

No. 842,944.

PATENTED FEB. 5, 1907.

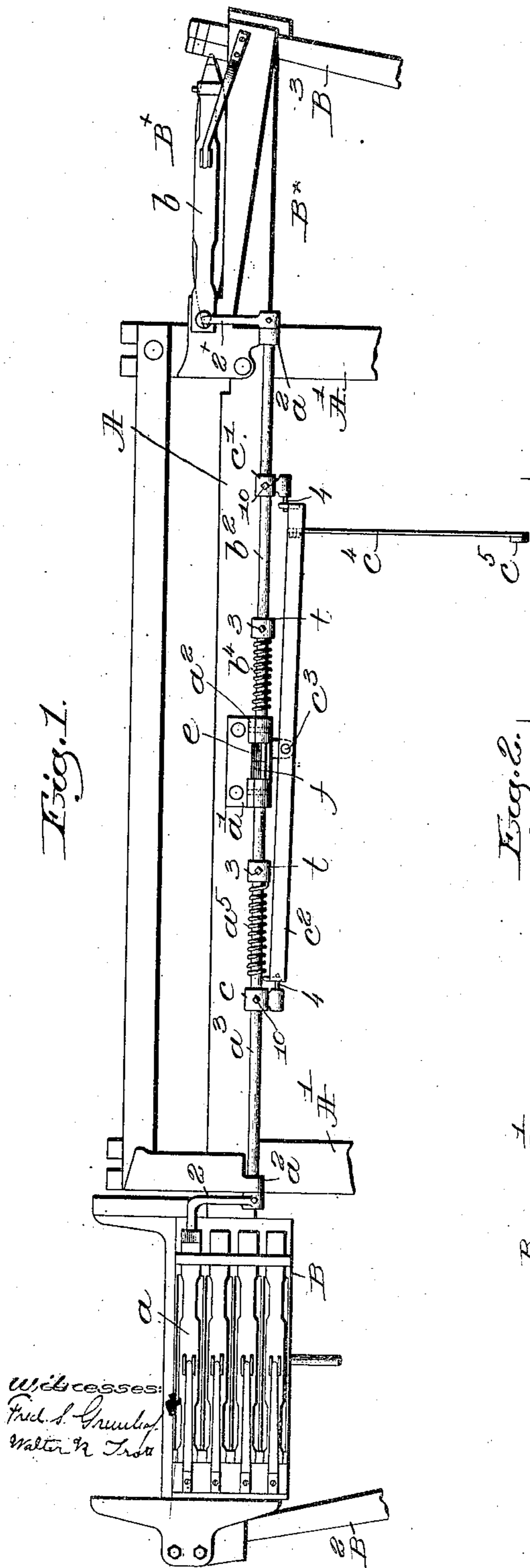
R. CROMPTON.

PROTECTOR AND SMASH PREVENTING MECHANISM FOR LOOMS.

APPLICATION FILED MAY 19, 1906.

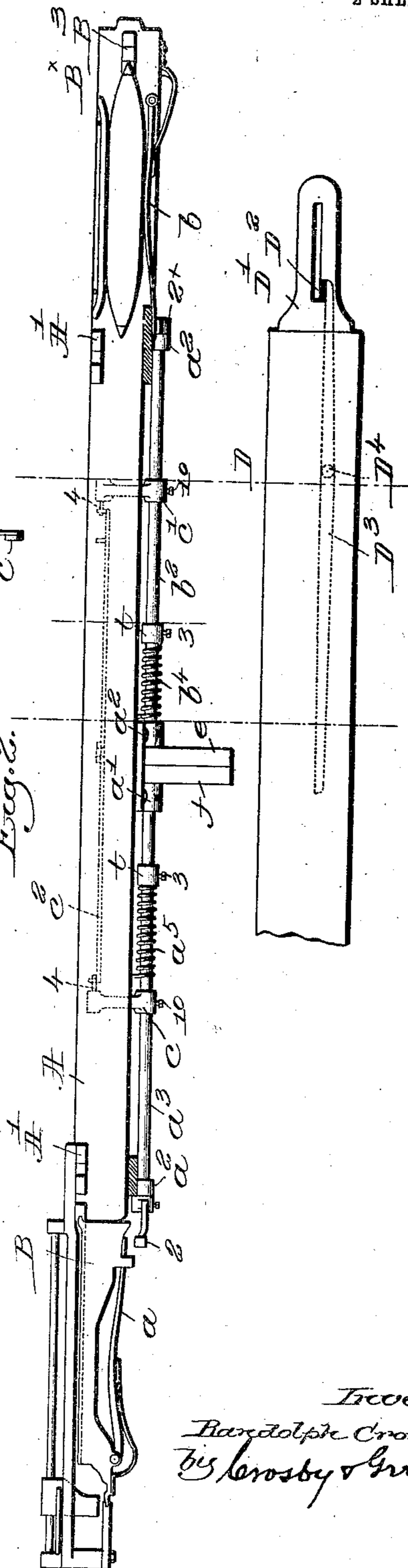
2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

