April 5, 1955 H. H. STÄUBLI 2,705,505

WEAVING LOOMS, PARTICULARLY DOBBIES

Filed Oct. 15, 1953

3 Sheets-Sheet 1

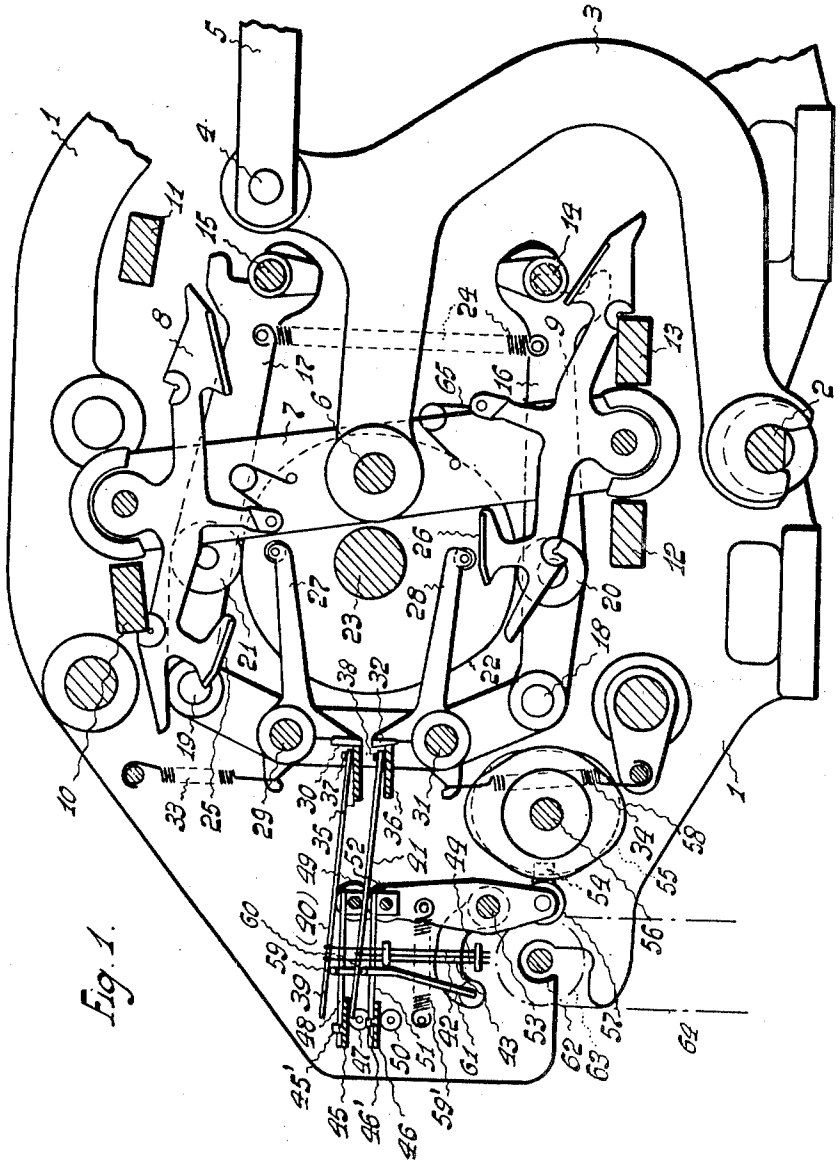


Fig. 1.

