Aug. 20, 1935. O. V. PAYNE 2,012,052

PROTECTOR MECHANISM AND SHUTTLE CONTROL

Filed Aug. 29, 1933 2 Sheets-Sheet 1

FIG. 1

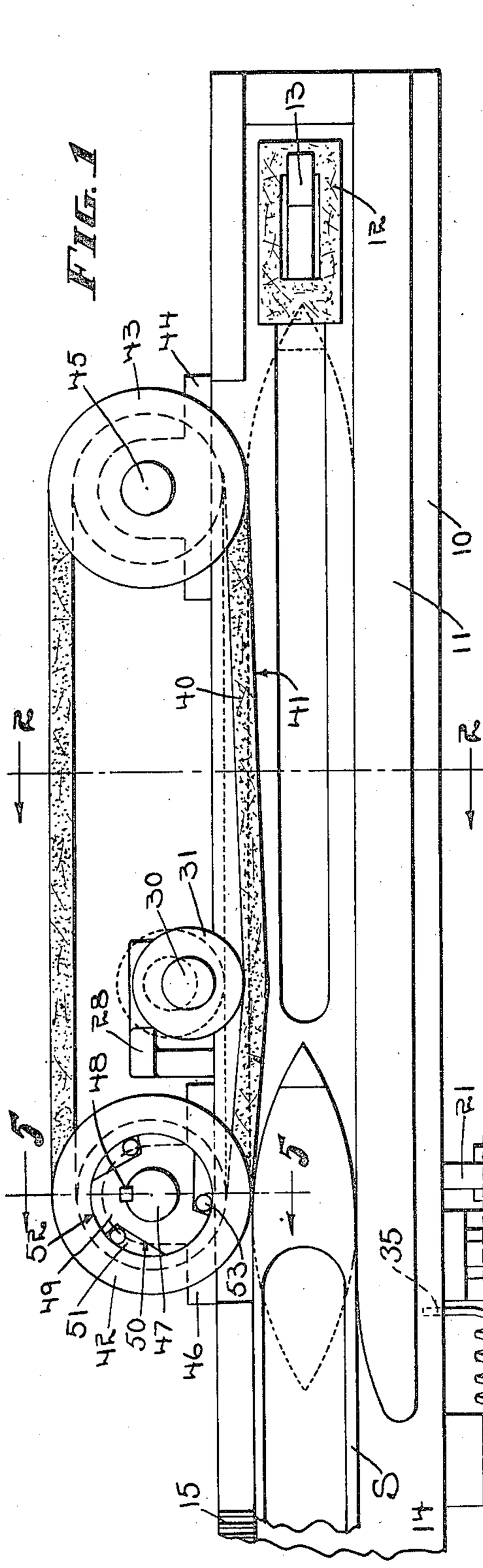


FIG. 2

