United States Patent

Porter

[15] **3,670,775**

[45] **June 20, 1972**

[54] BRAKING SHUTTLES IN LOOM SHUTTLE BOX

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[22] Filed: **Aug. 20, 1970**

[21] Appl. No.: **65,442**

[30] **Foreign Application Priority Data**

Aug. 28, 1969 Switzerland 13025/69

[52] **U.S. Cl.** **139/185**

[51] **Int. Cl.** **D03d 49/54**

[58] **Field of Search** 139/185, 186, 187, 183, 184

[56] **References Cited**

UNITED STATES PATENTS

2,081,319	5/1937	Bahan	139/186
2,012,050	8/1935	Payne	139/186
2,184,058	12/1939	Payne	139/185

FOREIGN PATENTS OR APPLICATIONS

695,371	8/1940	Germany	139/185

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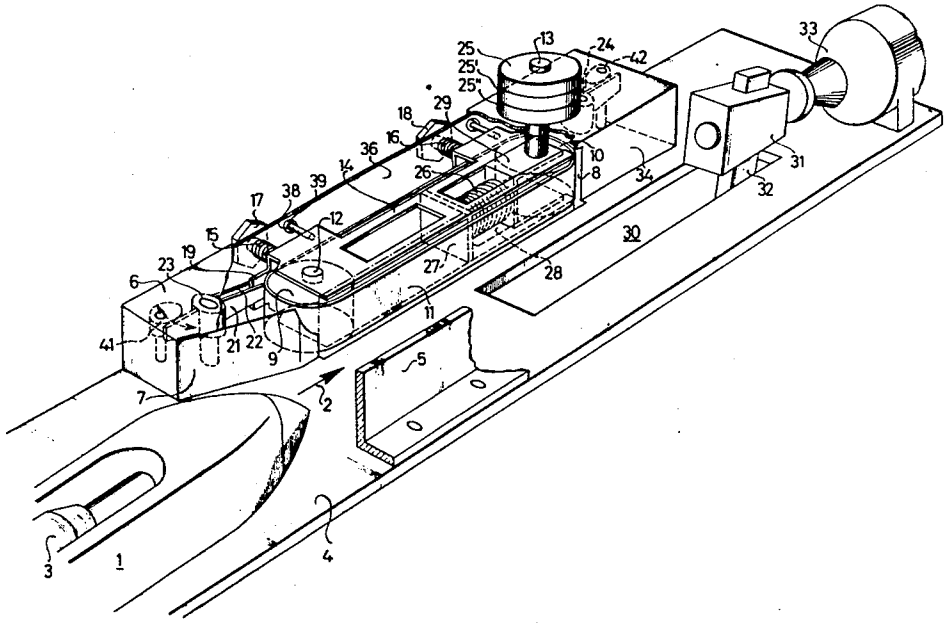
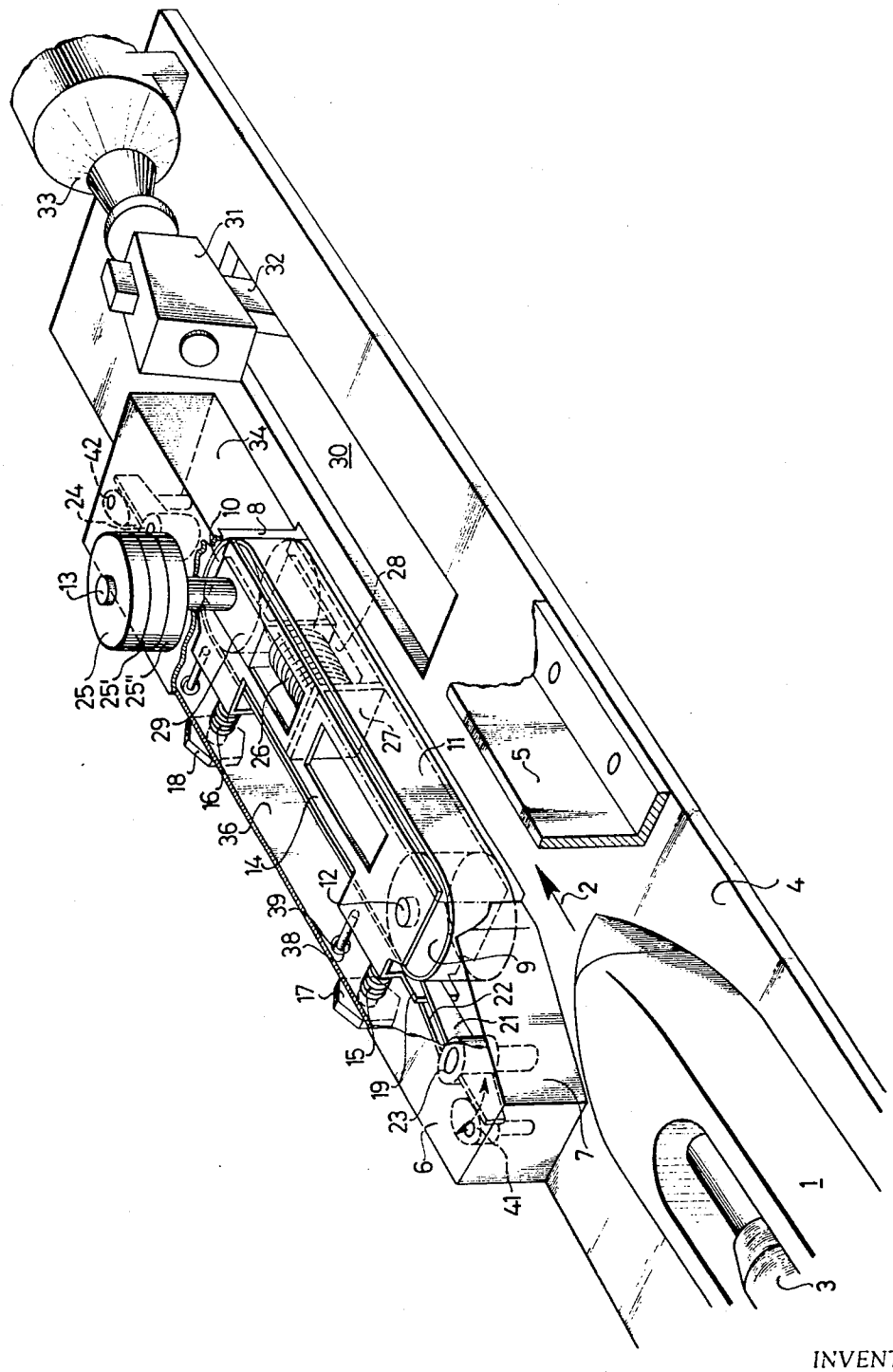
[57] **ABSTRACT**