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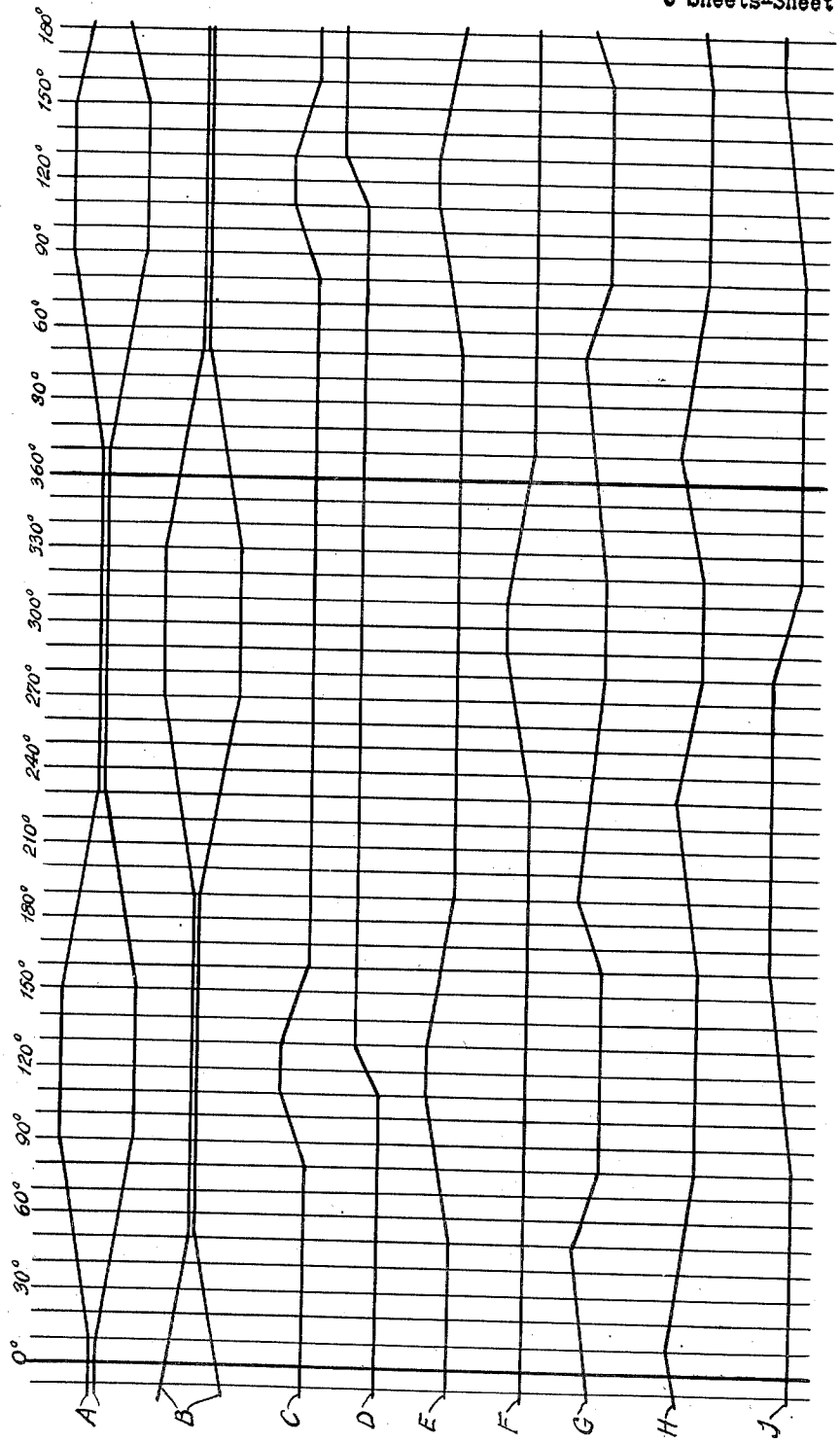


Fig. 2.

