G. CROMPTON, JR.

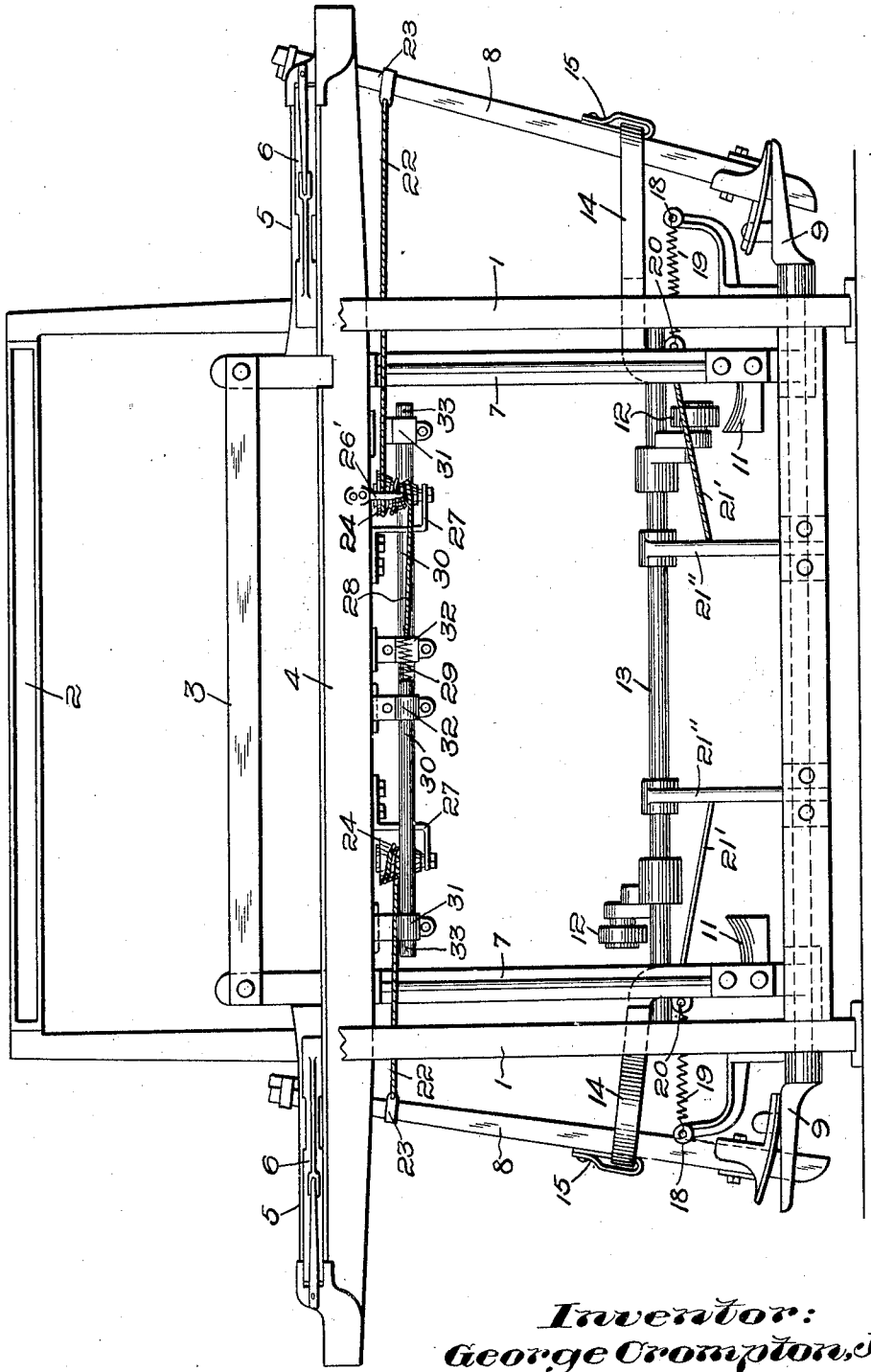
RECOIL PICKING MECHANISM FOR LOOMS.

APPLICATION FILED APR. 21, 1921.

1,393,758. **Patented Oct. 18, 1921.**

3 SHEETS—SHEET 1.

Fig. 1.



