May 29, 1934. A. A. GORDON 1,961,042

HARNESS MOTION AND PATTERN CONTROL THEREFOR

Filed Jan. 4, 1933 3 Sheets-Sheet 1

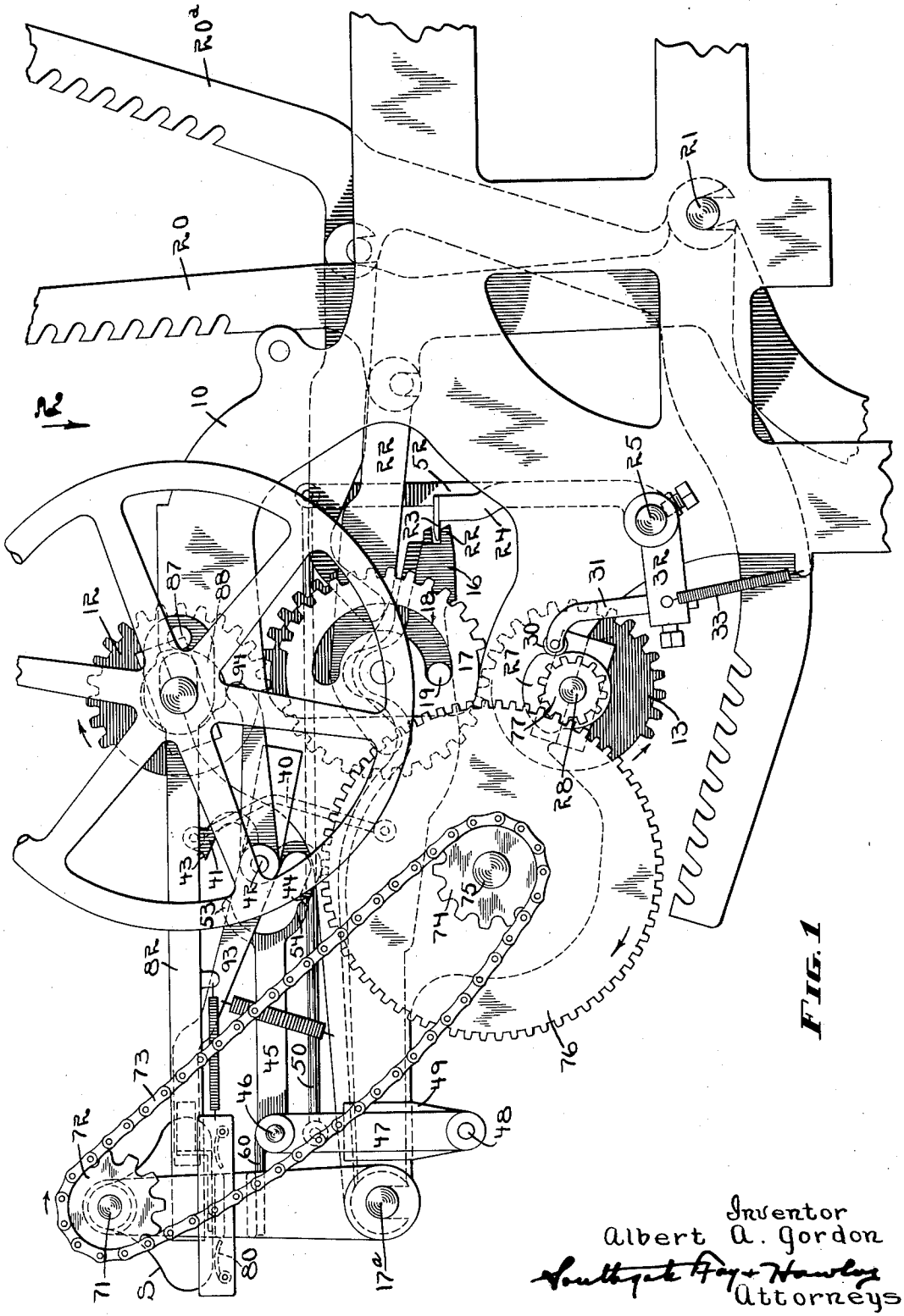


FIG. 1

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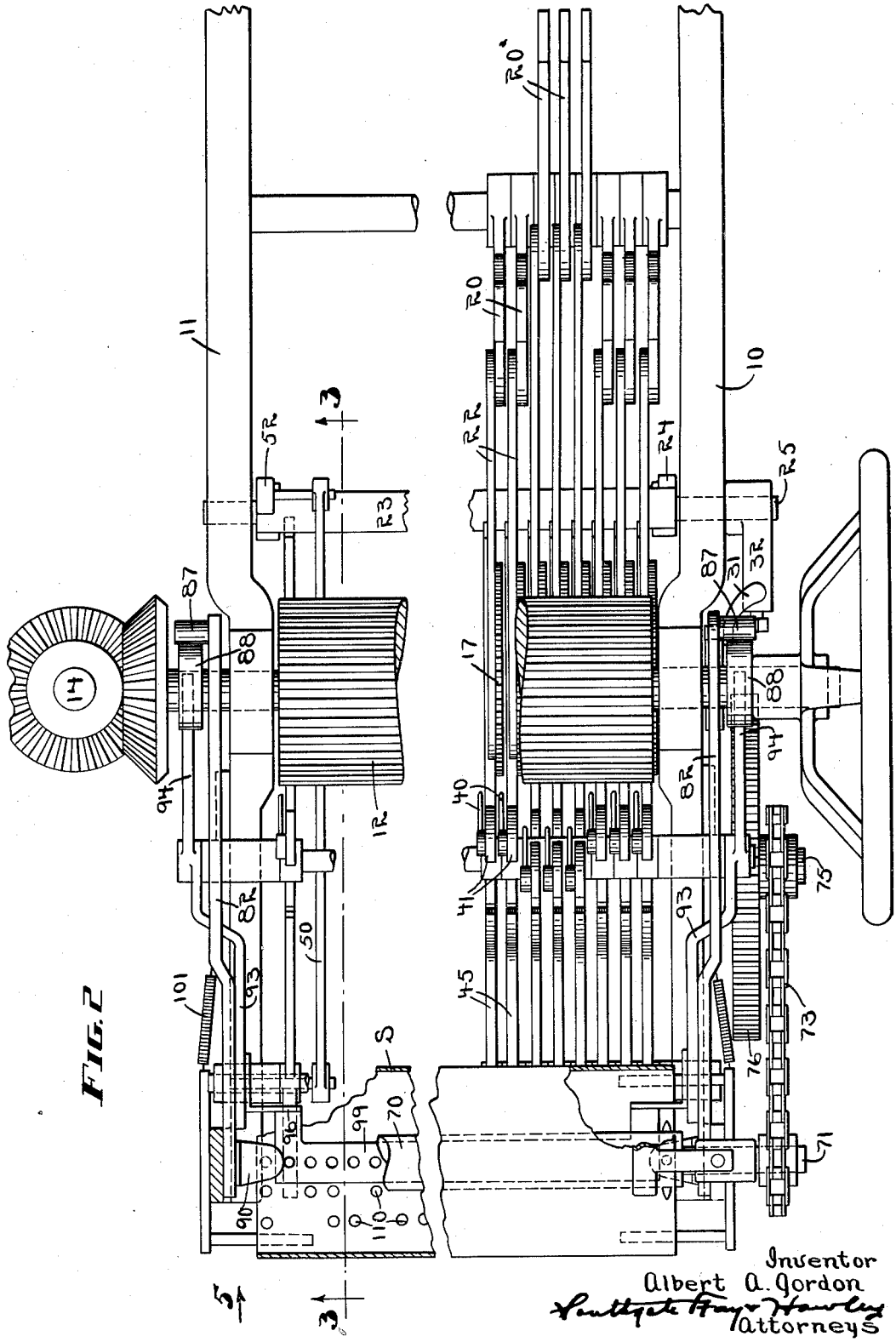