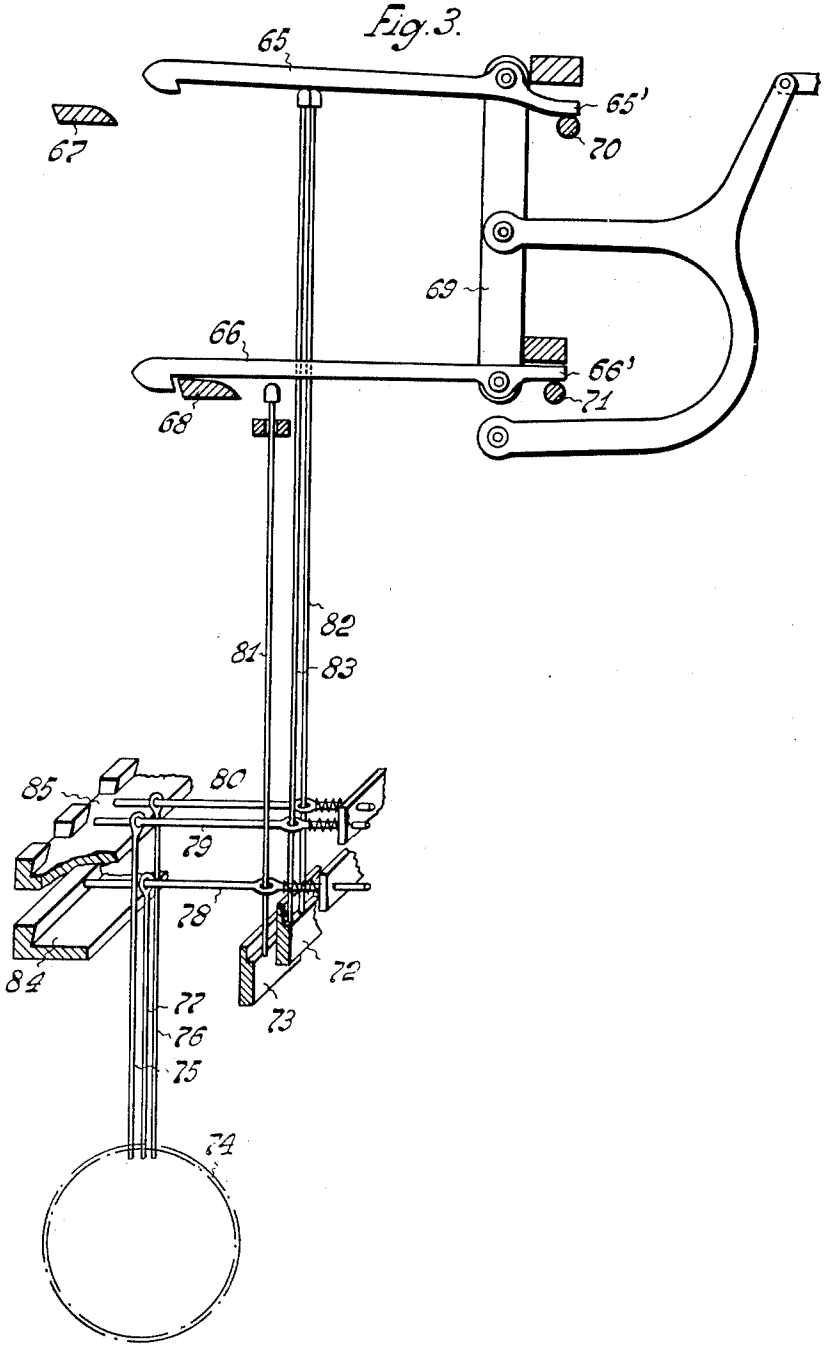
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Fig. 3.



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WEAVING LOOMS, PARTICULARLY DOBBIES

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1 Claim. (Cl. 139—68)

A tendency exists in weaving to increase the speed of the looms, this also being the case with dobbies. However, a limit is set to the speed of these latter owing to the fact that the draw hooks drop on to the draw knives in free manner. The object aimed at in the present invention is to provide means for attaching the draw hooks positively to the draw knives or for removing them in positive manner from the latter. This enables the free drop method to be dispensed with and so allows the speed of the machine to be increased. To achieve this purpose an auxiliary knife works in conjunction with those members controlling the hooks in correspondence with the pattern card so that the motion the draw hooks have to make for attachment to the draw knife or which they have to make in order to lift themselves away from the draw knife is imparted to them positively. The attachment of the draw hooks to the draw knives and the lifting away from them takes place at the instant the draw knives are in their original position and the hooks are released. At this instant, that is to say, in the middle of the stoppage of the knives in their original position all the hooks of the corresponding pair of knives are pressed on to one knife and then, in accordance with the pattern card those hooks which have to be attached to the other knife of the pair of knives are attached by means of elements associated with each hook while the other element which had pressed all the hooks on to the other knife moves away from the knife thus freeing the path for that group of hooks.

Two embodiments of the invention are illustrated in the accompanying drawing.

