

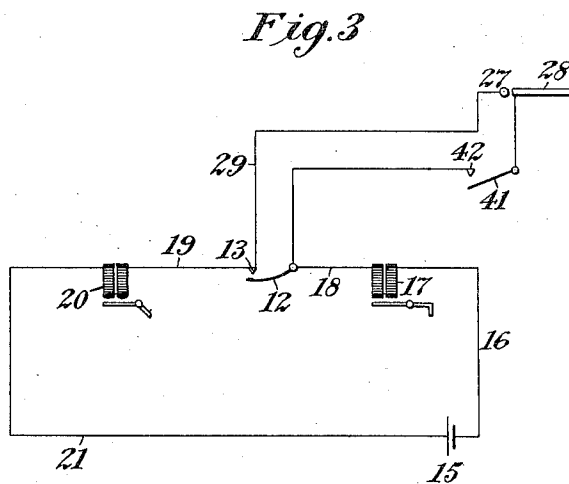
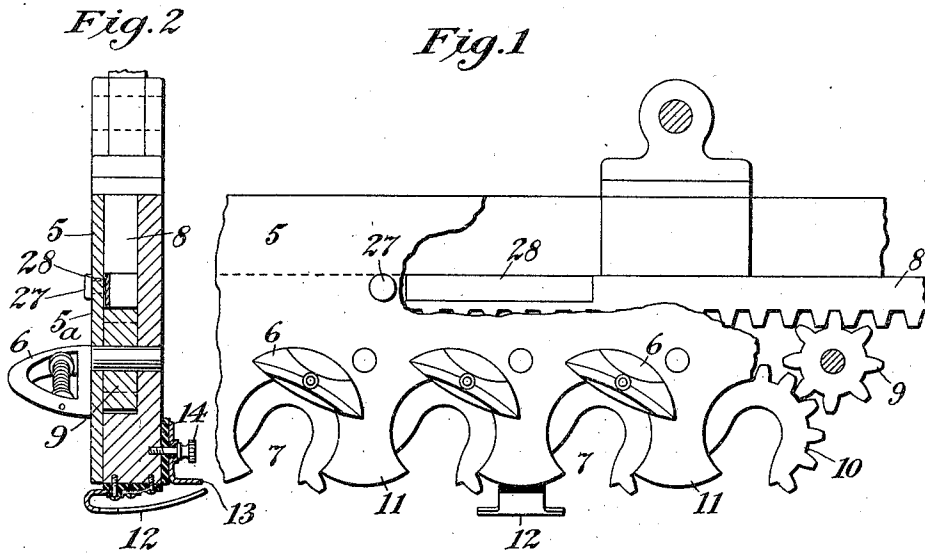
M. SEMOFF.
SWIVEL LOOM.

APPLICATION FILED SEPT. 23, 1910.

1,030,928.

Patented July 2, 1912.

2 SHEETS-SHEET 1.



Witnesses:
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Inventor:
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2 SHEETS—SHEET 2.

