No. 651,973. Patented June 19, 1900.

T. G. MOSER.

BOX MOTION FOR LOOMS.

(Application filed Feb. 12, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

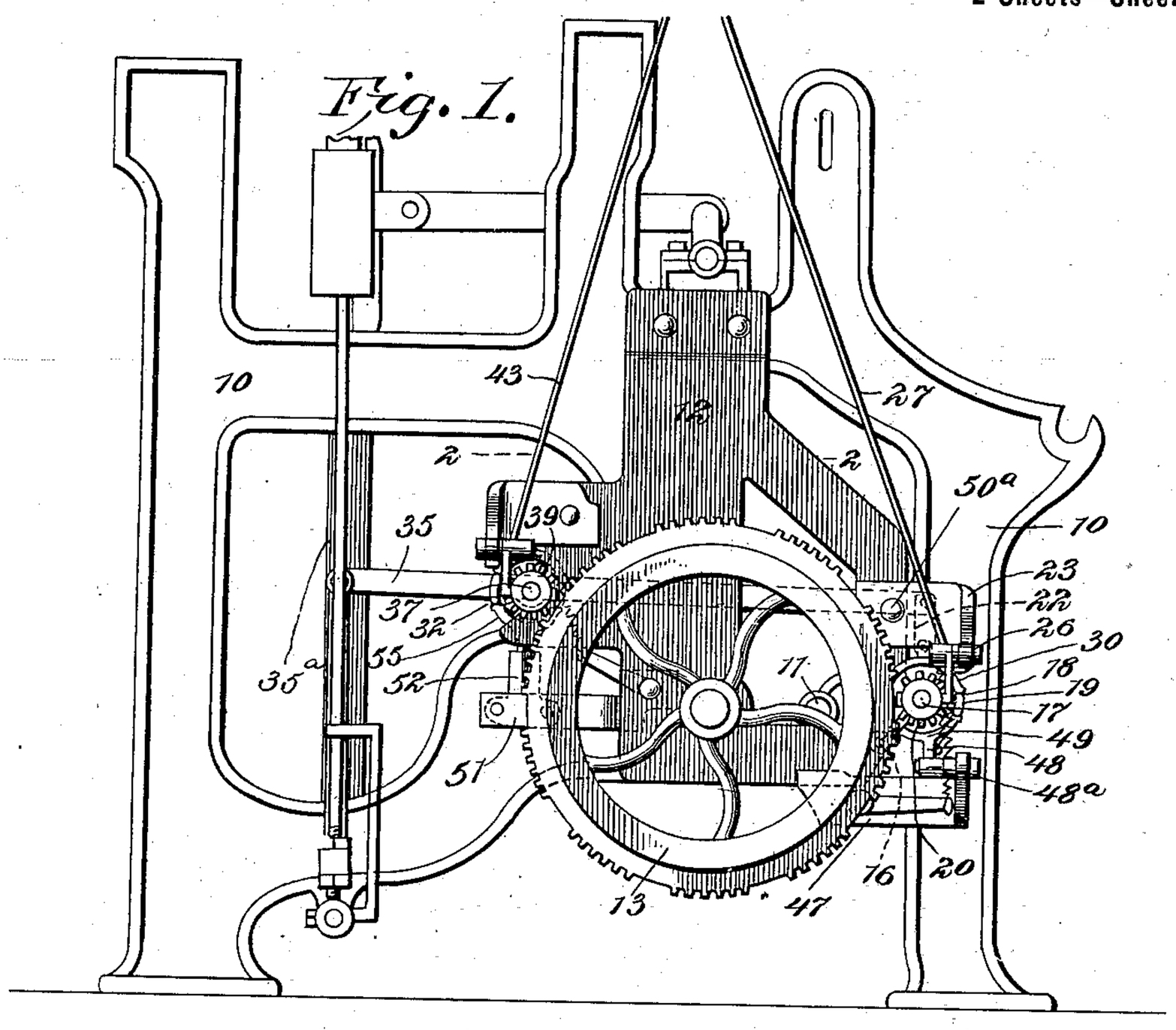
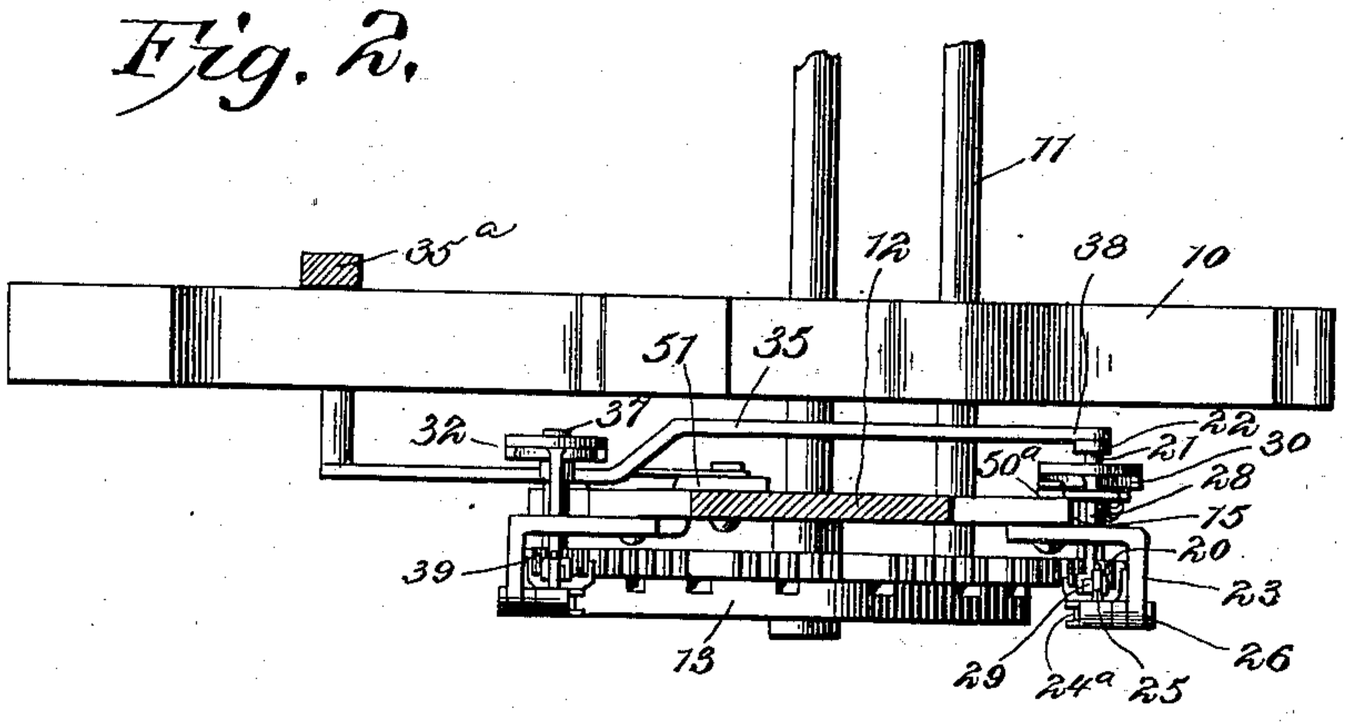


