a horizontal shaft journaled on said base for rotation about its horizontal axis, elevating arms fixed at one end to said shaft for rotation therewith from a position in which their free ends are close to the floor to a position in which their free ends are close to the brackets, a gear sector fixed to the shaft near one end, a worm shaft on said base in mesh with the gear sector, a sprocket on the worm shaft, a sprocket at the upper end of one of the stanchions, a chain embracing the sprockets and a crank on the upper sprocket for effecting movement of the chain and hence elevation or depression of the elevator arms.

6. A warp-beam dolly comprising a base, spaced stanchions on the base, journal brackets mounted on the stanchions for vertical movement therealong, clamps for fixing the heightwise position of the brackets on the stanchions, a horizontal shaft journaled on said base for rotation about its horizontal axis, elevating arms fixed at one end to said shaft for rotation with the shaft about its fixed end in an arc from a position in which the free ends are close to the floor to a position in which the free ends are close to the brackets, a gear sector fixed to the shaft near one end, a worm shaft on said base in mesh with the gear sector, a sprocket on the worm shaft, a sprocket at the upper end of the stanchion, a chain embracing the sprockets, a crank on the upper sprocket for driving the chain and means for supporting the stabilizer on the stanchion in a position to prevent rotation of the crank as long as it is supported thereby.

7. A warp-beam dolly comprising a base, spaced stanchions on the base, journal brackets mounted on the stanchions above the base, elevating arms movable on the base from a nearly prone position close to the floor to an elevated position close to the brackets, means for effecting depression and elevation of the arms to lift a warp-beam from the floor onto the journal brackets, arms at the upper ends of the stanchions parallel to the axis of the warp-beam as supported in the journal brackets and hanger bars fixed to the arms so as to extend horizontally over the warp-beam substantially at right angles to its axis for supporting heddles and reeds preparatory to threading up.

8. A warp-beam dolly comprising a base, spaced stanchions on the base, journal brackets mounted on the stanchions above the base, elevating arms movable on the base from a nearly prone position close to the floor to an elevated position close to the brackets, means for effecting depression and elevation of the arms to lift a warp-beam from the floor to a place above the journal brackets, and means for shortening the elevating arms to lower the beam from its elevated position above the journals into the journals, said last named means being independent of the means for effecting movement of the arms from depressed to elevated positions.

9. A warp-beam dolly comprising a base, casters supporting the base for movement along the floor, spaced stanchions on the base, journal brackets mounted on the stanchions above the base, elevator arms on the base movable from a prone position close to the floor to an elevated position, means for effecting movement of the elevator arms to lift a beam from the floor into the journal brackets, a carriage fastened to the under side of the base, a pair of wheels journaled on said carriage to turn about an axis at right angles to the axis of the warp-beam and eccentric means for moving the wheels on the carriage downwardly into contact with the floor to lift the casters just off the floor.

10. A warp-beam dolly comprising a base, casters supporting the base for movement along the floor, spaced stanchions on the base, journal brackets mounted on the stanchions above the base, elevator arms on the base movable from a prone position close to the floor to an elevated position, means for effecting movement of the elevator arms to lift a beam from the floor into the journal brackets, a carriage fastened to the under side of the base, a shaft journaled for rotation on the carriage at right angles to the axis of the warp-beam on the journals, eccentric stub shaft at the ends of said shaft on which are rotatably mounted wheels, said shaft being rotatable to move the wheels from inoperative positions into contact with the floor and means for effecting rotation of the shaft.

11. A warp-beam dolly comprising a base, casters supporting the base for movement along the floor, spaced stanchions on the base, journal brackets mounted on the stanchions above the

base, elevator arms on the base movable from a prone position close to the floor to an elevated position, means for effecting movement of the elevator arms to lift a beam from the floor into the journal brackets, a carriage fastened to the under side of the base, a shaft journaled for rotation on the carriage at right angles to the axis of the warp-beam on the journals, eccentric stub shafts at the ends of said shaft on which are rotatably mounted wheels, a lever for effecting rotation of the shaft to bring the wheels into engagement with the floor, and a latch for holding the lever fixed following movement of the wheel into operative position.

12. A warp-beam dolly comprising a base, casters supporting the base for movement along the floor, spaced stanchions on the base, having journal brackets mounted thereon, elevating means on the base for lifting a beam from the floor into the brackets and means for effecting movement of the elevating means, said base being adjustable to change the distance between the journal brackets for warp-beams of different length.

13. A warp-beam dolly comprising a base, casters supporting the base for movement along the floor, spaced stanchions on the base having journal brackets mounted thereon, elevators on the base movable from a normally prone position close to the floor to an erect position, means effecting movement of the elevator means to lift a beam from the floor into the brackets, said base being divided between its ends so as to be adjustable to change the distance between the stanchions, and means operable to effect a change in the relative position of the divided parts of the base.

14. A warp-beam dolly comprising a pair of rigid end members, a pair of rigid side rails situated between the end members with their ends fixed to the end members, each side rail being divided between its ends and said divided parts of said side rails being movable relatively to each other to change the distance between the end members, a stanchion mounted on each end member, a journal bracket mounted on each stanchion, a pair of elevating arms on the base one at each side of the division between the ends, means for effecting movement of the elevating arms to lift a beam from the floor onto the journal brackets and means for effecting relative movement of the side members to change the distance between the journal brackets and the lifting arms.

15. A warp-beam dolly comprising a pair of rigid end members, a pair of rigid side rails situated between the end members with their ends fixed to the end members, each side rail having telescoping parts movable relatively to change the distance between the end members, a stanchion mounted on each end member, a journal bracket mounted on each stanchion, a pair of elevating arms on the base one at each side of the division between the end members, means for effecting movement of the elevating arms to lift the beam from the floor onto the journal brackets and means for effecting relative movement of the side members to change the distance between the journal brackets and the lifting arms.

16. A warp-beam dolly comprising a pair of rigid channel beam members, a pair of rigid tubular rails situated between the end members with their ends fixed to the channel members to form a rigid frame, each tubular rail comprising telescoping parts slidable one within the other to change the distance between the channel members, a stanchion mounted on each end member, a journal bracket mounted on each stanchion, a pair of elevator arms on the base one at each side of the division between the end members, means for effecting movement of the elevator arms to lift a beam from the floor onto the journals and means for effecting relative movement of the telescoping parts of the rails to change the distance between the journal brackets and the lifting arms.

17. A warp-beam dolly comprising a pair of rigid end members, a pair of rigid tubular side rails situated between the end members with the ends fixed thereto to form a rigid frame, each tubular side rail comprising telescoping parts slidable one within the other to change the distance between the end members, a stanchion mounted on each end member, a journal bracket mounted on each stanchion, a pair of elevator arms on the base one at each side of the division between the end members, means for effecting movement of the elevator arms to lift the beam from the floor onto the journal brackets, a screw within one of the tubular rail parts and means for turning the screw to change the telescopic relation of the side rails.

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