Oct. 19, 1926. 1,603,708

J. NORTHROP

LOOM

Filed June 22, 1923 3 Sheets-Sheet 1

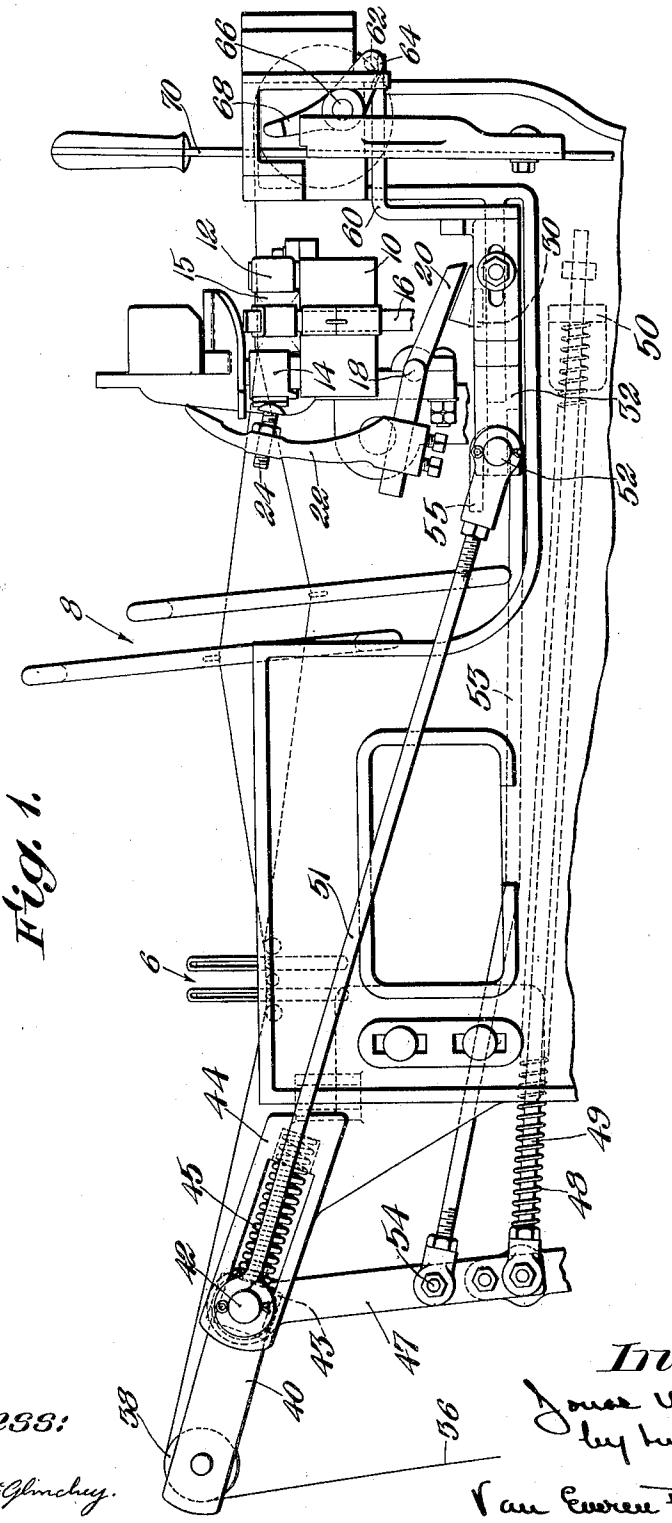


Fig. 1.