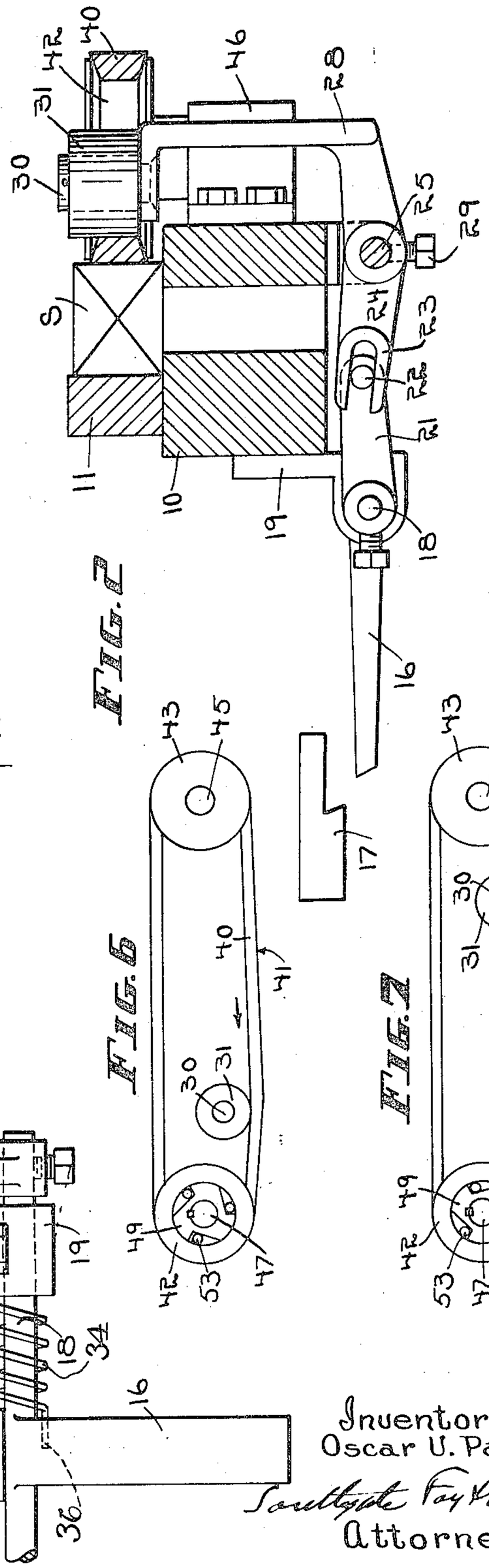
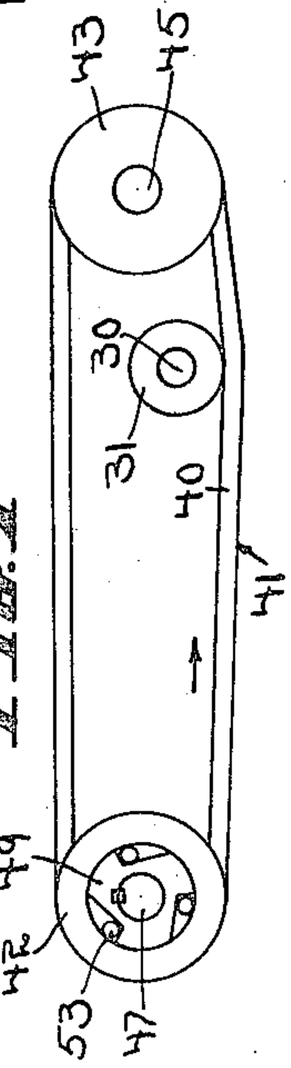


FIG. 6

FIG. 7



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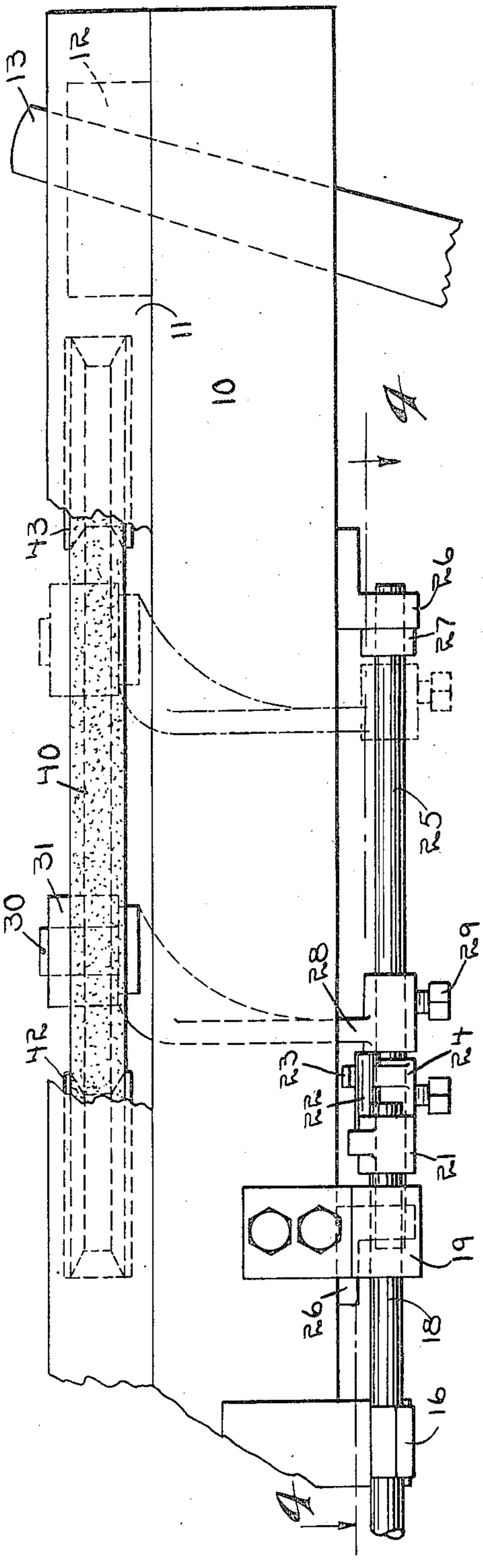