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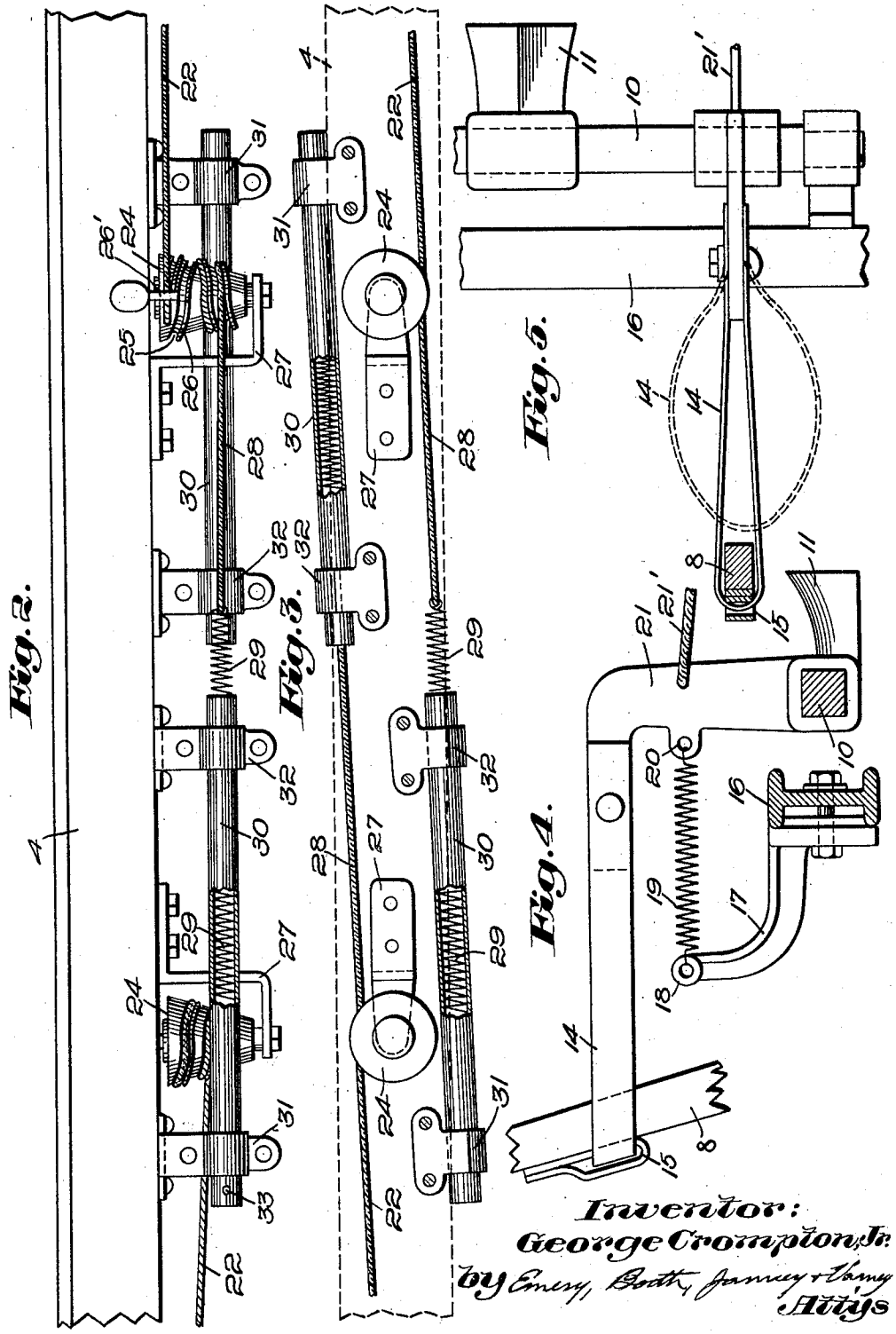


Fig. 2.

Fig. 3.

Fig. 5.

Fig. 4.

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3 SHEETS—SHEET 3.

Fig. 6.