Fig. 2.



Witnesses
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Thomas G. Moser, Inventor,
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Fig. 3.

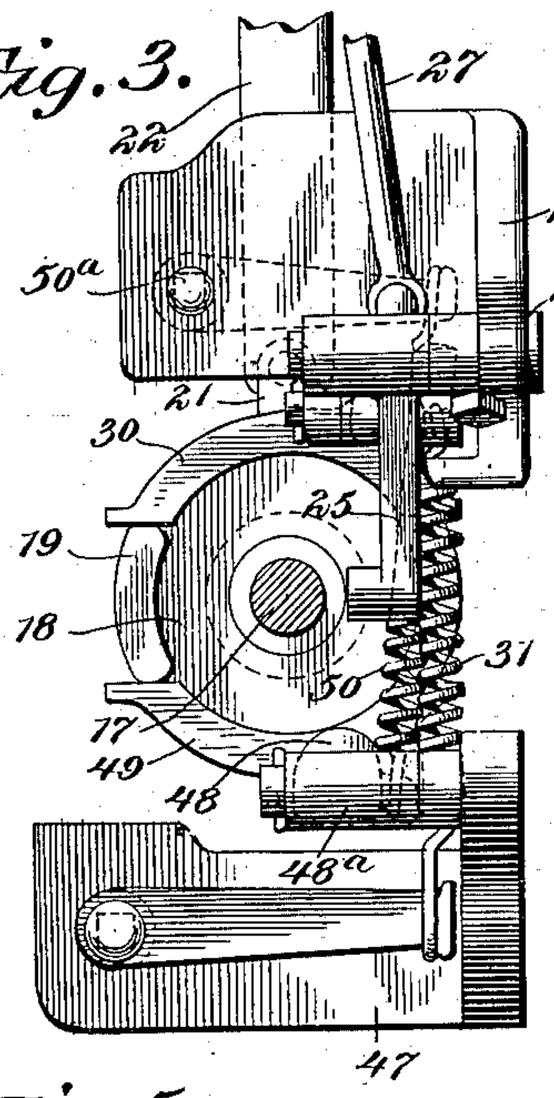


Fig. 4.

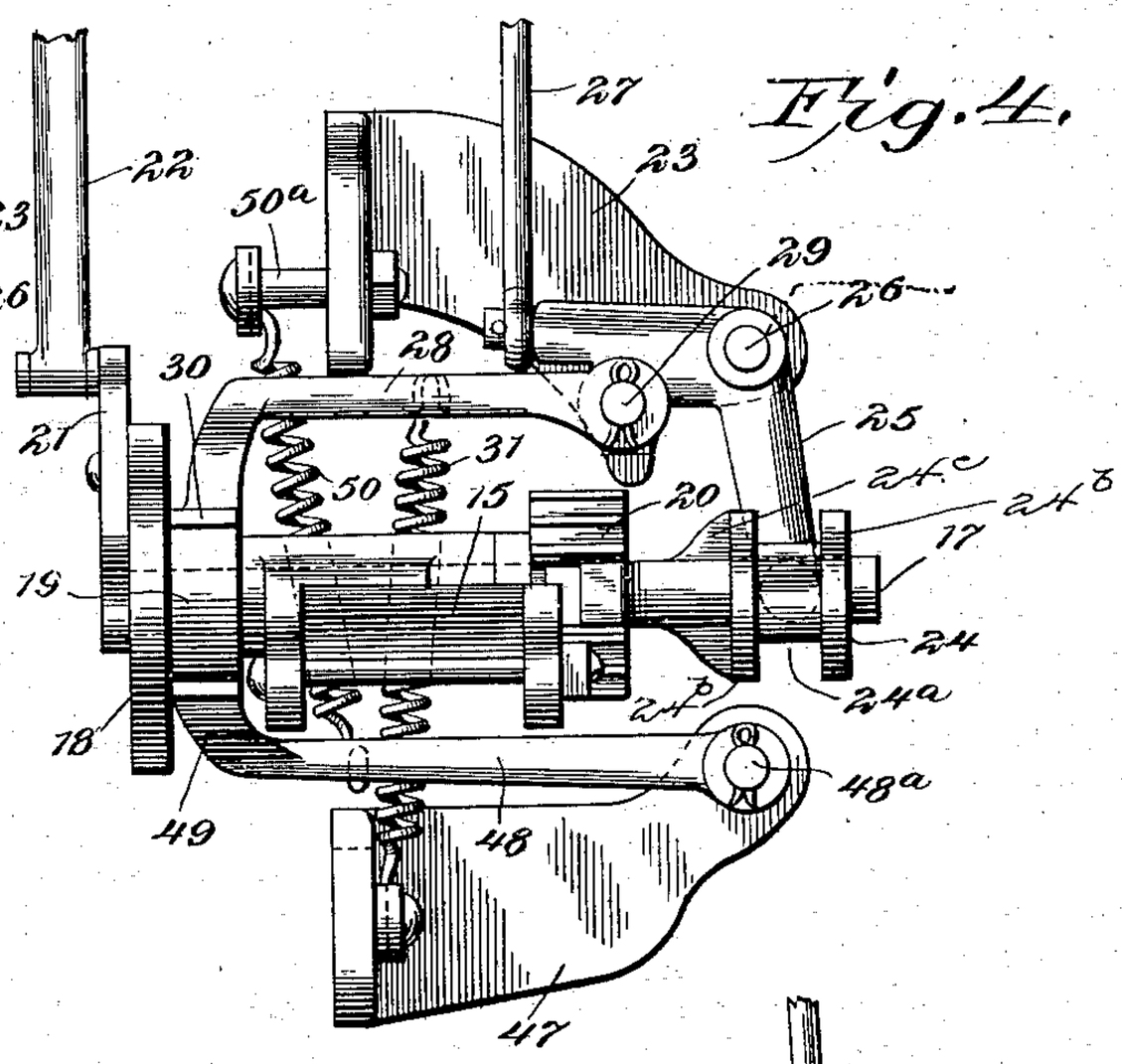


Fig. 5.