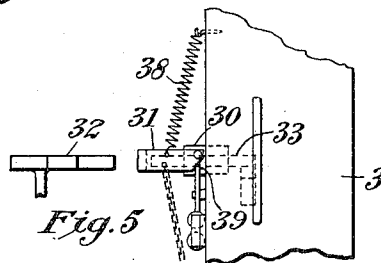
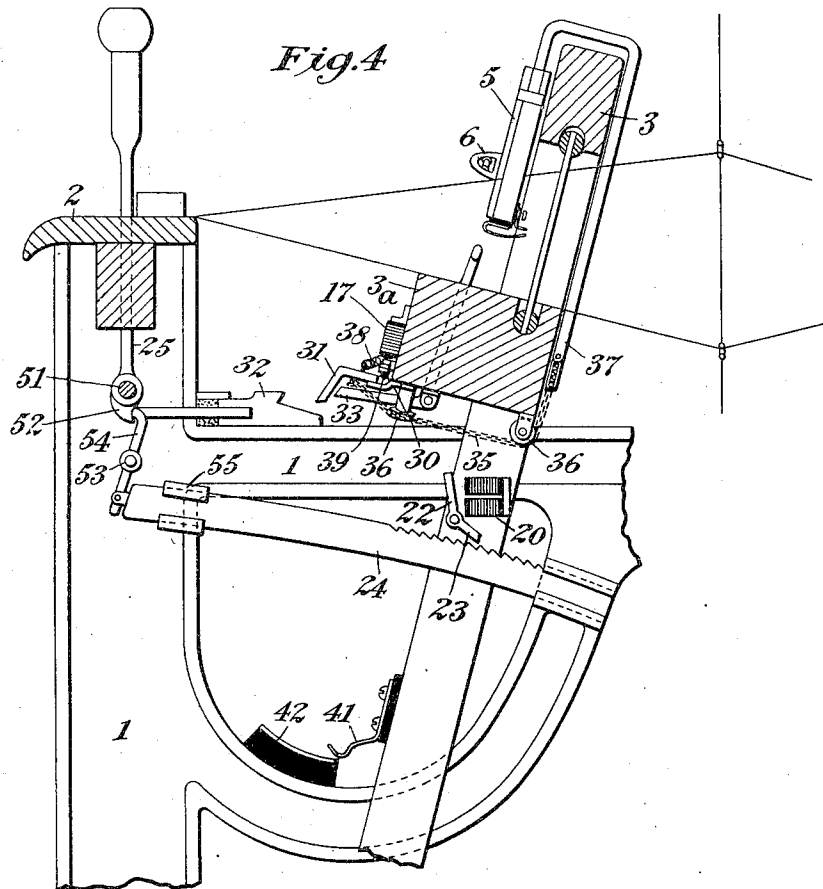
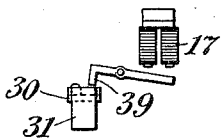


Fig. 6



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UNITED STATES PATENT OFFICE.

MEYER SEMOFF, OF NEW YORK, N. Y.

SWIVEL-LOOM.

1,030,928.

Specification of Letters Patent.

Patented July 2, 1912.

Application filed September 23, 1910. Serial No. 583,350.

To all whom it may concern:

Be it known that I, MEYER SEMOFF, a citizen of the United States, residing at the borough of the Bronx, in the city and county of New York and State of New York, have invented certain new and useful Improvements in Swivel-Looms, of which the following is a specification, reference being had therein to the accompanying drawings, forming part thereof.

My invention relates to swivel looms in which, in addition to the ordinary fly shuttle for weaving the body of the fabric, circular shuttles or other devices are used to weave spots or small figures on the face of the fabric, according to the desired design.

My invention has for its object to provide means for automatically stopping looms of the class described whenever there is any irregularity of movement of the swivel shuttle rail due to the failure of the pattern mechanism or other actuating means to operate properly, as a result of which the warp threads not in their proper positions for the weaving operation of the swivel shuttles, will be caught thereby and damaged.

My invention has for its object to provide means for automatically stopping the loom to prevent the smash up of the threads when they are not located in their proper positions with respect to the swivel shuttles.

My invention has for its object, in addition to the above, to provide means for automatically stopping the loom whenever the swivel shuttles fail to act properly and remain in the shed.

My invention also has for its object to provide means for automatically stopping the loom during either the forward or backward movement of the lay.

My invention also has for its object, simplicity and economy of construction, ease and reliability of operation, and adaptability for attachment to the ordinary loom.

My invention has other objects which will appear more fully hereinafter.

I shall now describe the embodiment of my invention illustrated in the accompanying drawings and will thereafter point out my invention in claims.

Figure 1 is a front elevation of a detached portion of the swivel shuttle rail and swivels carried thereby, the rail being partly broken away to show the internal mechanism thereof. Fig. 2 is a side elevation of the same in section. Fig. 3 is a diagram-

matic outline of the circuits controlling the stopping mechanism of the illustrated embodiment of my invention. Fig. 4 is a side elevation of a loom with the improvements thereon embodying my invention. Fig. 5 is a plan view of the blades and buffer operating the stopping mechanism and the controlling means therefor. Fig. 6 is an end elevation of the blade controlling magnet.