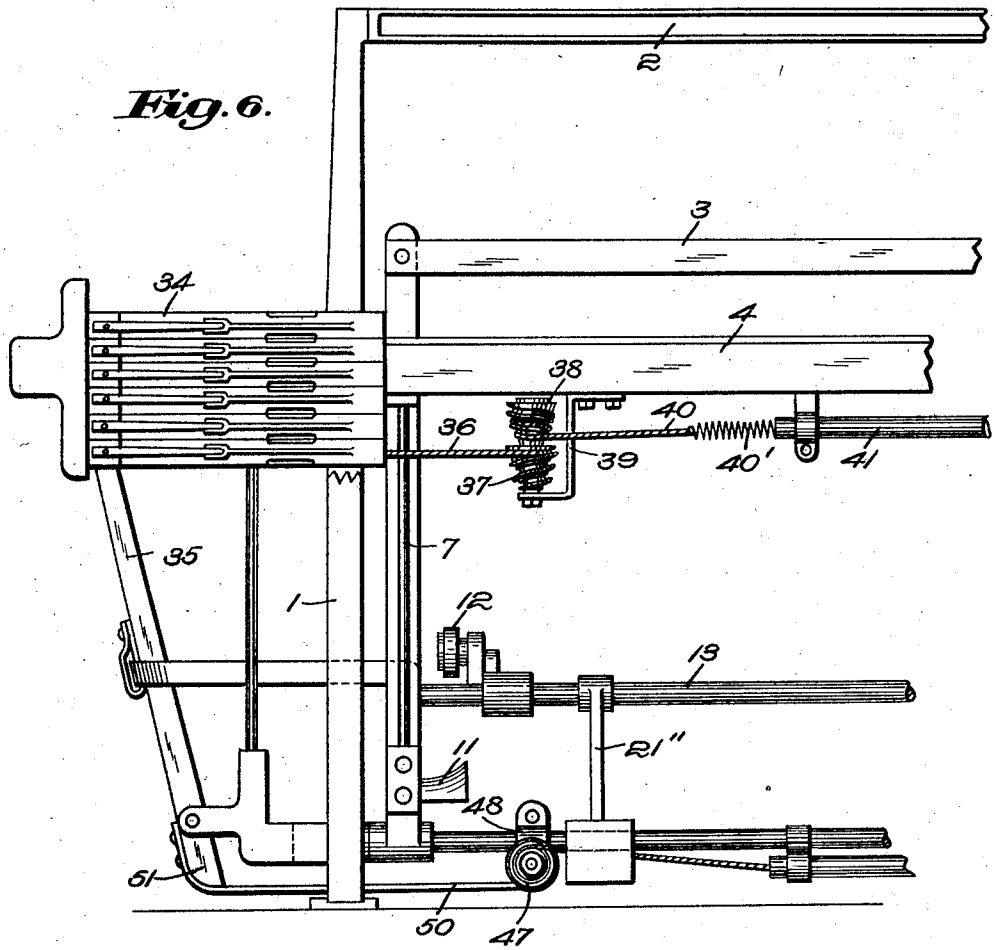
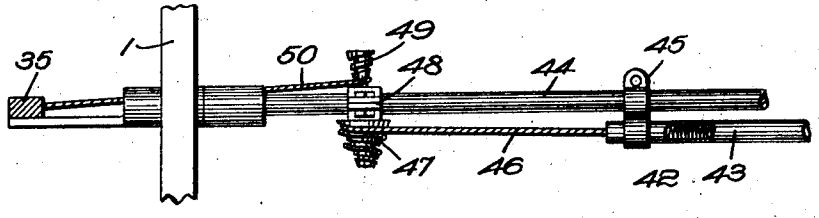


Fig. 7.



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UNITED STATES PATENT OFFICE.

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RECOIL PICKING MECHANISM FOR LOOMS.

1,393,758. Specification of Letters Patent. Patented Oct. 18, 1921.

Application filed April 21, 1921. Serial No. 463,252.

To all whom it may concern:

Be it known that I, GEORGE CROMPTON, JR., a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Recoil Picking Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to picking mechanism for looms. In order that the principle of the invention may readily be understood, I have disclosed in the accompanying drawings a single embodiment of the invention, representing the same as applied to a one-and-one loom and also as applied to a shuttle box loom.