Method and device for braking shuttles in loom shuttle box whereby a shuttle is braked by contact with a belt supported by a pair of rollers.

4 Claims, 1 Drawing Figure





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BRAKING SHUTTLES IN LOOM SHUTTLE BOX

The present invention concerns a method for the braking of shuttles in the shuttle box of looms whereby the shuttle is forced into driving contact with a means capable or rotation which is thus caused to rotate, and further concerns a disclosure for the application of this method.

In known looms in which shuttles fly free from the shuttle box on one side of the loom to the shuttle box on the other side of the loom, the shuttle is slowed down from its entry speed to a residual fraction thereof by friction brakes arranged in the shuttle box. At that residual speed, the shuttle then hits against a stop, which may be fitted to the picking device. The friction brake often consists of one of the side walls of the shuttle box, which is provided with a brake lining and resiliently presses the shuttle against a fixed backing wall serving as a guide wall.

In this type of shuttle-braking system, vibrations of the yielding wall, changes in the brake lining due to temperature or wear, etc., tend to cause variations in the braking effect, so that the impact speed of the shuttle hitting the stop may vary considerably, occasionally resulting in rebound. Also, if braking exclusive the shuttle may not reach its limit position at all. Accordingly, the position of the shuttle at standstill is also subject to variation, which may cause trouble at bobbin change or at picking. As the pressure of the yielding wall on the shuttle and the friction coefficient of the brake lining are subject to natural limits, this type of shuttle braking system also sets a limit to the shuttle speed and thus to the maximum working rate of the loom.