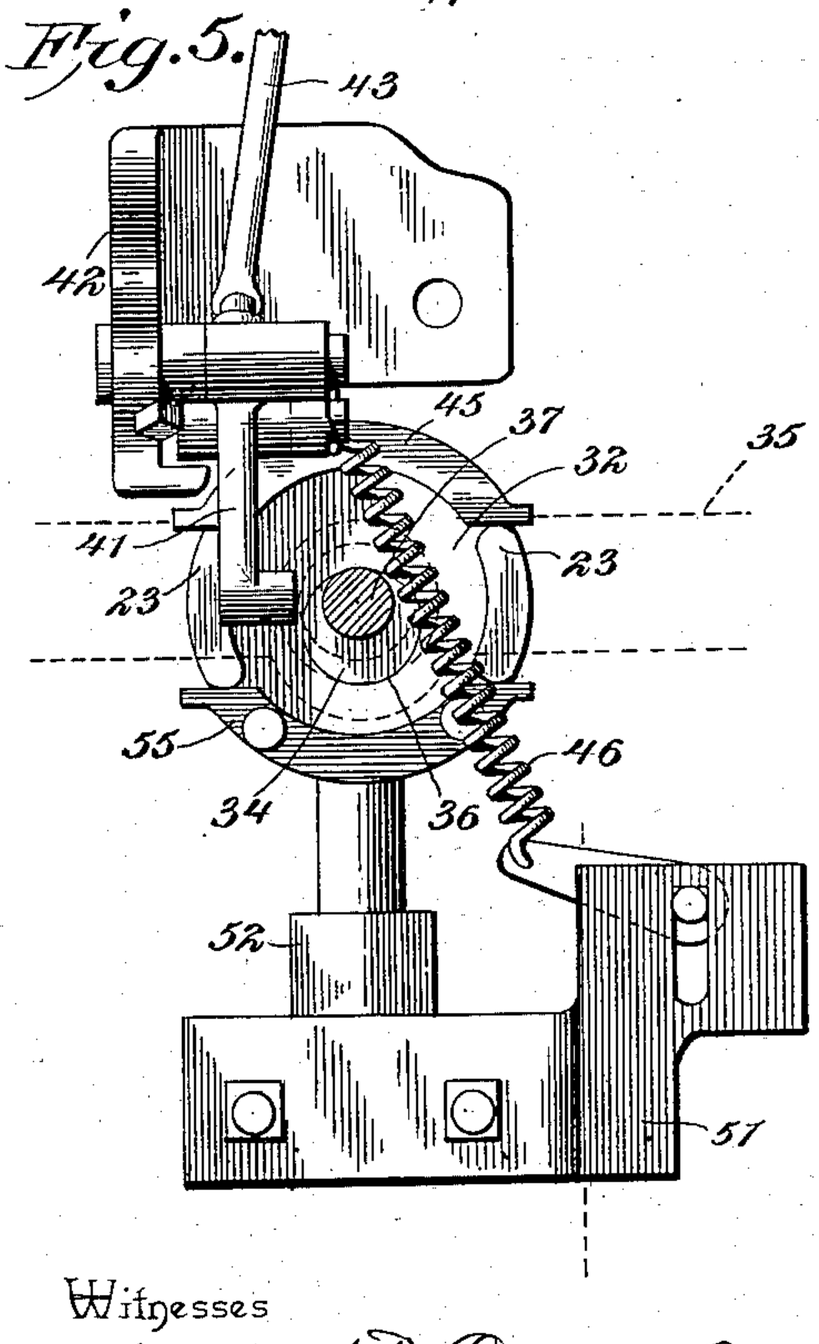