In Fig. 4 is shown an ordinary loom upon the frame 1 of which is mounted the breast beam 2, the lay 3 carried by the lay swords 4, and other parts well understood by those skilled in the art. The shuttle rail 5 is slidably fitted on the lay 3 and permitted to be raised and lowered thereon at times predetermined by the action of the pattern mechanism operating through suitable cams, levers and springs not shown. The shuttle rail is provided with a series of swivel shuttles 6 of circular form which are located along the rail at fixed distances apart and adapted in their movement to bridge the recesses 7 provided along the lower portion of the rail. The shuttles 6 are shown as operated through a reciprocating rack 8, pinions 9 and horse-shoe shaped gears 10, carried by the shuttle rail 5. The mechanism for giving the lateral reciprocating movement to the rail may be of any well known manner of construction and operation and is therefore not shown. The rack drives all the shuttles in perfect unison with each other. The mechanism for raising and lowering the shuttle rail 5 and for laterally moving it to the right and left may also be of any of the well known types of construction and operation and are therefore not shown in the accompanying drawings and therefore need not be described at length.

The swivel shuttles normally lie in their positions at the top of the recesses 7 leaving the latter unrestricted for the passage thereof of the warp threads lifted by the pattern mechanism in the formation of the figure or spot. As the shuttles perform their rotational movement they pass beneath the lifted warp threads and above the lower warp threads. The number of threads in each series of threads passing within any one of said recesses 7 is always equal in number to those passing through the other recesses along the shuttle rail. The relative position of each thread in each series is in all cases the same so that in the event of any irregularity in the movement of the

shuttle rail, the same relative threads in each series will fail to clear the blocks 11 between the recesses 7 and be prevented from passing up and within those recesses. A smash up results from the engagement of the quick moving shuttles 6 with the improperly positioned warp threads. To prevent the smash up, with the consequent labor of reuniting the threads and repairing the damage done, and insure the stoppage of the loom in the event of the warp threads failing to clear the blocks 11 along the base of the rail is one of the principal objects of my invention.

In the illustrated embodiment of my invention, I provide along the lower edge of one of the blocks 11 a movable contact, preferably a flat spring 12 which extends the length of the block 11 and which is moved into contact with an L-shaped plate 13 mounted on the rear face of the shuttle rail and above the spring 12. The plate is adjustable to vary the distance between it and the flat spring, the adjustment screw 14 accomplishing this purpose. The warp threads which fail to pass within the recesses 7 when lifted by the pattern mechanism will engage the flat spring 12 as the shuttle rail is lowered. The spring will be moved into contact with the plate 13 and close an electrical circuit to operate an electromagnet 20. In Fig. 3, the circuit which is thus called into play is traced as follows: from battery 15, wire 16, electromagnet 17, wire 18, contacts 12 and 13, wire 19, electromagnet 20, and wire 21 to the battery. The electromagnet 20 is mounted on the lay sword 4 and when energized operates to attract the arm 22 of the bell crank lever the engaging end 23 of which falls into one of the notches in the ratchet bar 24 to move the lever 54 into engagement with the projection 52 on the belt shifting lever shaft 51 to shift the belt and operate the brake mechanism (not shown) to stop the loom and prevent the further rearward movement of the lay. Thus as the shed is opened and the lay moved backward and the shuttle rail lowered preliminary to the rotational movement of the shuttles across the recess, the misplaced threads engaging the spring contact 12 effect the closing of the electrical circuit which through the electromagnet and stopping mechanism operates to stop the loom immediately.

It is obvious that in case the swivel shuttle 6 is held within the shed and prevented from moving out of its position at the lower end of the recess 7 for some reason or other, there will result with the forward movement of the lay and the shuttles carried thereon, a serious and damaging smash up of the warp threads forming the shed. This is prevented, however by stopping the loom before any damage can take place. To illustrate, with the shuttles 6 at the lower end of the

recesses 7 the contacts 27 and 28 will be in engagement with each other. As soon as the batten 3^a has advanced one fourth of its forward movement and the spring contact or key 41 engages the stationary contact 42, an electrical circuit is closed thereby energizing an electromagnet to operate the automatic stop mechanism hereinafter described. In Fig. 3 this circuit may be traced as follows: from battery 15, wire 16, electromagnet 17, wire 18, contacts 41, 42, contacts 27, 28, wire 29, wire 19, electromagnet 20, and wire 21 back to the battery. In the illustrated embodiment, the electromagnet 17, is mounted on the batten 3^a near its longitudinal center. It operates to attract the lever 39 and cause the stop pin carried thereon to drop into the V-shaped recess provided at the end of the blade 31 to prevent the latter from swinging on its pivot to clear the frog or buffer 32. The buffer is mounted on the frame beneath the breast beam 2, and engages the projection 52 on the shaft 51 to rotate the latter and operate the belt shifting and brake mechanisms well understood by those familiar with this art.