FIG. 7

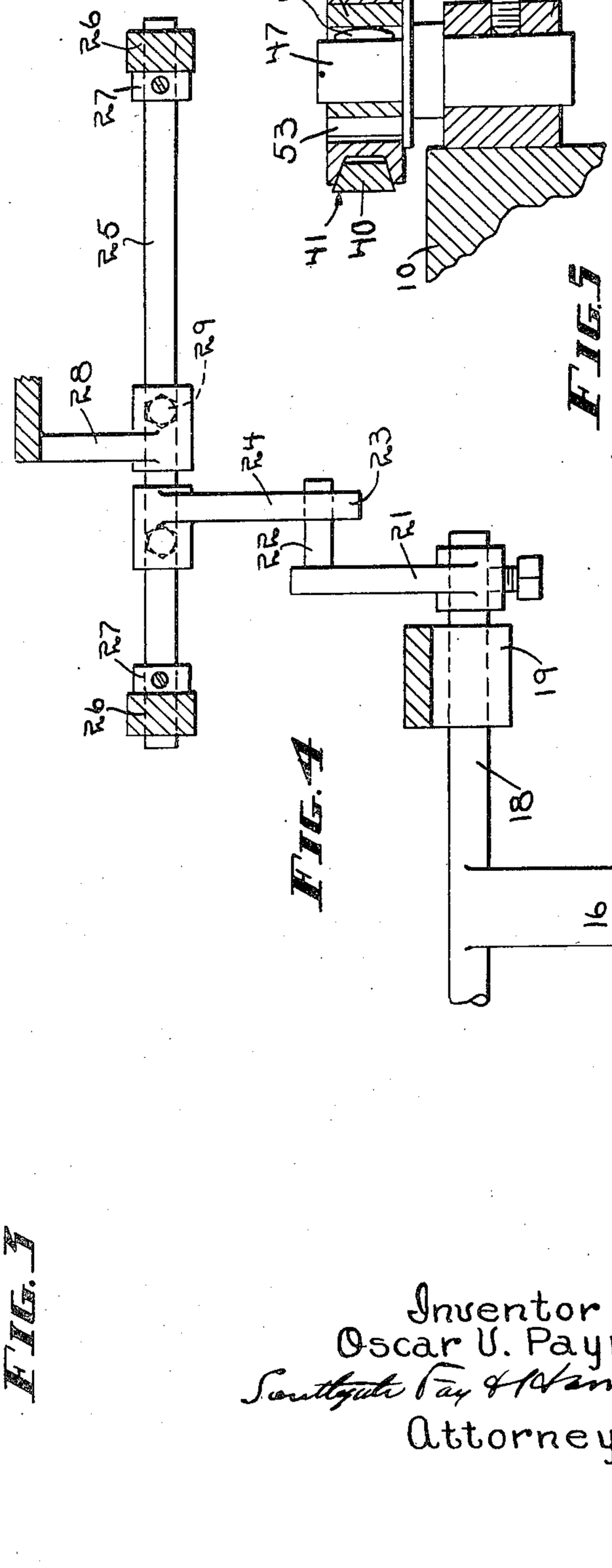

FIG. 4

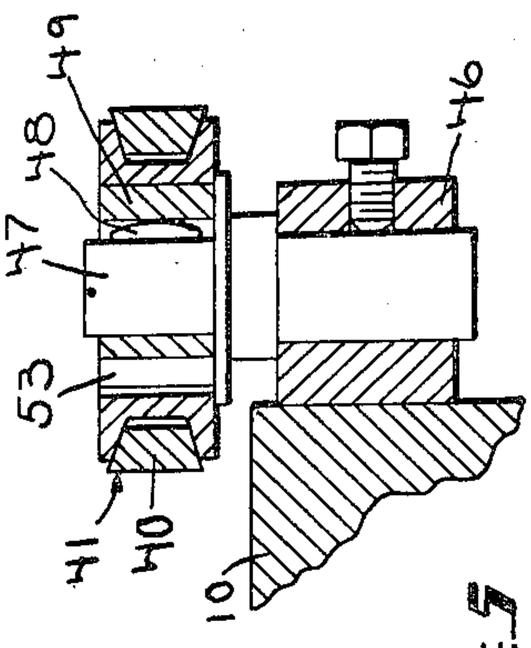

FIG. 5

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PROTECTOR MECHANISM AND SHUTTLE CONTROL

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Application August 29, 1933, Serial No. 687,319

19 Claims. (Cl. 139—345)

This invention relates to protector mechanism for looms and it is the general object of the invention to provide means to protect at any one of a plurality of positions along the shuttle box.