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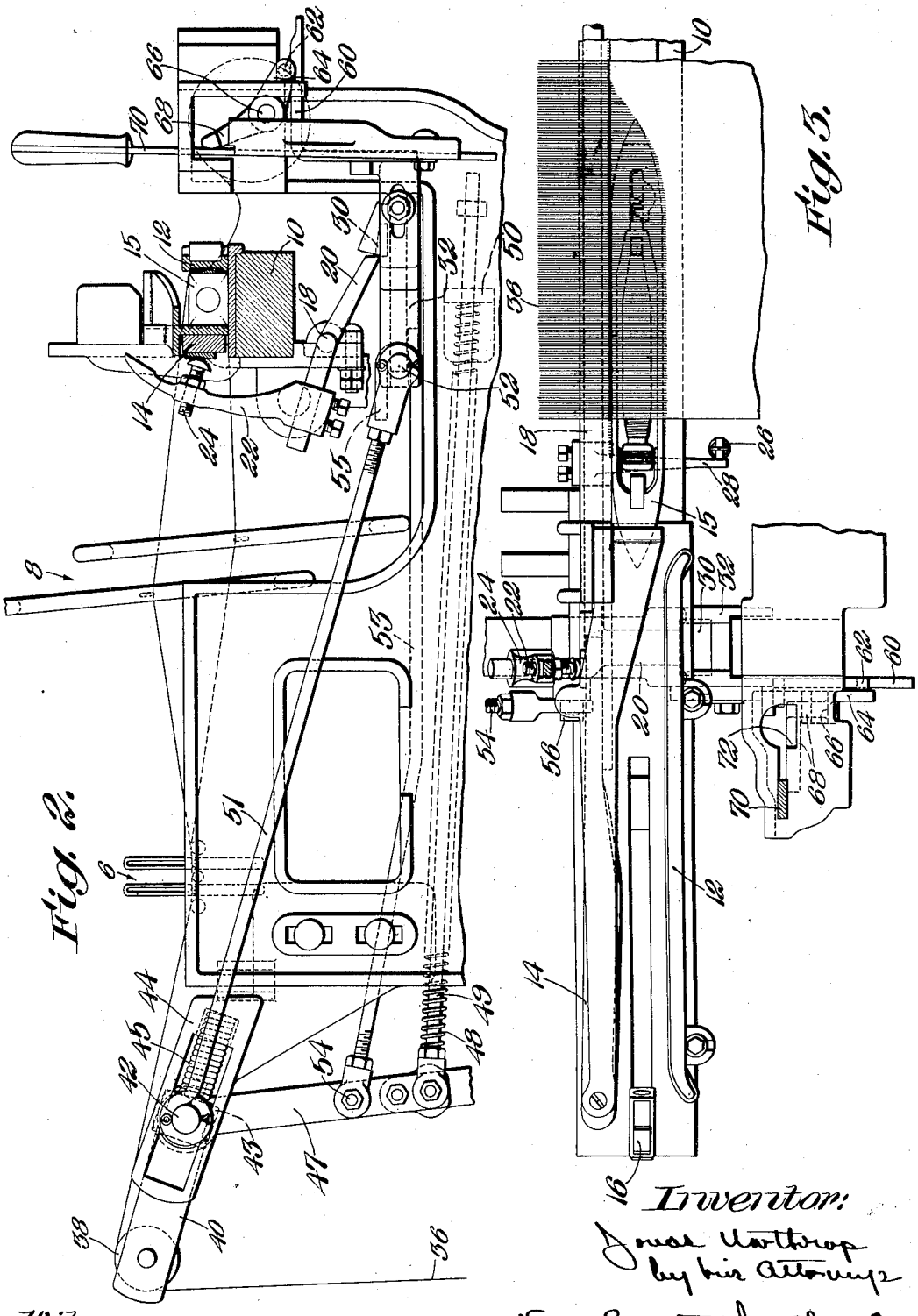


Fig. 2.

Fig. 3.

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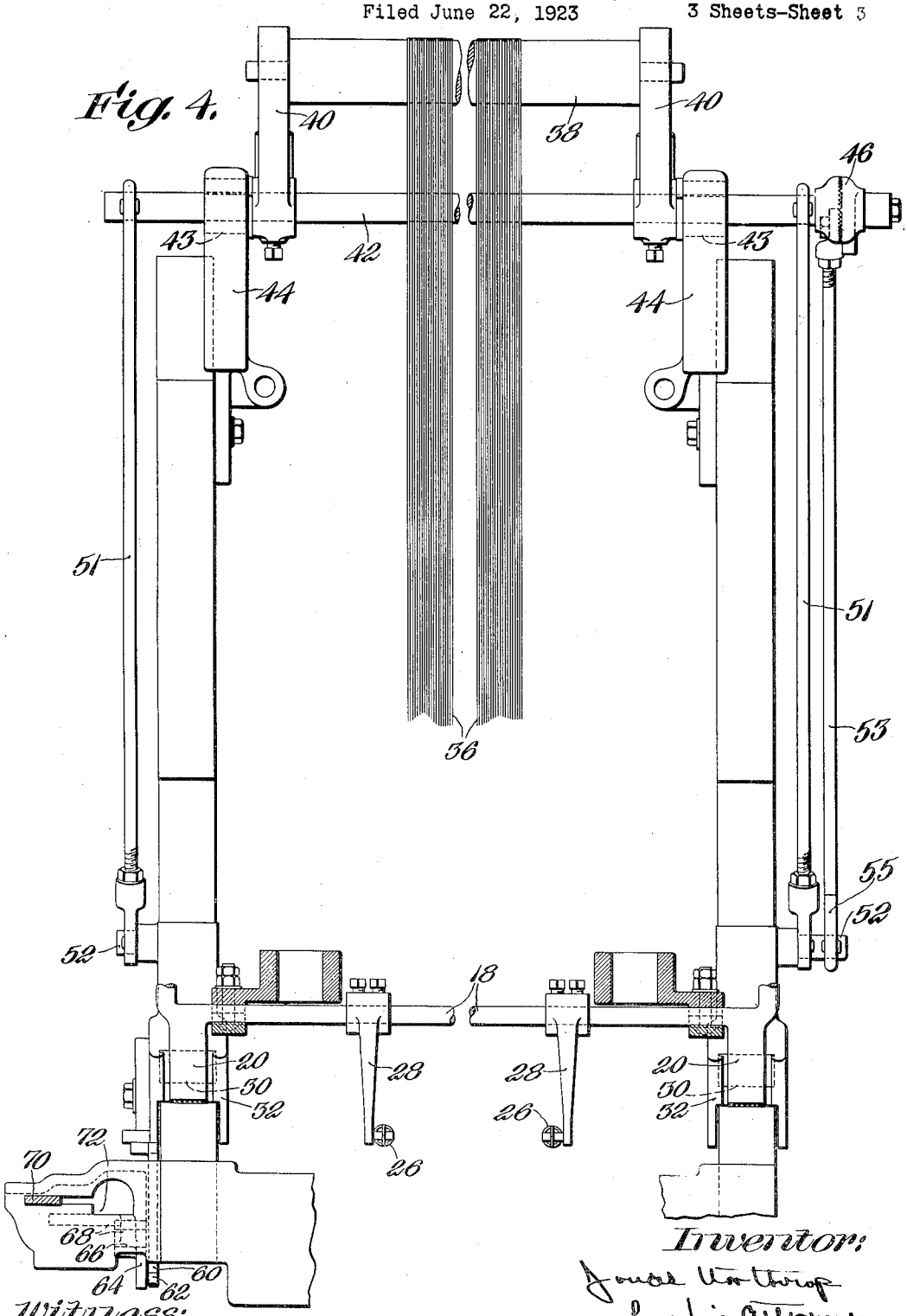
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Fig. 4.