It is obvious that while the shuttles are acting properly there will be no closing of the circuit as the lay moves forward and a closing of the contacts 41 and 42 effected, for the reason that the circuits will still remain open at the contacts 27 and 28. With the shuttles acting properly, the contacts 27 and 28 will be closed during the period when the lay is at the end of its movement backward. The circuit, however, will still remain open by reason of the fact that the contacts 41 and 42 are not brought into engagement with each other until the lay has completed one fourth of its forward movement.

The impact blade 31 is controlled by the swivel shuttles and is shown as pivotally mounted on a plate 30 carried on the batten 3^a, directly over the fly shuttle blade 33. The swivel shuttle blade 31 is provided with a depending portion which hangs over the edge of the fly shuttle blade and very close thereto. With the forward movement of the lay 3, the depending portion engages the buffer 32 to stop the operation of the loom. The blade 33 assists in bearing the brunt of the shock of the impact of the blade 31 against the buffer. In order that the blade 31 may clear the buffer 32, in a manner similar to that provided in the ordinary loom when the fly shuttle alone is used, so as to keep the loom in constant operation and avoid the stopping thereof with each forward movement, the blade 31 is connected to the shuttle rail 5 by means of the chain operating around a series of pulleys 36 and connected to the shuttle rail actuating rod 37. As the rail moves upwardly the blade is caused to swing upon its pivot against the resistance of the return spring 38

and made to move part way toward the batten 3^a. This swinging movement is prevented, when necessary, by the energization of the electromagnet 17 and the interference 5 produced by the stop pin carried on lever 39 controlled by the electromagnet, results in the engagement of the blade with the buffer 32 as the lay moves forward and approaches the breast beam. This engagement results in 10 the immediate stopping of the loom. The frog or buffer 32 is of a well known form of construction and in the present embodiment is arranged to be engaged by the blade 33 controlled by the fly shuttle whenever the shuttle 15 is absent from or fails to reach its proper box. The blade 31 controlled by and operable in connection with the swivel shuttles to engage the buffer 32, is located above the fly shuttle blade 33, being provided with 20 a downwardly extending part which is arranged to engage the buffer 32 with the forward movement of the lay.

I shall now describe the operation of the swivel loom in weaving the small detached 25 figures or spots on the fabric being woven by the ordinary fly shuttle.

With the fly shuttle out of operation, the swivel shuttle rail 5 is ready to be lowered. As the lay moves rearwardly and the warp 30 threads are raised to form the shed, the shuttle rail 5 is moved transversely or laterally to bring the swivel shuttles 6 and the recesses 7 in the proper position relative to the threads. The mechanism for moving 35 the shuttle rail transversely is not shown but it may consist of any suitable construction and be operated in the manner well understood by those familiar with the art. When the lay 3 has practically covered two- 40 thirds of its rearward movement the shuttle rail will have reached its lowermost position. The swivel shuttles 6 carrying their threads now make their rapid movement between the warp threads forming the shed 45 and after completing this weaving operation return to their positions at the upper end of the recess. When the lay has reached the end of its rearward movement it begins its forward movement. The shuttle rail 50 now rises and reaches its highest position when the lay has practically finished its forward movement. It is thus out of the way for the operation of the fly shuttle should the pattern call for the long cross threads 55 of the latter. As the lay moves forward and the shuttle rail upward, the blade 31 actuated by the chain 35 attached to the shuttle rail actuating rod 37 is swung on its pivot to clear the buffer 32 and avoid stopping the 60 loom.