It is accordingly an object of the present invention to overcome the defects of the prior art, such as indicated above.

It is another object of the present invention to provide a method which eliminates the drawbacks described and in particular ensures, in a very simple manner, that the standstill position of the shuttle is invariably the same.

These objects are achieved by transmitting kinetic energy from the shuttle to an unbraked system of masses so that, when the shuttle hits the stop, the moving system of masses holds the shuttle against the stop until the system, braked in particular by the shuttle, has converted its energy into heat and come to rest.

A further object of the present invention is to provide a device for the application of the above described method. In one embodiment, the device comprises a system of masses comprising two rolls which are arranged one behind the other preferably in the movement direction of the shuttle and which are interconnected by a transmission belt whereof one course runs at least approximately parallel to the movement direction of the shuttle; this device is characterized in that the roll nearer to loom shed is mounted on a fixed axis and has less rotation inertia, while the roll further from the loom shed is resiliently displaceable towards the first roll and has greater rotation inertia. Further, the space delimited by the belt is free at least immediately behind the course coming into contact with the shuttle. According to another embodiment of the invention, the rolls may be mounted in a frame or a case which can pivot towards the shuttle or away therefrom and which is translationally movable perpendicularly to the shuttle movement direction.

For a better understanding of this invention, a possible embodiment thereof is illustrated by way of example in the following description and the accompanying drawing, which shows a perspective and partly cut-away view of a device for the application of the method described. It is to be understood that this embodiment is merely exemplary and in no way limitative.

Referring to the drawing there is seen part of a shuttle **1** moving from the loom shed towards the shuttle box as indicated by an arrow **2**, and carrying a weft bobbin **3**. Rigidly fixed to the shuttle box base **4** is a lateral guide wall **5** for the shuttle **1**. Opposite the wall **5** is a box-type or frame-type unit **6** which is also rigidly fixed to the shuttle box base **4**. The wall **34** of the unit **6** facing the guide wall **5** presents an angled-off or inclined entrance surface **7** and a window **8**. Projecting through the window **8** into the shuttle box is a belt **11** carried around two rolls or rollers **9** and **10**.

The rolls **9** and **10** are supported by pins or axles **12** and **13** which in turn are mounted in a frame **14** which is supported against the rear wall **36** of the unit **6** by springs **15**, **16**, whose pressure is adjustable by screws **17**, **18**. The frame **14** is guided in the direction perpendicular to the shuttle box base **4** by bottom and top surfaces of the unit **6**, and in the direction of the shuttle movement by sliding pins **38** sliding in corresponding holes **39** in the rear wall **36** of the unit **6**, the guidance being such as to permit the support frame **14** to pivot about axes perpendicular to the shuttle box base **4**.

The distance by which the belt **11** projects through the window **8** into the shuttle box is set by a tab at each end of the frame **14** only the one such tab **19** is being shown, each in conjunction with a wing (only the wing **21** is shown) of a double-arm lever. The two levers **23**, **24** which are actuated, for example, by cams **41** and **42**.

Seated on the pin **13** of the roll **10** and connected thereto with drive-transmitting effect are exchangeable fly-weights **25**, **25'**, **25''**. The connection between pin **13** and fly-weights **25**, **25'**, **25''** may be rigid or elastic. The tension of the belt **11** is produced by a spring **26** which rests on one side against a fixed transverse wall **27** of the support frame **14** and which acts on the other side on a C-shaped bearing plate **29** of the pin **13** which is displaceable in a longitudinal slot **28** of the support **14**.

A picker **31** fixed to a picking arm **32** projects through an opening **30** in the shuttle box base **4** into the picking plane. Arranged behind the picker **31** and the picking arm **32** is a buffer **33** acting as a stop.