The invention contemplates the use of a flexible element, as a belt, to form one side of the shuttle box, instead of the usual binder. The ordinary protector finger bears against the binder and is pushed out when the shuttle reaches a given point in its travel along the lay. If it is desired to protect late in the loom cycle this can be accomplished only by bending the binder to engage the shuttle later. This adjustment necessarily alters the checking of the shuttle. It is an important object of my invention to provide a protector indicator movable to various positions along a flexible shuttle check the effective length of which is not materially changed by the setting of the indicator, or time of protecting. By such an arrangement the same amount of surface contact between the shuttle and its check is maintained regardless of the adjustment for protection.

The travelling shuttle checking surface can be arranged to move freely in one direction and against resistance in the other direction, and furthermore the free motion may be either toward or away from the center of the loom. It is a further object of my invention to render the protection effective irrespective of the direction of free travel of the checking surface. This feature of my invention permits a variety of arrangements of the checking and protecting. If a relatively long time is allowable for the shuttle flight, the protector indicator will be set deep into the shuttle box toward the picker, and the belt arranged to rotate freely toward the picker. If, on the other hand, an early protection is needed with high shuttle speed, the indicator will be placed near the mouth of the box and the belt connected to resist the shuttle as it enters the box.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a top plan view of a lay end having my invention applied to protect early and with the shuttle checking belt resisting boxing of the shuttle,

Fig. 2 is a vertical section on line 2—2, Fig. 1,

Fig. 3 is a front elevation of the structure shown in Fig. 1, parts being removed for the sake of clearness, and the indicator shown in an adjusted position in dot and dash lines for late protecting,

Fig. 4 is a detail horizontal section on line 4—4, Fig. 3,

Fig. 5 is a detail vertical section on line 5—5 of Fig. 1, and

Figs. 6 and 7 are diagrammatic views showing the control for the shuttle checking belt, and the protector indicator, in different positions.

Referring to the drawings, the lay 10 has a box front 11 behind which moves picker 12 and picker stick 13. The shuttle S moves along the race plate 14 in front of reed 15 and lies against the box front when box is as shown in dotted lines in Fig. 1.

A protector dagger 16 coacts as usual with a bunter 17 to stop the loom when the shuttle fails to reach a predetermined point along the lay at a given point in the loom cycle. The protector rod 18 to which the dagger is secured rocks in bearings on the lay, one of which is shown at 19, while a similar bearing not shown is at the opposite end of the lay. An arm 21 adjustably secured to the rod has a finger 22 projecting into a fork 23 on a second arm 24 adjustably secured to a small shaft 25. The latter is rotatable relatively to the lay in bearings 26 and is held against end motion by collars 27 fixed thereto.

An arm 28 is mounted on the shaft and held in adjusted angular and longitudinal position by a set screw 29. The upper end of the arm carries a vertical stud 30 on which is rotatably mounted a roll 31. Movement of the roll to the right in Fig. 2 by shuttle presence will act to depress the dagger and cause it to clear the bunter as the lay moves forwardly, or to the left in Fig. 2. A torsion spring 34 surrounds rod 18 and has one end 35 under the lay 10 and the other end 36 under the dagger 16 to lift the latter and also urge the protector roll 31 to the left, or toward the shuttle, as viewed in Fig. 2.

The back of the box is formed in part by a continuous belt 40 having an outer vertical face 41. Inner and outer guide wheels or pulleys 42 and 43, respectively, are mounted rotatably on the lay so that the belt may travel in a direction substantially parallel to the shuttle. To accomplish this result, a stand 44 on the outer end of the lay has a stud 45 for the pulley 43. A second stand 46 for the inner pulley 42 is also on the lay and carries a stud 47 to which is keyed as at 48 a clutch member 49. The latter has in this instance three notches 50 which define wedge

shaped pockets 51 with the interior surface 52 of wheel 42.

Clutch pins 53 are located in the pockets and are the means for effecting a holding connection between the pulley 42 and the fixed clutch member. As shown in Fig. 5, the pins are supported by the stand 46, and the engaging concentric parts of the pulley 42 and clutch member are cylindrical so that the latter may be reversed.