In said drawings,—

Figure 1 is a front elevation of a one-and-one loom having my invention applied thereto;

Fig. 2 is a front elevation on an enlarged scale of a portion only of the mechanism shown in Fig. 1;

Fig. 3 represents the parts shown in Fig. 2 when viewed from a position at right angles to that from which the parts are viewed in Fig. 2;

Fig. 4 is a detail partly in front elevation and partly in vertical section of a portion of the picker mechanism;

Fig. 5 is a view mainly in plan of the construction shown in Fig. 4;

Fig. 6 is a front elevation of the multiple box end of a box loom; and

Fig. 7 is a plan view of a portion of the structure represented in Fig. 6.

The usual picking mechanism of a loom provides means for throwing the shuttle across the lay and catching it in the opposite box by means of a binder. It is then necessary, when the shuttle is returned to the box from which it is thrown, to force the shuttle out of its box against the pressure of the binder mechanism. This, as is well known, results in wasted and lost energy. Moreover the energy so wasted or lost is detrimental in its effect, for the friction of the binder upon the shuttle, occurring twice, as it does, in every pick, heats up the shuttle, thus imposing a limiting factor upon the speed with which the loom may be run. Furthermore the energy required for picking is imparted as or with a blow, thus shaking the loom and all its parts. Therefore the energy above referred to as lost or wasted is converted into vibration as well as heat. The third outlet for such lost energy is the noise consequent upon the operation of the loom as described.

In order to overcome these defects in the usual form of picking mechanism, I provide spring means attached to each picker stick when adapting my invention to a one-and-one loom, whereby the said picker stick tends always to come or move toward the center of the lay. Thus when the shuttle enters a box, it forces the corresponding picker and picker stick back against the pressure of such spring means, imparting some of its energy to said spring means. When the shuttle is ejected from the box, this energy is given back.

While I need not do away with the binder and binder spring, I may retain only the former, the shuttle being held in the box by the pressure of the bang-off mechanism or by a suitable lock not shown. I have, however, conventionally indicated a binder spring in this embodiment of the invention. I am enabled to do away with the binder spring when desired, by reason of the fact that the spring means is of the character hereinafter set forth. My invention is not limited to the employment of a binder and a binder spring.

In order to cause the spring means to act in full accordance with the principle of my invention and to carry out the purpose of my invention most effectively, I provide certain modifying means therefor as hereinafter fully set forth.

In order that the purpose of my invention may be clearly understood, it is pointed out that to keep the shuttle in its box until the next pick, it is necessary that the binder press upon the shuttle strongly enough to hold the shuttle against the tendency of the spring means to eject the shuttle. Spring means, without controlling or influencing agency, exerts more pressure the more such spring means is displaced, and therefore it ordinarily exerts the most pressure when the least pressure is in reality required (*i. e.*, when the shuttle is in the box and is simply being held), and it exerts the least pressure

when in reality the most is wanted (*i. e.*, when the shuttle is being stopped).

In order to counteract this tendency of the spring means unless modified, I employ means tending to equalize or modify the normal action of the spring so that the spring means exerts a much greater force or much greater leverage (using the latter word in the usual mechanical sense) upon the picker stick at the commencement of its movements (*i. e.*, when the shuttle is entering the box) than at the finish of its movement (*i. e.*, when the shuttle is fully in its box).

Within the scope of my invention various means may be employed to equalize or modify or alter the normal action of the spring means. Desirably, however, I use a tapered rotatable member, such for example as a cone, a spiral or a scroll.

I will first describe that form of my invention shown in Figs. 1 to 5 inclusive.

In said figures, the loom sides are represented at 1, the arch at 2, the hand rail at 3, the lay at 4, the shuttle boxes at 5, the binder mechanism at 6, the lay swords at 7 and the parallel mechanism for operating the picker sticks 8 at 9. These parts may be and desirably are all of usual construction. Each of said picker sticks is adapted to be operated from the pick cam shaft, one of which is represented at 10 in Fig. 4, there being a pick cam 11 for each of the pickers, adapted to be acted upon by the pick cam balls 12 upon the cam shaft 13 desirably as usual.

Instead of the usual construction of picker strap, I preferably provide for each of the picker sticks 8, a piece of thin flexible leather 14 shown most clearly in Fig. 5 as bent or folded into a loop and passed through the leather loop or strap 15 upon the picker stick 8. The construction is such that when the shuttle is not in its box the corresponding picker strap 14 exerts little, if any, force or tendency to move the picker stick back.