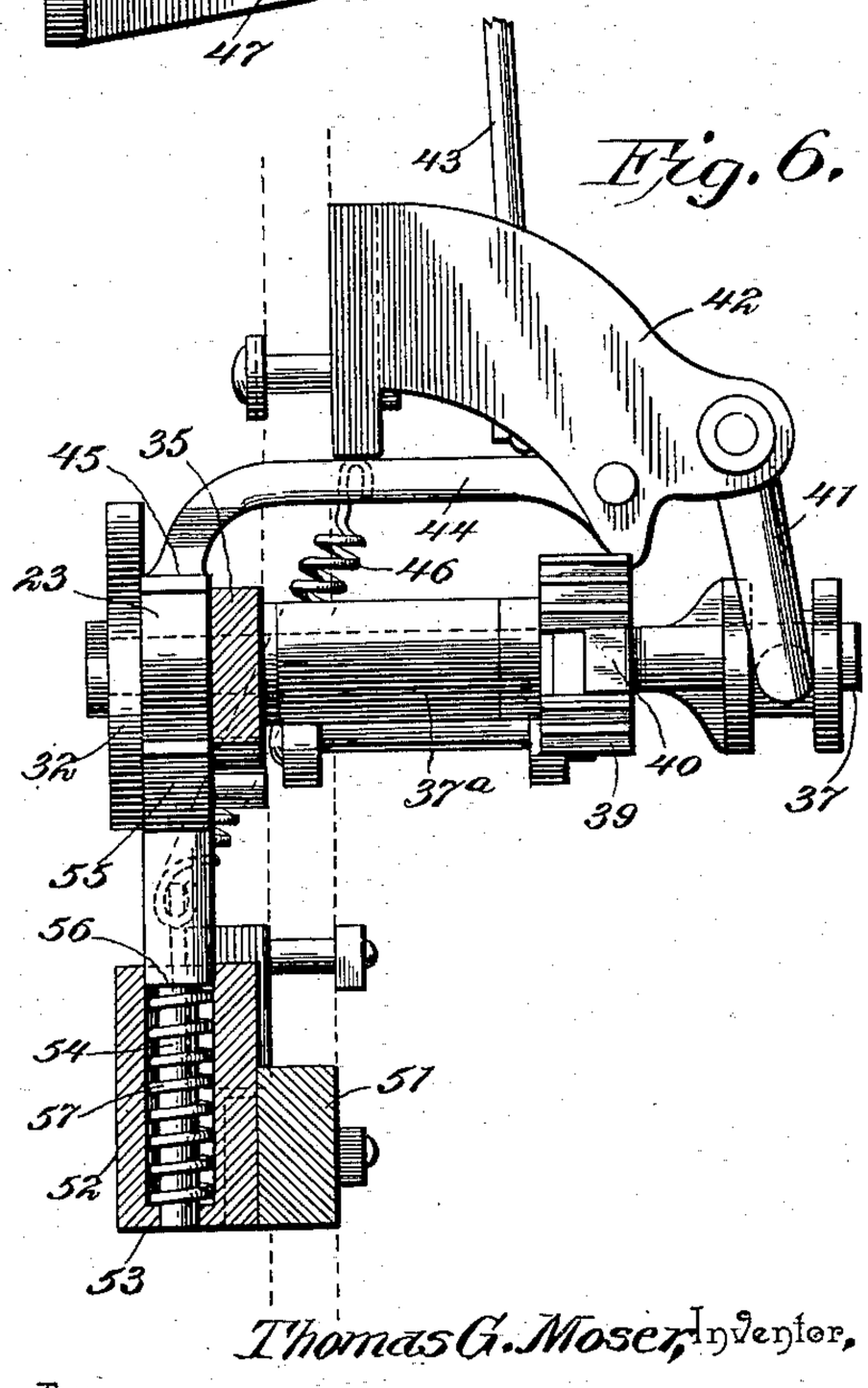