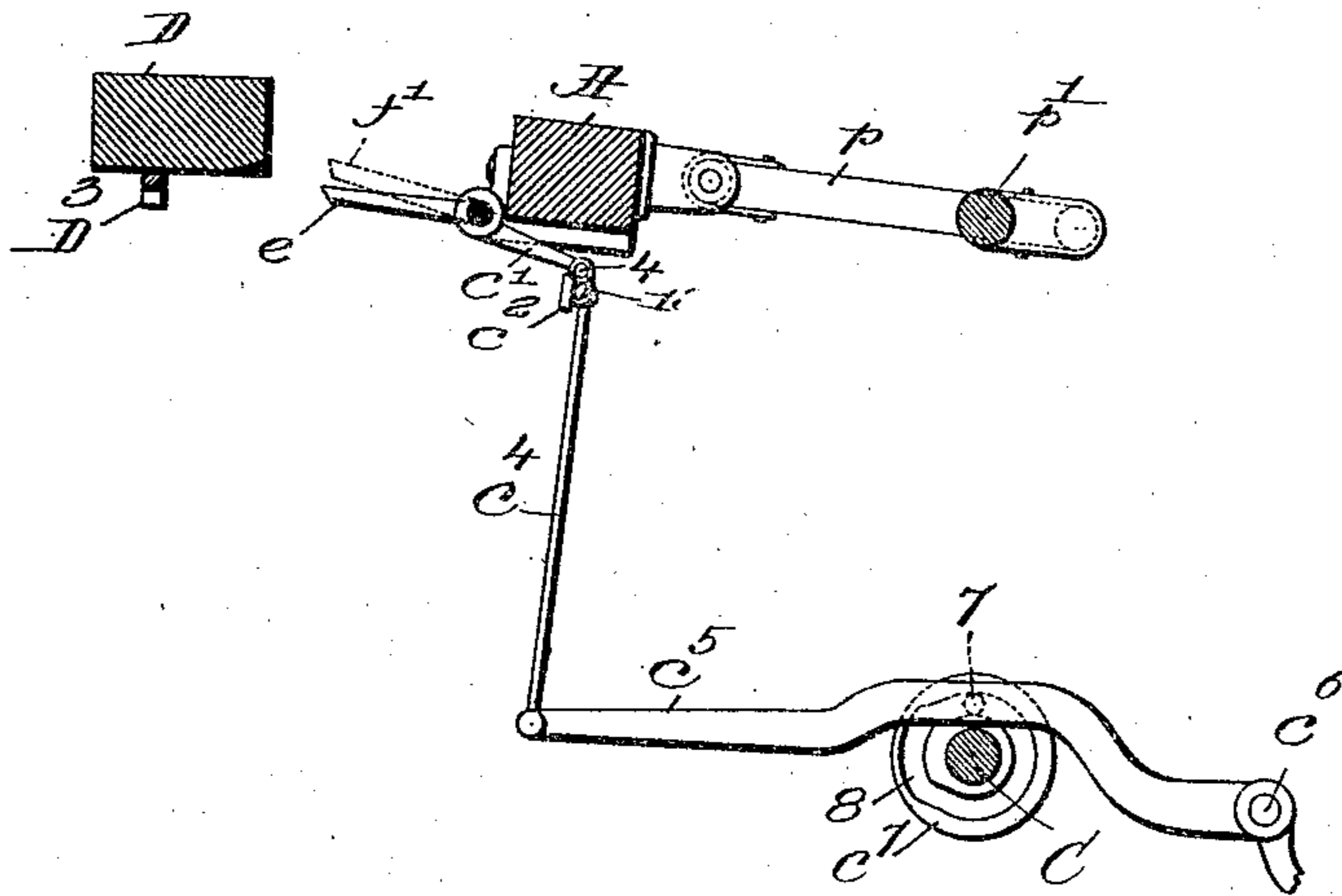


Fig. 4.