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UNITED STATES PATENT OFFICE.

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LOOM.

Application filed June 22, 1923. Serial No. 647,151.

The present invention relates to an improvement in looms and is more particularly concerned with mechanisms designed to prevent a smash.

The usual forms of protector mechanisms for preventing a smash operate by suddenly stopping the lay a sufficient distance from the fell to prevent breaking of the warps by the improperly picked shuttle, during which operation the shipper mechanism is actuated to knock off the loom as soon as possible. This method is undesirable since it places a great strain upon the moving parts of the loom and is especially unsuitable in the case of high speed looms where the sudden shock of stopping the lay is apt to cause serious damage.

The object of the present invention is to provide a protector mechanism which will prevent injury to the warps when the shuttle is improperly picked and which will operate without undue shock to any parts of the loom.

To this end, the present invention consists of the loom hereinafter described and particularly defined in the claims.

In the accompanying drawings Figure 1 is a side elevation of the loom in normal running position with certain of the parts removed; Fig. 2 is an elevation, partly in section, of the loom shown in Fig. 1 showing the operation of the anti-bang mechanism; Fig. 3 is a plan view of the lay and other parts shown in Fig. 2; and Fig. 4 is a plan view of the loom with certain of the parts omitted.

According to the present invention, the loom is provided with a protector or anti-bang mechanism to relieve the tension on the warps whenever the shuttle is trapped in the shed during the forward beat of the lay. By this means the trapping of the shuttle between the reed and the fell takes place without damage to the warps or the finished cloth. The mechanism is also adapted to initiate knock-off of the loom at the same time.

The illustrated embodiment of the invention includes a loom provided with drop wires 6 and harness 8 of the usual form, together with a lay 10 having a box 12 at each end. Each box is provided with a binder 14 of the usual type to hold the shuttle 15 in its proper position in the path of the picker stick 16. Mounted upon the lay in the usual manner is a dagger rod 18 having secured thereto a dagger 20 to which is connected a binder finger 22 provided with a binder bolt 24. A similar assembly is provided to cooperate with the shuttle box at the other side of the loom. The bolt 24 is urged against the binder 14 through the action of a plurality of tension springs 26 pulling upon cooperating rock levers 28 secured to the dagger rod 18, as indicated in Fig. 4. Under normal running conditions, that is to say, when the shuttle is properly picked so as to be properly boxed during the forward beat of the lay, the binder 14 bearing against the bolt 24 raises the dagger 20 so that the dagger may pass over a frog 30 which is mounted upon a frog slide 32. However, if the shuttle fails to reach the box in time, the binder 14 is displaced inwardly and since the binder bolt 24 is always maintained against the binder through the action of springs 26, the dagger 20 will fall and engage the frog 30 so that continued motion of the lay will push the frog 30 and frog slide 32 to the right, as indicated in Fig. 2.