Fig. 6.



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UNITED STATES PATENT OFFICE.

THOMAS G. MOSER, OF GIBSONVILLE, NORTH CAROLINA, ASSIGNOR OF ONE-HALF TO ROBERT F. RICE, OF GREENSBOROUGH, NORTH CAROLINA.

BOX-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 651,973, dated June 19, 1900.

Application filed February 12, 1900. Serial No. 4,964. (No model.)

To all whom it may concern:

Be it known that I, THOMAS G. MOSER, a citizen of the United States, residing at Gibsonville, in the county of Guilford and State of North Carolina, have invented a new and useful Box-Motion for Looms, of which the following is a specification.

My invention relates to box-motions for looms, the same being directed more particularly to structures of that class known in the art as the "Crompton loom," an example of which is disclosed in the patent to H. Wyman, No. 227,667, and capable of use in connection with a box-motion employing two, four, or six shuttle-boxes.

Heretofore in the art it has been common to connect the box-rod of the shuttle-box with a tripping-dog that rides upon a cam, or, as it is technically known, a "whirl," adapted to be driven from an intermittently-revoluble master-gear through the medium of a gear-pinion, the latter being made fast or loose with the cam-shaft through the medium of a shiftable clutch-lever that is actuated from a pattern-chain. Such arrangement also contemplates the use of a spring in connection with the tripping-dog for holding the latter in engagement with the cam or whirl; but in the practical service of the structure it is found that a great deal of friction exists between the tripping-dog and the cam or whirl and also between the master-gear and the clutch for the pinion, which decreases the speed of the loom. A serious objection to this mechanism also resides in the liability of the tripping-dog spring to become broken, as well as several of the other parts of the box-motion, because actual use has shown that the tripping-dog, the cam projections on the cam or whirl, and the hinged boxing for the shaft of said cam or whirl are frequently broken, thus arresting the motion of the loom until the parts are repaired or replaced.

The object that I have in view is to provide means which reduces the friction on the parts and minimizes the liability of breakage of said parts, thus making the loom operate more easily, obviating stoppages of the parts and improper shifting of the shuttle-boxes, so that the shuttles will not strike one another in the shed and to allow the loom to remain in service should one of the springs become broken.

The invention consists in the combination, with a cam-wheel or whirl and a tripping-dog riding thereon, of a yieldable shoe engaging with the cam-wheel or whirl, so as to operate thereon in opposition to the tripping-dog.

The invention further consists in the novel construction and arrangement of parts, which will be hereinafter more fully described and claimed.

In the drawings I have represented my improvements in connection with a four-box box-motion of a Crompton loom, in which—

Figure 1 is a side elevation of a portion of the box-motion with my improvements applied thereto. Fig. 2 is a horizontal sectional plan view taken in the plane of the dotted line 2 2 of Fig. 1. Fig. 3 is an elevation, on an enlarged scale, of the cam or whirl and the parts associated directly therewith, the cam-shaft being shown in cross-section. Fig. 4 is a side view of the parts shown by Fig. 3, said views illustrating the elements known as the "back cam" or "whirl" for the four-box motion. Figs. 5 and 6 are views in end and side elevation of the devices associated with the part known as the "front cam" or "whirl" of the four-box motion.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

10 designates the end frame of a loom at the left-hand end thereof, and 11 is the main shaft of the loom. A frame-bracket 12 is secured firmly to the end frame 10, and on this frame-bracket is mounted a stub-shaft of the intermittently-revoluble master-gear 13, the teeth of which are not continuous, so that they are grouped in sets designed to be successively engaged with an idle gear-pinion which normally is loose on the cam-shaft presently described. This master-gear 13 is designed to be rotated intermittently in one continuous direction by devices actuated in an ordinary manner from the main shaft 11, and as in the patent before mentioned. The shaft for the back cam of the box-motion is carried in a hinged bracket 15, which is con-