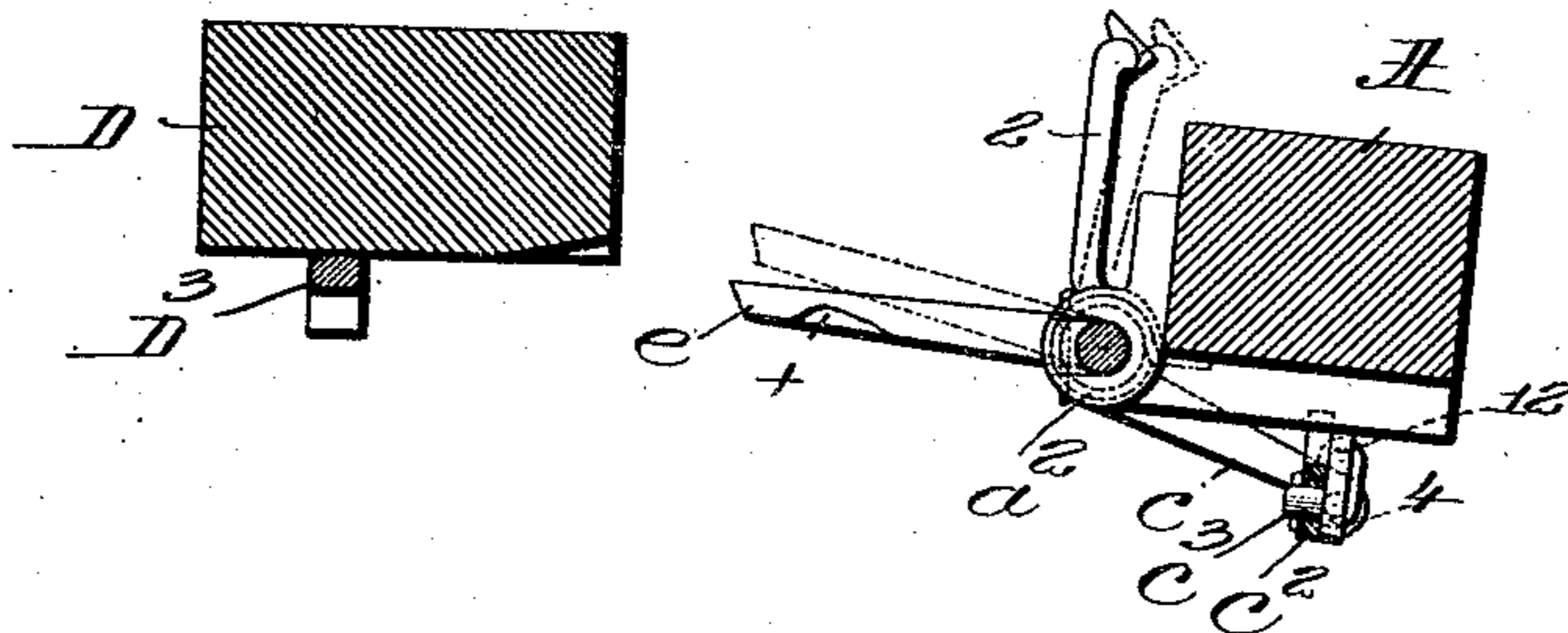
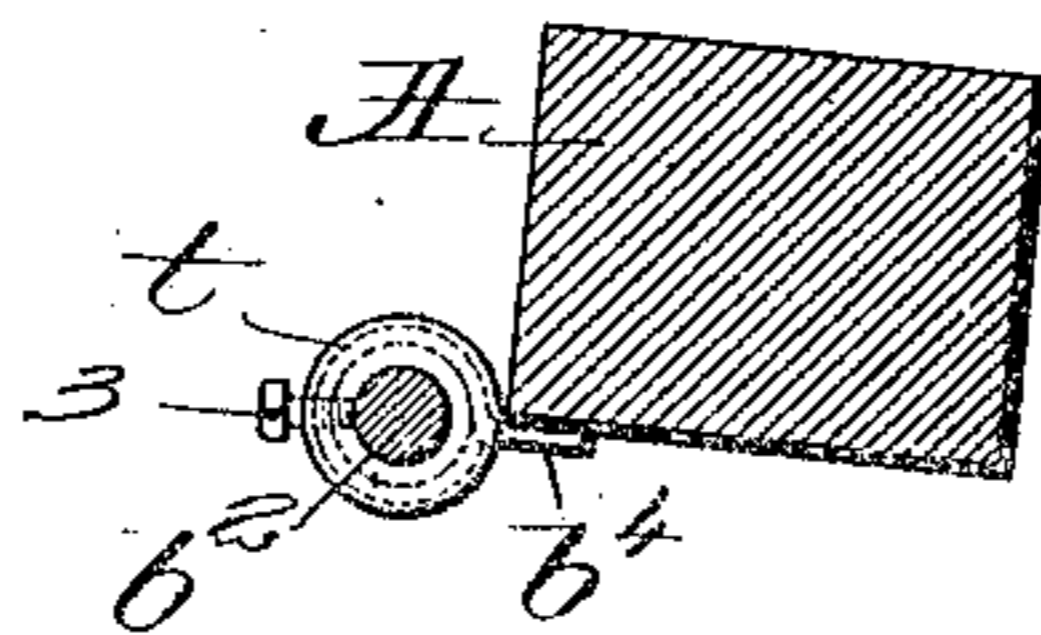