The picker stick is not held in the back of the box when the shuttle is out of the box, as in constructions heretofore employed, but the said picker stick is forward. Furthermore, it is pointed out that the coil spring heretofore employed, tending to move the picker stick outwardly, is done away with in the practice of my invention.

Desirably and as shown most clearly in Fig. 4, I provide upon that portion of the framing shown at 16 a bracket 17 to which is connected at 18 one end of a coil spring 19 of suitable strength, the other end thereof being connected at 20 to the arm 21 upon the pick cam shaft. The purpose of this construction is to return the parts into the position shown in Fig. 4 after the impact or action of the pick cam ball upon the pick cam. Desirably and as shown in Fig. 1, I provide means to prevent the springs 19 from at any time lifting the picking cams 11 above the pick cam balls 12. For this purpose I have herein represented cords or flexible members 21′ adapted to be connected at one end to brackets 21″ upon the cam shaft 13 and at their opposite ends to arms 21. This construction affords a limiting means to the action of the coil springs 19, as will be readily understood.

One form of the modifying, controlling or action equalizing means for the spring means of the picker sticks is represented in Figs. 1, 2 and 3. Therein, at each end of the loom, I have represented a cord 22 which is attached by a strap 23 to the picker stick 8 at one end, the opposite end of said cord being wound upon a tapered member 24 here shown as a cone which desirably is provided with a spiral groove 25 extending thereabout and preferably furnished with a spiral flange 26 or like means to retain the cord 22 in the spiral groove of the cone. If desired I may employ other or additional means for retaining the cord or cords in the groove of each of the cones. I have herein shown additional means consisting of fingers 26′, one for each of the cones as clearly indicated in Fig. 1. The said fingers are secured to the lay and extend downward in sufficient proximity to the surface of the cone to assist in retaining the cords in the grooves. If desired the said fingers may be positioned in parallelism with the tapering surface of the cone. As stated, I employ in this form of my invention two cones, one for each of the picker sticks and as clearly represented in said figure, I support the said cones by means of brackets 27 attached to the under side of the lay 4 and in such manner that the said cones may rotate freely upon their axes.

The cord 22 does not extend from end to end of the cone 24 but extends only from the middle substantially to the larger end, and there is suitably secured to the surface of the cone. Desirably and in accordance with this form of my invention a second cord 28 is provided, one end whereof is secured to the surface of the cone desirably near the middle of the cone, and in such manner that the said cord is at times wrapped in that part of the spiral groove extending from the small end of the cone toward or to about midlength thereof. The other end of the cord 28 is attached to the spring means to which I have referred and which is here typified by a spiral spring 29 that desirably is supported in a tube 30 to prevent undue sagging. Said tube 30 may be supported in any suitable manner as by brackets 31, 32 at or near its opposite ends. As indicated at 33, the end of the coil spring 29 is attached to the tube 30 at or

near its end, it being obvious that the spring 29 may be of any suitable character and that any other suitable character of spring means may be provided.

Viewing Figs. 1 and 2, it will be evident that as the shuttle enters the right hand box viewing Fig. 1 and pushes the picker stick 8 before it to the right, the cord 22 unwinds from the conical member 24 and in so doing rotates said cone upon its axis, but imparts less and less leverage thereto because of the conical formation of the said member 24. The rotation of the conical member 24 effects the winding up of the cord 28 upon the cone from the smaller end of the cone to about midlength thereof and thus imparts a greater tension to or applies greater force to the corresponding spring 29 as this winding up action occurs. The result however of the unwinding of the cord 22 and the simultaneous winding of the cord 28 is to equalize or to reverse the action of the spring 29. Thus I avoid or overcome the normal tendency of the spring to exert its greatest force upon the shuttle when the shuttle is fully boxed and its least force when the shuttle is entering the box, and either equalize the action of the spring or cause it to exert less pressure when the shuttle is in the box than when it is entering the box.

It is not necessary that the two cords 22 and 28 pertaining to a single picker stick be wound upon the same cone or tapering member, though this is a simple and preferred construction so far as that form of my invention shown in Figs. 1 to 5 inclusive is concerned.