nected pivotally at 16 with the frame-bracket 12. The back-cam shaft 17 is journaled idly in the hinged swinging bracket 15, and the back cam or whirl 18 is made fast with the shaft 17 in any usual way. The back cam is provided with cam lugs or flanges 19, which project from one face of a disk. On the back-cam shaft 17 is loosely mounted a spur-gear pinion 20, which is adapted to intermesh with the series or groups of teeth on the mutilated master-gear. The back cam 18 is provided with a laterally-extending pin 21, which in a box-motion using multiple shuttle-boxes is connected pivotally with a vertically-disposed short pitman 22, the latter being pivoted to one end of a box-rod lever that is also associated with the front cam or whirl 32 of the box-motion, as will presently appear. A bracket-hanger 23 is made fast with the frame-bracket 12, as is usual in the art, and on the back-cam shaft 17 is a shiftable clutch 24, that is adapted for engagement with the gear-pinion 20 at regular intervals for the purpose of making said gear fast with the shaft, so as to rotate the latter and the back cam when the master-gear is actuated from the main shaft. The clutch 24 comprises connected opposite end disks 24^b, slidable on the shaft 17 and having projections 24^c to interlock with the said gear-pinion. The shiftable clutch is also provided with a groove 24^a, in which loosely fits one arm of the bell-crank lever 25, which constitutes the clutch-shifter. Said clutch-shifter lever is fulcrumed at 26 on the bracket-hanger 23, and to its otherwise free end is loosely connected the lower extremity of one of the pattern-chain rods 27, the latter extending from the clutch-shifter lever to a point for actuation by the pattern-chain in the ordinary manner familiar to those skilled in the art. With the back cam is associated the usual tripping-dog 28, which is provided with an arm that is pivotally connected at 29 to the clutch-shipping lever 25, so as to be movable therewith. This dog is provided at its free end with a segmental shoe 30, that is adapted to be held normally in contact with the cam projections or lugs 19 of the back cam by means of a tension-spring 31, said tension-spring being connected to the back dog and to a fixed part of the frame-bracket 12.

One of the improvements which I have made in the box-motion and which is especially adapted for use in connection with the intermittently-revoluble back cam 18 consists of a yieldable shoe mounted for engagement with the lugs or projections of the back cam, so as to act thereon in opposition to the tripping-dog. In adapting my improvement to this back cam of the box-motion I employ a bracket-plate 47, reference being had more particularly to Figs. 3 and 4 of the drawings. This bracket-plate is designed to be fastened by bolts to the frame-bracket 12 in a position below the horizontal plane of the back cam and its shaft, and to the free end of this fixed bracket-plate is connected one end of a vibratory arm 48. This arm is pivotally mounted or connected at 48^a to the bracket-plate 47, and the free end of this arm is formed with an integral shoe 49. This shoe is provided with a convex surface which faces in an upward direction, and the vibratory arm is hung on the bracket-plate, so as to present the curved shoe in the vertical plane of the cam lugs or projections 19 of the back cam 18. This vibratory arm and its shoe are normally held in operative positions by means of a spring 50, so as to always hold the shoe in engagement with the cam on the opposite side thereof to the tripping-dog shoe. The spring 50 has one end connected with the vibratory arm 48 at a point between its pivot and the shoe, the other end of said spring being attached to a bolt 50^a, which fastens the bracket-hanger 23 to the frame-bracket 12. The yieldable shoe 49 is held under spring-pressure in engagement with the projections of the back cam on the opposite side thereof to the shoe of the tripping-dog, and it will thus be seen that the two shoes work in opposition to each other and under spring-pressure against the lugs or projections of the back cam. The effect of this combination and organization of elements is to reduce the friction between the back cam and the shoe of the tripping-dog, and the friction is thus borne partly by the yieldable shoe 49, which I have provided, thereby distributing the strain on the back cam and minimizing the tendency of the breakage of the parts.

In the four-box motion represented by the drawings the front cam or whirl is indicated at 32 in the form of a disk provided with the lugs or flanges 33, reference being had more particularly to Figs. 5 and 6. This front cam is provided with an eccentric boss 34, and adjacent to said front cam is the usual box-rod lever 35, the latter having a short slot 36, which receives the eccentric boss 34 of said front cam. One end of the lever 35 is connected pivotally at 38 to the pitman 22, which is driven by the wrist-pin on the back cam. The front cam 32 is made fast with a short shaft 37, which is journaled in a hinged bracket 37^a, that is connected pivotally with the frame-bracket 12 in the usual way, and on this front cam-shaft is loosely mounted the gear-pinion 39, the latter adapted to intergear with the mutilated master-gear. A clutch 40 is fitted on the front-cam shaft for engagement with the idle gear 39, and with this clutch is associated the clutch-shifter 41, the latter being hung pivotally on a bracket-hanger 42, which is bolted to the frame-bracket 12. The other pattern-chain rod 43 is connected pivotally with the tripping-dog 44, that is pivoted on the clutch-shifter 41 and is provided with the shoe 45, adapted to be normally drawn into engagement with the lugs or projections 23 of the front cam by the usual spring 46.