Fig. 5.



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UNITED STATES PATENT OFFICE.

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A FIRM

PROTECTOR AND SMASH-PREVENTING MECHANISM FOR LOOMS.

No. 842,944.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed May 19, 1906. Serial No. 317,661.

To all whom it may concern:

Be it known that I, RANDOLPH CROMPTON, 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 Protector and Smash-Preventing Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Looms having a shifting shuttle-box at one end of the lay and a single shuttle-box at the other end of the lay are commonly provided with a single shaft at the front of the lay, said shaft having a central dagger and at each end a finger contacting with the usual binders of the shuttle-boxes. Whenever a shuttle is absent from the box in which it should be for proper running of the loom, the binder is not thrown out, and a spring surrounding the protector-shaft turns the latter and lifts the dagger in position to knock off and stop the loom. In other looms a single protector-shaft has been provided with a plurality of daggers, and said shaft has been moved by its spring whenever a shuttle was absent from the box that it should occupy as the lay is moving forward and the loom is stopped automatically. The usual protecting mechanism also stops the loom if for any reason the shuttle was left to protrude from the box; otherwise the warp would be broken and a warp smash would occur.

The object of this invention is to prevent a loom from being started whenever the operator in supplying a shuttle fails to place the shuttle in the box from which the shuttle was taken that is to be replaced.

The mechanism to be herein described with which I have embodied my invention is also so constructed that it serves the purpose of the usual protecting mechanism to protect against the absence of a shuttle from its box and the improper boxing of the shuttle to thus avoid warp smashes.

Figure 1 in front elevation shows a sufficient portion of the lay of a loom with shuttle-boxes at either end and means embodying my invention attached to the lay. Fig. 2 is a top or plan view thereof, said figure also showing a part of the breast-beam, the lever

of the knock-off motion, and part of the shipper-handle. Fig. 3 is a diagram showing the lay, the breast-beam, and lever referred to forming part of the knock-off motion in section, together with the cam-shaft and means actuated thereby for operating the daggers alternately to place them in their inoperative position. Fig. 4 is a detail to be referred to in the operation of the protector-rods. Fig. 5 shows part of the lay and protector-rod chiefly to illustrate the spring for moving the protector-rod in one direction.

Referring to the drawings, A represents the lay-beam, carried by the arms A', mounted as usual in the lay-frame. This lay has, as shown at its left-hand end, Figs. 1 and 2, suitable guideways in which is shown as sliding a drop-box B, containing, as represented, four cells, said boxes in practice being raised and lowered by any usual shuttle-box-shifting mechanism common to drop-box or fancy looms and controlled by a pattern-surface. Each of the cells of the drop-box has its own shuttle, and the shuttles are thrown from the drop-box to the single box B^x at the right-hand end of the lay by any usual picker-stick, as B², when the shuttle-box occupies a position at the level of the race of the lay. The single shuttle-box B^x has a picker-stick B³ to throw the shuttle therefrom back across the lay into the empty cell of the shuttle-box. The shuttle-boxes have usual binders a b.

In front of the lay in suitable bearings a' and a² are mounted two protector-rods a³ b². Each of these protector-rods has a finger 2 or 2^x, and said fingers act, respectively, against the binders a b in usual manner.