When the loom is running at a high speed, it is desirable to check the shuttle effectively and also protect as early as possible to allow time for stopping. Under these conditions, as the shuttle enters the box, it will engage the belt which will be bent inwardly by spring 34 acting through the roll as shown in full lines in Fig. 1. The clutch and pins will act to resist movement of the belt around the pulleys so that checking of the shuttle may result. As the shuttle continues to move it will push the belt rearwardly, straightening it out to the dotted line position of Fig. 1 and thereby moving the roll 31 rearwardly or to the right as seen in Fig. 2. The loom will therefore continue to run. Failure of the shuttle to enter the box will leave the roll 31 in forward position, with resultant loom stoppage.

Should the loom be running slower, a reduced checking may be desirable, and also, a later protection will give the shuttle more time to enter the box without undue shock when the loom protects. Accordingly, under these conditions the arm 28 may be moved to the dot and dash position shown in Fig. 3, and the clutch member may be reversed to assume the position shown in Fig. 7. As the shuttle enters the box, the belt will move with it, so that if the shuttle force is almost spent, as may be the case in wide looms, little resistance will be offered the shuttle. As the shuttle approaches the roll 31, the latter will be pushed rearwardly to permit continued loom operation.

Herein I have shown two combinations between the location of roll 31 and the direction of travel of the belt, but I do not wish to be thus limited, since the roll may be placed in any of its adjusted positions with the belt travelling in either direction. The protection feature is independent of the direction of travel of the belt, and the latter is illustrated as capable of cooperating in different ways with the shuttle to indicate the range of conditions under which the protection will operate. The shuttle checking feature of the belt is set forth and claimed in my copending application Serial No. 687,320.

From the foregoing it will be seen that I have provided protecting means effective to operate at different positions along the path of the shuttle. The amount of the belt surface in contact with the shuttle need not change materially to effect this adjustment. Also, there are possible various arrangements between the location of the protector indicator and the direction of free movement of the belt.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a loom operating with a shuttle box and shuttle, a flexible element mounted on the lay for engagement with the shuttle, extending and movable longitudinally along and forming one side of the shuttle box and protector mechanism having a part positioned for engagement with the flexible element.

2. In a loom operating with a lay and shuttle, a flexible element mounted on and movable longitudinally of the lay and having a portion to present a normally straight shuttle engaging surface, and protector mechanism having a part to engage the flexible element and produce a bend therein, the shuttle operative to straighten the flexible element and move said part to prevent operation of the protector mechanism.

3. In a loom operating with a shuttle, a flexible element having a surface extending along the path of the shuttle, protector mechanism including a part to engage the element and produce a bend therein toward the path of the shuttle, and means to mount said part in any one of a plurality of positions along the element to locate the bend at a plurality of positions relatively to the path of the shuttle, the latter engaging and straightening the element to move said part.

4. In a loom operating with a shuttle, a shuttle checking belt extending along the path of the shuttle to be engaged by the latter and carried by the lay, protector mechanism having a part to be moved by the belt, and means to locate said part at any one of a plurality of positions along the belt, the amount of belt surface in contact with the shuttle being substantially the same for all positions of said part.

5. In a loom operating with a shuttle, a flexible shuttle engaging means carried by the lay, and protector mechanism having an indicating part to be located at different positions along said means, and produce a deformation in said means at any one of several different points, the amount of surface in engagement with the shuttle being substantially the same for all positions of said indicating part.

6. In a loom operating with a shuttle, a protector indicator capable of being located at a plurality of points along the path of travel of the shuttle, and a shuttle engaging belt interposed between the shuttle and said indicator to move the latter and having substantially the same extent of surface contact with the shuttle regardless of the position of the indicator.

7. In a loom operating with a shuttle, a protector indicator operable by the shuttle to be located in different positions along the path of the shuttle to protect at different times in the loom cycle, and a flexible deformable shuttle engaging means interposed operatively between the indicator and shuttle and capable of deformation by the indicator in any position the latter occupies, said means having substantially the same surface contact with the shuttle regardless of the time in the cycle of the loom when the shuttle engages the deformation caused by the indicator.

8. In a loom operating with a shuttle, a flexible shuttle engaging element movable along the path of the shuttle, and a protector indicator urged normally against the element and capable of assuming any one of a plurality of positions along said element and exerting substantially the same pressure on said element for all the positions thereof, the shuttle acting through the surface of the element to move the indicator in any of its positions.

9. In a loom operating with a shuttle, a flexible shuttle engaging element movable along the path of the shuttle, and a protector indicator urged normally against the element and capable of assuming any one of a plurality of positions along said element and exerting substantially the same

pressure on said element for all the positions thereof, the shuttle acting through the surface of the element to move the indicator in any of its positions, and the element having substantially the same amount of surface contact with the shuttle for all positions of the indicator.