It sometimes happens that through some irregularity in the lateral movement of the shuttle rail 5, due to the failure of its operating mechanism to work properly, the recesses 7 are not brought in proper alinement

with respect to the warp threads lifted by the pattern mechanism. As the shuttle rail is lowered, the threads which cannot enter and pass within the recess 7^a engage the flat 70 spring contact 12 and lift it up against the plate 13 thereby closing the circuit which energizes the electromagnet 20. The pawl 23 is caused to immediately engage the ratchet bar 24 to effect the almost instantaneous stoppage of the loom before the lay 75 has made any material movement rearwardly. The stopping of the loom permits the weaver to correct the irregularity of movement of the rail. If, however, for some reason or other the pawl and ratchet 80 bar mechanism fails to operate to effect the stoppage of the loom and a smash up of one series of warp threads follows from the movement of the rail or swivel shuttles, further damage is prevented by the stopping 85 of the lay during its forward movement by the engagement of the blade 31 with the buffer 32 to stop the loom in the manner heretofore described. The electromagnet 17 having been also energized, the stop pin 39 90 falls into its slot as soon as the blade has reached the end of its return movement and prevents the latter from again swinging to clear the buffer with the forward movement 95 of the lay.

It happens sometimes that the swivel shuttle stops for some reason or other in its lowermost position and at the lower end of the recess. The reciprocating rack 8 may fail to complete its movement to bring the 100 shuttle back to its normal position at the upper end of the recess. In this event the contacts 27 and 28, mounted respectively on the reciprocating rack 8 and the inclosing casing 5^a of the rail 5, will remain in engagement with each other instead of moving 105 out of engagement with each other with the movement of the shuttle to its normal position; and as the lay 3 moves forward the key 41—42 is closed, thereby closing the 110 circuit and energizing the magnet 17 to prevent the swinging movement of the blade 31 to clear and effecting the stoppage of the loom as heretofore described. The contact 28 on the rack 8 is of a length equal 115 to six of the eight teeth of the pinion 9 and is so positioned relative to the spring contact button 27 carried by the casing 5^a that it will be out of contact therewith only 120 when the swivel shuttle is out of the shed in its proper position of rest at the top of the recess 7. When so positioned, as heretofore pointed out, there will be no closing of the circuit at this point so that the circuit will remain open even though the key 125 41, 42 be closed with the movement of the lay in proximity to the breast beam.

It is obvious that various modifications may be made in the construction and arrangements of parts shown and described 130

and that various embodiments of my invention differing in form and construction from the particular embodiment herein shown and described may be made within the spirit and scope of my invention.

What I claim is:

1. In a swivel loom, the combination with the loom stopping mechanism, the lay and the movable shuttle rail carried thereby, of a smash protector comprising a part pivotally mounted on the lay and carried thereon and in the path of the loom stopping mechanism and adapted to engage and actuate said mechanism to stop the loom, means operatively connected with the shuttle rail and with said pivoted part to swing said part on its pivot and out of the path of said mechanism, and an electrically controlled part adapted to engage said pivoted part and prevent its swinging movement to clear said mechanism whereby to stop the loom, said electrically controlled part being operative in the event of any irregularity in the movement of the shuttle rail.
2. In a swivel loom, the combination with the loom stopping mechanism, the batten and the movable shuttle rail, of a smash protector comprising a pivoted part carried on the batten and movable therewith in the path of the loom stopping mechanism and adapted to engage said mechanism to stop the loom, means operatively connecting the shuttle rail with said pivoted part to swing said part out of the path of the loom stopping mechanism, a stop carried by the batten and adapted to engage said pivoted part and prevent its swinging movement to clear the loom stopping mechanism, and an electrical device carried by the shuttle rail and adapted to control said stop and effect its operation in the event of any irregularity in the movement of the shuttle rail to cause the engagement of the pivoted part with the loom stopping mechanism to stop the loom.
3. In a swivel loom in combination with a loom stopping mechanism, of engaging means arranged to move in the path of said mechanism and engage the same to effect the stoppage of the loom, means normally operable with the movement of the loom to move said engaging means out of the path of said mechanism, actuating means carried by the lay and operable with the backward movement of the loom to engage and operate the loom stopping mechanism, and electrically controlled means for operating said actuating means during the backward movement of the loom and for operating to prevent the movement of the engaging means out of the path of the mechanism during the forward movement of the loom, whereby to effect the stoppage of the loom during either the forward or backward movement of the loom.

4. In a swivel loom, the combination with the loom stopping mechanism, the lay and the movable shuttle rail, of a smash protector comprising a pivoted part carried by the lay and movable therewith in the path of the loom stopping mechanism and adapted to engage said mechanism to stop the loom, means operatively connecting the shuttles and shuttle rail with said pivoted part to swing said part out of the path of the loom stopping mechanism, a stop electrically controlled and carried by the lay and adapted to engage said pivoted part to prevent its swinging movement to clear the loom stopping mechanism, and an electrical device carried by the shuttle rail and operative in the event of any irregularity in the movement of the shuttles or shuttle rail to effect the engagement of the stop with the pivoted part whereby said pivoted part will engage the loom stopping mechanism to stop the loom.