In Figs. 6 and 7, I have shown my invention as applied to a box loom which may be of a two-and-one, a four-and-one, a six-and-one or any other type. As herein shown, the loom is of a type having a single box at one end, and which may be of the same construction as that shown at either end of Fig. 1. On the multiple box end, being that represented in Fig. 6, I desirably provide two spring means working against each other. One or both of said spring means may be of the modified or equalized type indicated in Figs. 1 to 5. That is, I may provide at the multiple box end two equalized, modified, controlled or what I may term diminishing spring means working against each other, or I may provide one of such spring means working against one normal spring means of usual construction, so that the picker and picker stick tend to move toward the lay center when they are nearest the lay center, and then as they are pushed back, they pass through a neutral point where the combined or co-acting spring means exert no pressure whatever. Then as the picker stick arrives at its most backward position with respect to the multiple boxes the co-acting or combined spring means force the picker stick back so that the picker fits in the usual recess provided for it.

While this form of my invention may be variously applied, I have therein represented the multiple boxes at 34, the other parts being substantially the same as those already described except as hereinafter referred to.

The cord extending from the picker stick 35 is represented at 36, it being received upon a tapering member of the general character hereinbefore described. In this type or form of my invention, however, I have provided two cones 37, 38, mounted upon the same axis of rotation and supported by a bracket 39 upon the under side of the lay of the loom. The cord 36 is wound in the manner already described upon the cone 37, but the cord 40, which is connected to the spring 40′ and which is positioned in the tube 41 is wound upon the second cone 38, but in a manner similar to that already described. The result is that as the cord 36 is unwound from the cone 37, the cord 40 attached to the spring is wound upon the cone 38.

In this form of my invention, however, I provide a second spring means and which is indicated in part at 42 in the tube 43 corresponding in construction to the tubes already described, but supported upon the rock shaft 44 by means of brackets, one of which is indicated at 45. Attached to the free end of the spring 42 is a cord 46, the opposite end of said spring 42 being secured to and in the tube 43. The cord 46 passes to and is adapted to be wrapped about a tapering member such as a cone 47 which is desirably grooved in a manner already described with respect to other forms of my invention. The end of the cord 46 that is attached to the conical member 47 is adapted to be attached thereto at or near the smaller end of said member. The said conical member 47 is carried by a bracket 48 upon the said rock shaft 44, and the same bracket carries a second cone 49, to which is secured and about which is adapted to be wrapped a cord 50 for which a groove is provided, as hereinbefore described. The opposite end of the cord 50 is adapted to be attached to the lower end 51 of the picker stick 35 as indicated most clearly in Fig. 6.

It will be evident that the spring 42 and the spring 40′ act against each other, the spring 42 being stronger than the spring 40′ to the necessary extent. The said springs and conical members in this form of my invention are so designed that while there is a neutral point, the picker stick tends to go in when it is in or approaching the innermost position and tends to go out when it is out or approaching its outermost position.

While I have referred to cords as adapted to be wound upon tapering members, it

is obvious that any suitable flexible means may be provided desirably of a strand-like nature, such for example, as a strap, cord, metal strip or other part accomplishing the purpose of my invention.

In addition to reducing the vibration as already pointed out, and in addition to those advantages which I have already emphasized, my invention has the further marked advantage that it is particularly useful on automatic looms insomuch as by stopping the shuttle with means additional to the binder, I control the shuttle more completely than is otherwise possible, and thus I make more accurate the action of bobbin changing mechanisms on such automatic looms.

Having thus described certain embodiments of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims:

1. Picking mechanism for looms comprising spring means for at least partially stopping the shuttle in its box and adapted to be displaced by the shuttle in entering, said spring means acting oppositely to the motion of the shuttle in entering its box and co-acting means substantially preventing increase in the intensity in the action of said spring means as the shuttle goes into its said box.

2. Picking mechanism for looms comprising spring means for substantially wholly stopping the shuttle in its box and adapted to be displaced by the shuttle in entering, said spring means acting oppositely to the motion of the shuttle in entering its box and co-acting means for substantially preventing increase in the intensity of the action of said spring means as the shuttle goes into the said box.