10. In a loom operating with a shuttle, a flexible element extending along the path of the shuttle and positioned for engagement with the latter, a protection indicator to engage the flexible element and bend the same toward the path of the shuttle by a yielding force, and means to mount the indicator in any one of a plurality of positions to produce a bend at different points along the path of the shuttle, the yielding force exerted against the shuttle being substantially the same for all positions of the indicator.

11. In a loom operating with a shuttle, a flexible element extending along the path of the shuttle and positioned for engagement with the latter, a protection indicator to engage the flexible element and bend the same toward the path of the shuttle by a yielding force, and means to mount the indicator in any one of a plurality of positions to produce a bend at different points along the path of the shuttle, the yielding force exerted by the indicator against the flexible element and the surface contact between the said flexible element and the shuttle being substantially the same for all positions of the indicator.

12. In a loom having a lay operating with a shuttle, a flexible element to engage the shuttle mounted on and movable along the lay, reversible means operatively relatable to the element to resist movement of the latter in either direction, depending upon the position of said reversible element, and protector mechanism including a part to be located at a plurality of positions along said element and to be moved in any of said positions by a force transmitted from the shuttle through the belt.

13. In a loom having a lay operating with a shuttle, means presenting a travelling surface movable along the path of the shuttle, a reversible controller effective in one position to resist motion of the shuttle when the latter is being boxed and effective when in the reverse position to resist motion of the shuttle at the time of picking only, and protector mechanism including a part to engage the means and bend the same toward the path of the shuttle, said part to be located at any one of a plurality of positions for either of the positions to be assumed by said reversible element.

14. In a loom having a lay operating with a shuttle, shuttle engaging means presenting a travelling shuttle checking surface, a reversible means effective in one position to resist entry of the shuttle into the box and ineffective to offer resistance to movement of the shuttle out of the box, said reversible means in reverse position ineffective to check the shuttle as the same is boxed but effective to offer resistance to the shuttle when the same is picked out of the box, and protector mechanism including a part to engage the shuttle engaging means at any one of a plurality of points along the path of travel of said surface, said part effective by a force transmitted from the shuttle through the surface of the shuttle engaging means to operate the protecting mechanism.

15. In a loom operating with a shuttle and shuttle box, a flexible deformable shuttle engaging element extending along the path of the shuttle, and a protector indicator normally urged against the element to move a part of the latter into the shuttle path, the indicator capable of assuming a plurality of positions along the element to vary the time of protecting the loom relatively to the shuttle motion.

16 In a loom operating with a shuttle and shuttle box, a flexible deformable shuttle engaging element extending along the path of the shuttle, and a protector indicator normally urged against the element to move a part of the latter into the shuttle path, the indicator capable of assuming a plurality of positions along the element to vary the time of protecting the loom relatively to the shuttle motion, and the element engaging the shuttle at the same point along the path for all settings of the indicator.

17. In a loom operating with a shuttle box and shuttle, a flexible member extending along one side of the shuttle box, and protector mechanism having a part to engage the flexible member at any one of a plurality of points along the shuttle box to give the flexible member a plurality of contours depending upon the position of said part, a shuttle entering the box engaging the member to change the contour thereof and move said part by a force transmitted through the member, the time of movement of said part dependent upon the position thereof along the flexible member, the length of the contacting portion of the flexible member in contact with the shuttle when the latter is boxed remaining the same for all positions of said part of the protector mechanism.

18. In a loom operating with a shuttle box and shuttle, means presenting a yieldable surface extending along and movable longitudinally of the lay and forming one side of the shuttle box, and protector mechanism including a part to engage and deform the means and cause the latter to assume a given contour, said yielding means to be engaged by a shuttle entering the box to have the contour thereof changed, and said yielding means transmitting a force from the shuttle to the part to move the latter.

19. In a loom, a shuttle box, a shuttle, yieldable means presenting a surface extending along the shuttle box, and protector mechanism including a part to engage the means and cause the latter to assume a given contour which is dependent upon the longitudinal position of said part along the shuttle box, said means to be engaged by a shuttle in the box and have the contour thereof changed, and said means transmitting a force from the shuttle to the part to move the latter at a time during the entry of the shuttle into the box dependent upon the location of said part longitudinally of the box, the length of the contacting portion of the flexible member in contact with the shuttle when the latter is boxed remaining the same for all positions of said part of the protector mechanism.

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