The action of the device is as follows:

Coming from the loom shed, the shuttle **1** enters the space defined by the shuttle box base **4**, the guide wall **5** and the front surface of the belt **11**, in which process the inclined surface **7** facilitates the entry of the shuttle **1**. The belt **11**, being part of the spring-loaded support **14**, presses the shuttle **1** against the guide wall **5**. At the moment when the shuttle **1** makes contact with the belt **11**, the latter is at standstill. It would, of course, be possible instead to give the system of masses (belt **11**, rolls **9** and **10** with fly-weights **25**, **25'**, **25''**...) an assisting or opposing energy by running the belt **11** in the same or the opposite direction with respect to the entering shuttle, in order to give the braking process some other pattern. The belt **11** and, accordingly, the fly-weights **25**, **25'**, **25''**, are accelerated by the frictional force arising at the contact surfaces between the said belt and the shuttle **1**, until, for instance, the peripheral speed of the belt is identical with the speed of the shuttle **1** being slowed. This speed depends on the moment of inertia of the fly-weights **25**, **25'**, **25''** co-moved with the belt **11**; it can be given the value desired by suitable selection of the fly-weights. The friction in particular of the shuttle **1** at the fixed guide wall **5** and that in the bearing of the rolls **9** and **10** and at the belt **11** itself absorbs kinetic energy, so that the speed of the moving system comprising shuttle, belt, rolls and fly-weights diminishes. This braking action is in the nature of things and will inherently occur in the system. Continuing its movement, the shuttle **1** hits with its tip against the picker **31**, which rests against the buffer **33**. The belt **11**, and, accordingly, the fly-weights **25**, **25'** and **25''** are brought to a standstill, mainly by the frictional force arising between belt and the now stopped shuttle **1**, so that the shuttle is pressed against the picker and positively held in its limit position.

The braking course of the belt **11** projects into the shuttle box far enough for the entering shuttle **1** to touch the belt in the zone of its tip. Because the rolls **9** and **10** are mounted in the support **14** which is moveable perpendicularly to the direction of the shuttle **1** and parallel to the shuttle box base **4**, because of the special arrangement of the rolls in that the roll **9** nearer the loom shed is fixedly-mounted in the support frame **14** and has less inertia, while the roll **10** farther away from the loom shed is resiliently mounted in the support **14**

and has greater inertia and because the course of the belt facing the shuttle is movable toward and away therefrom, the effect is that when the belt **11** is pushed back in a direction perpendicular to the movement direction by the thickness of the shuttle **1** the roll **10** is pulled against the pressure of the spring **26** towards the roll **9** by the other course being tensioned by the braking course being pushed back.

The braking course is deformed before the point of contact with the shuttle to form a wave trending towards the shuttle tip. The braking course can thus hug the shape of the shuttle with its contact surface.

To ensure that the belt **11** together with the fly-weights **25**, **25'**, **25''** has no impeding effect when the shuttle **1** is propelled by the picking arm **32** for the next pick, the support **14** is withdrawn into the unit **6** by the cams **41**, **42**, setting by double-arm levers **22**, **24**.

It is also possible to arrange in place of the guide wall **5** another complete belt braking system as described.

It will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

I claim:

1. Method for the braking of shuttles in a shuttle box of a loom whereby the shuttle is brought into driving contact with a rotation-movable system of masses, which it thus causes to rotate, characterized in that the shuttle is caused to transmit kinetic energy to an unbraked system of masses which, when the shuttle hits the stop, holds the shuttle against the stop until the said system of masses, braked in particular by the shuttle, has converted its energy into heat and come to rest.

2. Device for the braking of shuttles in a shuttle box of a loom comprising a rotation-movable system of masses wherein said system of masses comprises a first roll and a second roll arranged behind the first roll in the movement direction of the shuttle, said rolls being interconnected by a transmission belt whereof one course is at least approximately parallel to the movement direction of the shuttle, said first roll being fixedly mounted and said second roll being resiliently displaceable towards said first roll and having a greater rotation inertia than said first roll.

3. Device according to claim **2** wherein free space is provided immediately behind the course of said belt coming into contact with the shuttle.

4. Device according to claim **2**, wherein said rolls are mounted in a frame which is mounted floatably movable perpendicularly to the shuttle movement direction.

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