The improvement which I have made for use in connection with the front cam is a yieldable shoe normally held under spring-pressure in engagement with the lugs or projections of the front cam, so as to act thereon in opposition to the front tripping-dog 44. This shoe is shown by Figs. 5 and 6 as supported in slidable relation to the front cam. A bracket-plate 51 is bolted or otherwise fastened firmly to the frame-bracket 12 to assume a position below the horizontal plane of the front cam and the shaft, and this bracket-plate is provided with a guide-socket 52, which is made integral therewith. This socket is formed at its lower end with the seat 53, and said socket loosely receives the vertically-movable stem 54. At the upper end of the stem is the curved shoe 55, which is integral with said stem, and the parts are arranged for this shoe to be pressed in an upward direction against the under side of the cam lugs or projections 33 of the front cam. The stem is reduced to provide the shoulder 56, against which is seated the upper end of a coiled spring 57, the latter being housed or contained in the socket 52, so as to have its lower end bear upon the seat 53. This slidable spring-pressed shoe acts on the front cam, in opposition to the tripping-dog thereof, in the same manner and for the same purpose as the shoe for the back cam heretofore described, and thus the friction on the cam is distributed between the shoe of the tripping-dog and the spring-pressed slidable shoe.

From the foregoing description, taken in connection with the drawings, it will be seen that I have combined with each cam a tripping-dog and a yieldable shoe, each held in engagement with the cam by a spring, which is independent of the spring for the other element. This is an important feature, because one or the other of the parts is maintained in engagement with the cam in the event of breakage of one of the springs. Heretofore a single dog has been held in engagement with one cam by a single spring, and when this spring broke, as frequently happens, the cam is free to rotate so as to improperly actuate the box-rod and the shuttle-box, which resulted in improper guidance and delivery of the shuttle, so that two shuttles would meet in the shed and break the threads. This objection is overcome by the use of my improvement, because if the spring of the tripping-dog breaks the spring of the yieldable shoe will remain intact and the shoe will engage with the cam, so as to allow the loom to remain in operation until the broken spring can be replaced.

I have not considered it necessary to illustrate the shuttle-box nor the pattern-chains, because these parts are ordinary in the art.

The operation of the box-motion is essentially the same as box-motions of the ordinary Crompton loom familiar to those skilled in this art; but the use of my improvements lessens the friction on the tripping-dog associated with each cam, so that the strain and friction are distributed, the liability of the parts to break is minimized, and the loom may run easier and more rapidly.

Although I have shown and described a swinging spring-pressed shoe for use in connection with the back cam and the slidable spring-actuated shoe adapted to the front cam, I am aware that the shoes can be reversed—that is to say, the slidable shoe may be used in connection with the back cam and the swinging shoe in connection with the front cam.

It is to be understood that the improvements which I have made are designed, primarily, to prevent smashing of the working parts of a box-motion and to reduce the friction and wear on the cam.

Although I have shown and described the improvements in connection with the cams of a four-box motion, it is evident that my improvements may be used in connection with a two-box motion or a six-box motion.

Changes within the scope of the appended claims may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention is embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what I claim is—

1. In a box-motion for looms, the combination with a cam and a dog under spring tension engaging therewith, of a shoe also engaging with the cam in opposition to the dog, under spring tension in a direction reverse to that of the latter, substantially as described.

2. In a box-motion for looms, the combination with a cam, and a dog under spring tension engaging therewith, of a yieldable shoe under spring tension in a direction reverse to that of the dog and also engaging with the cam, and means for holding said shoe normally in operative relation to the cam, substantially as described.

3. In a box-motion for looms, the combination with a cam, and a dog, of a shoe, and independent springs connected respectively with the dog and the shoe, and exerting an inward drawing on said latter parts in reverse directions, substantially as described.

4. In a box-motion for looms, the combination with a cam, of movable elements engaging with the cam in opposition to each other, and independent tension devices connected individually with said elements, for the purpose described, substantially as set forth.

5. In a box-motion for looms, the combination with a cam, and a yieldable dog engaging therewith, of a movable element having a shoe, and a spring connected with said element to normally hold the shoe thereof in engagement with the cam, substantially as described.

6. In a box-motion for looms, the combina-

tion with a cam, and a spring-pressed dog, of a stationary bracket, a movable element mounted on said bracket and having a shoe which is presented in operative relation to the cam, and a spring connected with said element, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

THOMAS G. MOSER.

Witnesses:
W. THEO. WILLIAMS,
J. P. GILBERT.