This motion of the frog is utilized for relieving the tension upon the warps and at the same time for actuating the shipper mechanism to knock off the loom. To the former end, the warps 36 which come from the warp beam (not shown) pass over a whip roll 38 supported in whip roll arms 40 which are secured to a whip roll shaft 42. The whip roll shaft 42 is journaled in blocks 43 supported in brackets 44 secured to the frame of the loom. Each block 43 is held in outward position by a compression spring 45 which bears against the block at one end and against a portion of the bracket at the other end. The springs 45 are sufficiently strong to resist any appreciable compression caused by the tension of the warps passing over the whip roll 38. The shaft 42 is secured at one end by means of a member 46 to a lever 47 which connects with a suitable let-off mechanism (not shown). The particular form of let-off mechanism best adapted for this purpose is that described in the Northrop Patent No. 1,448,081, dated March 13, 1923. It operates to increase the rate of advance of the warps from the warp beam when the tension of the warps becomes sufficiently great to depress the whip roll 38 and thereby turn the lever 47 in a counterclockwise direc-

tion about the shaft 42, as viewed in Fig. 1. This turning of the lever 47 is resisted by a compression spring 48 which surrounds a rod 49 pivoted to the lever 47 and slidable within a bracket 50 secured to the frame of the loom. To each end of the whip roll shaft 42 is attached a link 51 which connects the shaft to one of the frog slides 32, being pivoted thereto by means of a stud 52. A second link 53 is pivoted to the lever 47 at 54 and is provided with a hooked end 55 surrounding the stud 52. It will be seen that upon motion of the frog 30 and frog slide 32, due to improper boxing of the shuttle, links 51 and 53, together with lever 47 and shaft 42, will be moved bodily to the right overcoming the pressure of the springs 45 and thereby releasing the tension upon the warps so that the shuttle may be pushed against the fell without damage, as indicated in Fig. 2, without the necessity of suddenly stopping the lay on its forward beat. During the normal operation of the loom, the lever 47 is caused to undergo slight oscillations due to changes in warp tension, as described in the above mentioned patent, the hooked end 55 of the link 53 being allowed to slide over the stud 52 in such a case.

For the purpose of knocking off the loom, one of the frogs is provided with a trip member 60 which is adapted to strike a pin 62 on one arm of a trip lever 64 which is pivoted at 66 and which has another arm 68 adapted to press against the shipper lever 70 and disengage it from its notch 72, thereby allowing the loom to be knocked off. As in other protector mechanisms, it is desirable that the loom be knocked off as quickly as possible after detecting the absence of the shuttle from both boxes on the forward beat of the lay. By the present construction, however, the lay is not necessarily stopped on its forward beat but may actually come to and pass front center before the loom is brought to rest. The compression of the springs 45 also tends to resist the motion of the lay so that the loom may be more quickly stopped without imparting any excessive shocks to any of the moving parts.

I claim:

1. A loom having, in combination, a lay provided with shuttle boxes, a slidingly and oscillatingly mounted whip roll, a lever mounted in relation to the whip roll and adapted to oscillate upon slight changes in tension of the warps passing over the whip roll, a lay provided with shuttle boxes, a frog slide adapted to be moved upon indication of shuttle absence from both boxes, and connections between the frog slide and the whip roll for sliding the whip roll forward to prevent a smash.

2. A loom having, in combination, a lay, shuttle boxes provided with binders on the lay, binder fingers for the binders, a slidingly and oscillatingly mounted whip roll, a whip roll shaft, a lever mounted upon the shaft and adapted to oscillate upon slight changes in tension upon the warps, a frog slide adapted to be moved upon indication of shuttle absence from both boxes during the forward beat of the lay, and links connecting the frog slide with the whip roll shaft for bodily sliding the whip roll forward to prevent a smash.

3. A loom having, in combination, a lay, shuttle boxes on the lay, a frog slide adapted to be moved upon indication of shuttle absence from both boxes during the forward beat of the lay, a whip roll, arms in which the whip roll are received, a whip roll shaft, brackets in which the whip roll shaft is mounted, springs for retaining the whip roll in an outward position, a lever mounted on the whip roll shaft and adapted to oscillate upon slight changes in warp tension, a link connecting the frog slide with the whip roll shaft for causing the whip roll to be moved bodily forward to prevent a smash, and a link connecting the frog slide with the lever.

4. A loom having, in combination, a lay, shuttle boxes for the lay, a shuttle, a frog slide adapted to be moved forward upon indication of shuttle absence from both boxes during the forward beat of the lay, a whip roll, a whip roll shaft, brackets for the whip roll shaft, springs for maintaining the whip roll shaft in an outward position, a link connecting the frog slide and the whip roll shaft for moving the whip roll bodily forward to prevent a smash, a lever mounted upon the whip roll shaft, and a link connecting the frog slide with the lever, the link being provided with a hooked free end to permit the lever to oscillate upon slight changes in warp tension.

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