Fig. 1 is a side view of a double lift, positive dobby with one side frame of the machine removed.

Fig. 2 is a working diagram of the machine shown in Fig. 1.

Fig. 3 shows a diagrammatic representation of a double-lift dobby as a second embodiment.

Fig. 1 shows a vertical section through the machine. In this arrangement it will of course be undesrtood as a matter of course that the hooks and the parts working or associated with them are always arranged in series next to or behind one another as is usual in dobby machines.

The double-lift positive dobby machine illustrated in Fig. 1 is provided with a frame **1** at front and rear, only the rear one being shown in this case, the front one being omitted. The shaft **2** is mounted in these frames, and the rocking levers **3** are mounted on this shaft so that they are capable of rocking, these levers **3** being connected by means of pivots **4** and connecting rods **5** with the shaft-lifting levers, not shown in the drawings. The rocking levers **3** are connected by pins **6** to balance levers **7** which carry the double hooks **8** and **9** rockably mounted at both ends. The double hooks **8** work in conjunction with the upper pair of knives **10**, **11** and the double hooks **9** work in conjunction with the lower pair of knives **12**, **13**. The double hooks are pressed in each case, at the instant the associated pair of knives has reached its original position, by means of a shaft **14** or **15**, against the knives **13** or **11**. The shafts **14** and **15** extend over the whole width of the machine between the frames, so that all the hooks are pressed in each case against the associated knife. The shaft **14** is fixed in a pair of levers **16** and the shaft **15** in a pair of levers **17** between the frames of the machine. The levers **16** are mounted so as to be capable of rocking on a fixed shaft **18**, while the levers **17** are rockably mounted on a fixed shaft **19**.

Each of the levers **16** and **17** is provided with a roller **20** and **21**. These rollers run on cams **22**, one of these being mounted at each side of the machine on a cam shaft **23**. The levers **16** and **17** are pressed against the cam **22** by means of a tension spring **24** and have a to and fro movement imparted to them by the cam. The double hooks **8** and **9** are provided at their ends which are pressed against the knives **10** or **12** with pressure faces **25** and **26**. The levers **27** and **28** act on these faces at the moment when the associated knives **10** and **12** have reached their original position. The levers **27** are mounted in such a way that they can rotate on the shaft **29** and are provided with a pressure surface **30**. The levers **28** are mounted so that they can rock on the shaft **31** and are provided with a pressure surface **32**. The spring **33** rotates the lever **27** in a clockwise direction until the face **30** comes against the stop **35**. The spring **34** rotates the lever **28** in a counterclockwise direction until its face **32** comes against the stop **36**. The fixed stops **35** and **36** are provided with recesses **37** and **38** for guiding the front needles **39** and **40** or **41** so that these are able to act on the faces **30** and **32**. The front needles **39** and **40** carry the reading needles **42** and **44** while the front needles **41** carry the reading needles **43**. The front needles **39** and **40** can be actuated by the driving bar **45** and the front needles **41** by the driving bar **46**, these driving bars executing a horizontal to and fro motion. Fig. 1 shows these driving bars **45** and **46** in their outermost position to the left. The driving bar **45** is provided with a rack-like attached bar **45'** and is supported by means of a roller **47** at each side of the machine and is rigidly connected to a lever **49** by means of a rod **48**. The driving bar **46** carries the attached bar **46'** and is supported by similarly arranged rollers **50** and is connected with the lever **52** by the rod **51**. The levers **49** and **52** are in the form of double-arm levers and are mounted so that they can rock on a shaft **53** mounted on the frame of the machine. The lever **49** is provided at its lower end with a roller **54**. The roller **54** runs on a cam **55** fixed on the shaft **56** and moves the driving bar **45** to and fro perpendicular to the plane of the drawing. The lever **52** is also in the form of a double-armed lever and is also provided at its lower end with a roller **57** which runs on a cam **58**. Both levers **49** and **52** are pressed by means of springs **59'** at their lower ends, that is, with their rollers against their cams. The cams **55** impart a to and fro motion to the driving bar **45** by means of the levers **49**. The cam **58** also imparts a to and fro motion to the driving bar **46** by means of the roller **57** and the lever **52**. The front needles **39** and **40** work in conjunction with the driving bar **45**. The front needles **41** work in conjunction with the driving bar **46**. The front needles **39** and **40** are supported by a rod **59** while the front needles **41** are supported by a rod **60**. These rods extend over the entire width of the machine and are mounted at each end in a lever **61**. By means of the rods **59** and **60** the front needles **39**, **40** and **41** from which the reading needles **42** and **44** and **43** hang loosely are raised in each case by known means in order to effect the cylinder motion. The shaft **62** carrying a cylinder **63** over which the pattern card **64** is guided is mounted in the machine frame.