5. In a swivel loom, the combination with the loom stopping mechanism, the lay and the movable shuttle rail, of a smash protector comprising a pivoted blade carried by the lay and movable therewith in the path of the buffer of the loom stopping mechanism and adapted to engage said buffer to actuate said mechanism to stop the loom, means operatively connecting the shuttle rail with said blade and adapted to swing said blade out of the path of said buffer, a stop electrically controlled and carried by the lay and adapted to engage said blade to prevent its swinging movement to clear the buffer of the loom stopping mechanism, and an electrical device carried by the shuttle rail and operative in the event of any irregularity in the movement of the shuttle rail to effect the engagement of the stop with the blade whereby said blade will be prevented from clearing said buffer and will engage the buffer to stop the loom.

6. In a swivel loom, the combination, with a lay, a shuttle rail and swivel shuttles movably carried thereon, and a loom-stopping mechanism, of an electric circuit, a closing device for said circuit carried by the rail and adapted to close said circuit in case there is any irregularity of movement of the shuttle rail, means for opening said circuit, and means controlled by said circuit closing device for actuating the loom-stopping mechanism whereby to effect the stoppage of the loom.

7. In a swivel loom, the combination, with a lay, a shuttle rail and swivel shuttles movably carried thereon, and a loom-stopping mechanism, of an electric circuit, a closing device for said circuit carried by the rail and adapted to close said circuit in case there is any irregularity of movement of the shuttle rail, and normally open with the regular movement of the shuttle rail and means car-

ried by the lay and controlled by said circuit closing device and operable with the backward movement of the lay to actuate the loom-stopping mechanism whereby to effect the stoppage of the loom.

8. In a swivel loom, the combination, with a lay, a shuttle rail and swivel shuttles movably carried thereon, and a loom-stopping mechanism, of an electric circuit, a closing device for said circuit carried by the rail and adapted to close said circuit in case there is any irregularity of movement of the rail, means for opening the circuit of said device during the normal and regular operation of said rail, means carried by the lay and adapted to actuate said mechanism with the backward movement of the lay, and a second circuit closing device carried by the rail and arranged to be closed in case there is any irregularity of movement of the rail whereby to effect the stoppage of the loom during either the forward or backward movement of the lay.

9. In a swivel loom, the combination with the loom stopping mechanism, the lay and the movable shuttle rail, of swivel shuttles carried by the shuttle rail and movable thereon across the recesses of the shuttle rail and normally held at the top of the recesses during their non-operation so as to leave said recesses open for the passage of the warp threads, an electrical circuit and a circuit closing device carried by the shuttle rail and adapted to be closed when said shuttles are not in their normal positions and a second circuit closing device adapted to coact with the first closing device and carried by the lay to close said circuit, and means controlled by said circuit closing devices jointly

and adapted to actuate said loom stopping mechanism to stop the loom.

10. In a swivel loom, the combination with the loom stopping mechanism, the lay and the movable shuttle rail provided with recesses for the passage of the warp threads, of swivel shuttles carried by the shuttle rail and movable across said recesses and held at the top of said recesses when they are not performing the weaving operation so as to leave said recesses open for the passage of the warp threads, an electrical circuit, two circuit closing devices adapted to coact with each other to close said circuit, one of said devices being carried by the shuttle rail and the other by the lay, said devices being adapted to close said circuit during the forward movement of the lay in the event of any irregularity in the movement of the swivel shuttles and their failure to return to their normal positions at the top of said recesses, a part carried by the lay in the path of the loom stopping mechanism and adapted to engage said mechanism to stop the loom, means operatively connected with the shuttle rail operating means and said part to swing said part out of the path of said loom stopping mechanism, and a part controlled by said electrical circuit and operable thereby to engage the first mentioned part and prevent its swinging movement to clear said mechanism and whereby to stop the loom.

In testimony whereof I have affixed my signature in the presence of two witnesses.

MEYER SEMOFF.

Witnesses:

BERNARD COWEN,
MAURICE B. RICH.