The protector-rod a³ has a dagger f, and the protector-rod b² a dagger e, and each protector-rod is surrounded by a suitable spring, as a⁵ b⁴, one end of each of said springs being connected with like adjustable collars t, secured to said protector-rods by suitable screws 3; the opposite ends of the springs underlying the lay, as represented in Fig. 5. The protector-rods a³ b² have applied to them, respectively, arms c c', said arms being fixed to said rods by suitable screws 10. The rear ends of these arms have projecting pins 4, (see Fig. 2,) that enter slots in ears 12 at opposite ends of a lever c², pivoted at c³ on an ear depending from the bearing a'. This lever

c^2 is connected by a link c^4 with one end of a lever c^5 , mounted on a stud c^6 of a bracket suitably secured to the loom-frame. The lever has a roller or other stud 7, that enters a cam-groove 8 in a cam c^7 , fast on the usual cam or cross shaft C. As the cam is rotated it moves the lever c^5 and through the link c^4 tips the lever c^2 about its pivot, and consequently turns the protector-rods a^3 b^2 alternately, each protector-rod being so moved that at one forward beat of the lay one dagger is elevated, the other dagger being elevated at the next beat of the lay. In other words, when one dagger is lifted the other is lowered, and vice versa.

The breast-beam D has at one end the usual slotted and notched plate D', in which moves the usual shipper-handle D², said shipper-handle being partially shown in Fig. 2 in the position it will occupy when the loom is running. Fig. 2 also shows a knock-off lever D³, pivoted at D⁴, said lever when struck by either dagger, as will be described, being moved in a direction to release the shipper-handle from its notch, so that the usual spring (not shown but forming part of the shipper-handle) will move said handle outwardly in its slot and set into operation usual stopping mechanism to stop the loom. The shipper-handle and stopping mechanism are not of the essence of this invention, and consequently need not be further described more than to say that any shipper-handle and stopping mechanism can be used.

The cam referred to is constructed and timed to depress the dagger coöperating with the shuttle-box at the opposite end of the loom from which the shuttle is thrown, so that said dagger is placed in its inoperative position during the forward beat of the lay as long as the loom is running properly, or, in other words, when the shuttles are properly boxed one or the other of the daggers—viz., the dagger farthest from the end of the loom where the shuttle starts—is depressed into its inoperative position as the lay is being moved forwardly by the usual pitman p , connected with the crank-shaft p' , said daggers being depressed alternately, according to the direction of the flight of the shuttle and by means independent of the binders that work through the fingers of the protector-rods to lower either detector-rod and place its dagger in its operative position to stop the loom whenever a shuttle is absent from the shuttle-box that it should occupy when the lay is being moved forward.

The two protector-rods each having its own dagger and binder-fingers not only effect, as usual, the stopping of the loom in the usual manner whenever a shuttle fails to enter its proper shuttle-box, but also to stop the loom whenever a shuttle is not properly boxed—that is, whenever the shuttle extends outwardly from the box into the shed.

In accordance with this invention I have provided suitable dagger-depressing means, herein shown as a cam c^7 , lever c^5 , link c^4 , and lever c^2 for operating the two protector-shafts, so that in case the operator fails to replace a shuttle in the particular cell of that shuttle-box from which the shuttle was removed the loom cannot be started.

In operation let it be assumed that the shuttle next to be thrown is in the single-box end of the lay, as represented in Figs. 1 and 2. In this condition the binder b , acting through the finger of protector-rod b^2 , will lower the dagger e into the full-line position, Fig. 3, so as not to meet the knock-off lever D³, and the loom will continue to work, other things being regular.

It will be understood that the shifting shuttle-box at the opposite end of the loom presents an empty cell in line with the race-way of the lay, and consequently the binder a of that empty cell will occupy its inward position and the spring a^5 of the protector-rod a^3 will raise the dagger f , (see dotted lines, Fig. 3,) so that as the lay is moved forward in such conditions the dagger would meet the lever D³, knock off and stop the loom. This of course has to be prevented, and consequently while the shuttle is being driven from the single-box end of the lay across the lay to enter the empty cell of the movable shuttle-box the cam referred to, acting through the means described, turns the protector-rod a^3 and depresses the dagger f from the position shown in dotted lines, Fig. 3, into a position behind the dagger e , which is depressed by the shuttle in the cell of the single box, so that the loom is not stopped.