Referring to the diagram shown in Fig. 2, the working of the arrangement described is as follows:

In this diagram, the curves A indicate the motion of the knives **10** and **11**; the curves B, the motion of the knives **12** and **13**; the curve C, the needle lifting; curve D, the cylinder motion; curve E, the pressing-away motion of the lower hook **9** from the knife **12** by the rod **14**; the curve F, the pressing-away motion of the hook **8** from the knife **10** by the rod **15**; the curve G, the motion of the driving bar **46** for lifting the lower hook **9** from the knife **13** through the lever **28**; the curve H, the lifting of the upper hook **8** from the knife **11** through the lever **27**, and the curve J, finally, the lateral motion of the driving bar **45** with the rack-like attached bar **45'**.

The position of the machine as illustrated in Fig. 1, corresponds to the instant 120° in the diagram shown in Fig. 2. At this instant, the shaft **14** (curve E) is in its lowest position and it has from the moment when the lower knives (curve B) have returned to their initial po-

sition (at 50°) commenced its motion and has pressed all the hooks **9** on to the knife **13**. The hooks **9** are held by the spring **65** in their initial position on the knife. As the machine continues running, the shaft **14** returns at 130° again into its initial position which it reaches at 190°. At 160° the driving bar **46** (curve G) begins its motion and presses those front needles which have dropped on to the driving bar **46** to the right and the hooks **9** corresponding to these dropped front needles on to the knife **12** so that at 190° the hooks can be taken along by the knives **12** or **13**. The process is similar in the case of the top pair of knives (curve A) and the hooks **8**, this starting at 300°. The analogous motions of the shaft **15** (curve F) and of levers **27** and of front needles **39** and **40** and driving bar **45** (curve J) can be seen from the diagram of Fig. 2.

Fig. 3 shows in diagrammatic manner an embodiment of the device applied to an ordinary double lift dobby.

In this case, the hooks **65** and **66** work in conjunction with the knives **67** and **68**, these hooks being mounted so that they can rock on the balance lever **69** and being provided wtih extensions **65'** and **66'** respectively. The positive application of the hooks **65** and **66** to the knives **67** and **68** is effected by means of the rods **70'** and **71**, these latter acting in conjunction with the lift bars **72** and **73** (in a manner not shown) so that the rods **70** and **71** are moved out of the way to provide a free path for the extensions **65'** and **66'** when the hooks **65** and **66** are lifted to inoperative position.

The pattern on the pattern cylinder **74** controls the reading needles **75**, **76** and **77**, these moving the front needles **78**, **79** and **80** at the moment the lift bars **72** and **73** are beginning their upward motion in such a manner that the rods **81**, **82** and **83** pass in accordance with the pattern into or out of the range of the lift bars **72** and **73** during the motion of the driving bars **84** and **85**.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

In a loom, a plurality of movable draw knives, draw hooks engageable with said draw knives for actuation of said hooks, pattern mechanism controlled by a pattern card and selectively controlling the engagement of said hooks with said draw knives and means for effecting the positive movement of the draw hooks by the draw knives in accordance with a pattern card, comprising means for attaching all the draw hooks positively to the associated draw knife while the draw knives are passing through their dead path, and means for positively attaching certain draw hooks to their associated draw knives and for positively detaching them therefrom before and after the middle of the interval of time during which the draw knives are passing their their dead path, in accordance with the pattern card, the said means for positively attaching and detaching the said draw hooks working together in respect of time in such a way that the hooks for such positive attaching and detaching are guided positively.

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