3. Picking means for looms comprising spring means for at least partially stopping the shuttle in its box, and co-acting means controlling the action of said spring means and comprising a tapering member, and flexible means adapted to be wound upon said member and also connected to said spring means.

4. Picking means for looms comprising spring means for at least partially stopping the shuttle in its box, and co-acting means for modifying the action of said spring means and comprising a rotatable tapering member, and a flexible member adapted to be wound thereon and connected to the said spring means.

5. Picking means for looms comprising spring means for at least partially stopping the shuttle in its box, and co-acting means for modifying the action of said spring means and comprising a rotatable cone and a cord attached to and adapted to be wound upon said cone and connected at its opposite portion to said spring means.

6. Picking means for looms comprising spring means for at least partially stopping the shuttle in its box, and co-acting means for modifying the action of said spring means and comprising a rotatable cone provided with a spiral groove and a cord attached to said cone adapted to be wound in said groove, the opposite end of said cord being attached to said spring means.

7. Picking mechanism for looms comprising spring means for at least partially stopping the shuttle in its box, said spring means acting oppositely to the motion of the shuttle in entering its box and means co-acting with said spring means for substantially equalizing the action of said spring means as the shuttle goes into the box.

8. Picking mechanism for looms comprising spring means for at least partially stopping the shuttle in its box and adapted to be displaced by the shuttle in entering, said spring means acting oppositely to the motion of the shuttle in entering its box and co-acting means for effecting with said spring means control of the shuttle and substantially preventing increase in the intensity in the action of said spring means as the shuttle goes into its box.

9. Picking mechanism for looms comprising spring means for at least partially aiding the shuttle in its egress from the box, said spring means acting oppositely to the motion of the shuttle in entering its box and co-acting means substantially increasing the intensity of the action of the said spring means as the shuttle passes out of its box.

10. Picking mechanism for looms comprising spring means for at least partially stopping the shuttle in its box and aiding in its egress from the box, and adapted to be displaced by the shuttle in entering, said spring means acting oppositely to the motion of the shuttle in entering its box and co-acting means substantially preventing increase in the intensity of the action of said spring means as the shuttle goes into its box, and substantially increasing the intensity of the action of the said spring means as the shuttle passes out of its box.

11. Picking mechanism for looms comprising spring means for substantially wholly stopping the shuttle in its box and adapted to be displaced by the shuttle in entering, said spring means acting oppositely to the motion of the shuttle in entering its box and co-acting means for effecting with said spring means control of the shuttle and substantially preventing increase in the intensity in the action of said spring means as the shuttle goes into its box.

12. Picking mechanism for looms com-

prising spring means for substantially wholly stopping the shuttle in its box and aiding in its egress from the box, and adapted to be displaced by the shuttle in entering, said spring means acting oppositely to the motion of the shuttle in entering its box and co-acting means substantially preventing increase in the intensity of the action of said spring means as the shuttle goes into its box and substantially increasing the intensity of the action of the said spring means as the shuttle passes out of its box.

13. Picking means for looms comprising spring means for at least partially stopping the shuttle in its box and co-acting means for modifying the action of said spring means and comprising a rotatable member, and a flexible member adapted to be wound thereon and connected to the said spring means, said rotatable member having that portion of its surface whereon the flexible member is adapted to be wound, at varying distances from the center of its rotation.

14. Picking means for looms comprising spring means for at least partially stopping the shuttle in its box, and co-acting means for modifying the action of said spring means and comprising a rotatable member, and a flexible member adapted to be wound thereon and connected to the said spring means.

15. Picking means for looms comprising spring means for at least partially stopping the shuttle in its box, and co-acting means for modifying the action of said spring means and comprising a rotatable member, and a flexible member adapted to be wound thereon and connected to the said spring means, said rotatable member having that portion of its surface whereon the flexible member is adapted to be wound at a gradually increasing distance in one direction of rotation from the center of its rotation.

16. Picking mechanism for looms comprising spring means for at least partially stopping the shuttle in its box and adapted to be displaced by the shuttle in entering, said spring means acting oppositely to the motion of the shuttle in entering its box, and co-acting means to cause said spring action to diminish in force as the shuttle goes into its box.

In testimony whereof I have signed my name to this specification.

GEORGE CROMPTON, JR.