Assuming that the shuttle is to be thrown from a cell of the shifting shuttle-box, the shuttle, through its binder a , acting on the finger 2 of the protector-rod a^3 , will turn that rod and depress the dagger f , and inasmuch as at this time there is no shuttle in the single box at the opposite end of the lay the spring b^4 of the protector-rod b^2 , acting normally, will turn said rod, raise the dagger e , which if not prevented would stop the loom at the next forward stroke of the lay; but this stopping of the loom is prevented by means of the cam and the devices actuated thereby that turns the protector-rod b^2 independently in a direction to depress the dagger e , so that the loom is not stopped. It will be understood, therefore, that these daggers are depressed alternately positively during the operation of the loom by the dagger-depressing means, said means acting to depress the dagger farthest from the end of the loom from where the shuttle starts. If for any reason a shuttle has to be removed from the drop-box end of the loom and a shuttle supplied in its place, the shuttle must be placed in the cell of the drop-box from which the shuttle was taken, and so, also, if a shuttle is taken out of the

single-box end of the lay the shuttle must be replaced in that box; otherwise the loom cannot be started.

It will be obvious should a shuttle that failed for any reason be removed from a cell of the drop-box and be replaced in the single shuttle-box and should be thrown therefrom that the shuttle leaving the single box could not enter a cell of the movable box if for any reason the boxes were moved through the pattern-surface between one and the next pick, for the empty box under such a condition would be out of line with the level of the race. If, for instance, a shuttle should be removed from one of the cells of the drop-box at the end of the lay and another shuttle to take its place should be applied to the single-box end of the lay, the binder of the single-box end of the lay would be moved outwardly, thus depressing the dagger *e*; but the binder in the empty cell of the drop-box at the opposite end of the lay, occupying its inward position, permits the spring *a*⁵ on the protector-rod to raise the dagger *f*, so that the loom will be immediately knocked off at the next forward beat of the lay.

If the shuttles fail from any cause in the single-box end of the lay and the operator should shoot a shuttle through the warp into the then empty cell of the drop-boxes in line with the race of the lay, said shuttle would move outwardly the binder of the drop-box and through the finger coacting therewith would turn the protector-rod *a*³, bearing the dagger *f*, but the single binder in the box where the shuttle ought to be would be left in and the spring *b*⁴, surrounding the protector-rod *b*², will lift the dagger *e*, so that as the lay moves forward it will act to immediately stop the loom.

I have herein shown both protector-rods as controlled by a single cam for moving the lever *c*², made and mounted as a whiffletree; but my invention would not be departed from if instead of one cam I used two cams and set them so as to act alternately upon like levers *c*⁵, each lever being connected by a like link *c*⁴ with the rear ends of the levers *c*³.

The slots in the ears 12 permit the pins 4 of the levers *c*³ to slide in said slots as a protector-rod is moved through the action of a finger 2 or 2^x on the shuttle-binder with which it coacts.

I believe I am the first to control the protector-rods independently of the binders and usual stop-motion devices to move the daggers alternately during the operation of the

loom and to place either dagger in a position to stop the loom in case a shuttle taken from one of the boxes should be replaced by a shuttle put into the other box, and consequently my invention is not limited to the particular means shown and described for turning the protector-rods alternately to raise and lower alternately the daggers in the manner described.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A lay having two protector-rods each provided with a dagger and with a finger coacting with the usual binder, and means to turn the protector-rods to place the daggers alternately in their inoperative positions.

2. In a loom, a knock-off mechanism combined with a lay having two protector-rods, each provided with a dagger and a finger, the finger coacting with the usual binder, and means to move the protector-rods independently to lower that dagger which is next to the end of the lay from which the shuttle starts.

3. In a loom having a series of drop-boxes provided with binders, a protector-rod having a finger coacting with each of said binders, and a dagger, and means to turn said rod independently of the binder to put its dagger in position to enable the loom to continue in operation in case the shuttle coming into the empty cell of the movable shuttle-box fails to be properly boxed.

4. In a loom, a lay having drop-boxes at one end thereof and a single box at its opposite end, said boxes having usual binders, a pair of protector-rods each provided with a dagger, and means independent of the binders to place one of said daggers in position to stop the loom in case the operative places a shuttle in any box except that from which the shuttle to be replaced was taken.

5. In a loom having drop shuttle-boxes at one end, a protector-rod having a dagger that is put into loom-starting position in case the shuttle is absent from the shuttle-box, and independent means for moving said protector-rod to stop the loom in case the shuttle has not been applied to its proper cell before starting the loom.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RANDOLPH CROMPTON

Witnesses:

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ROBT. C. DOUGLAS.