FIG. 2

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HARNESS MOTION AND PATTERN CONTROL THEREFOR

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FIG. 3

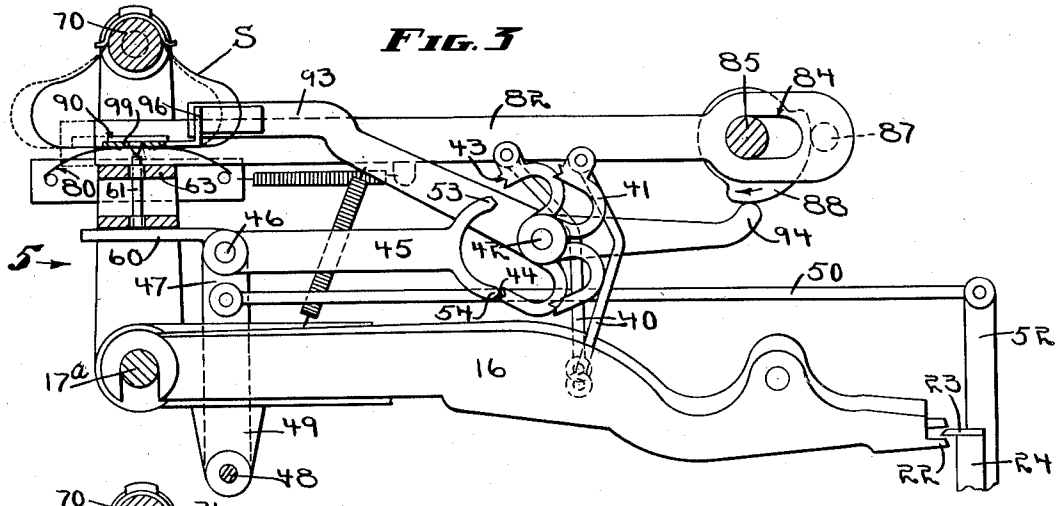


FIG. 4

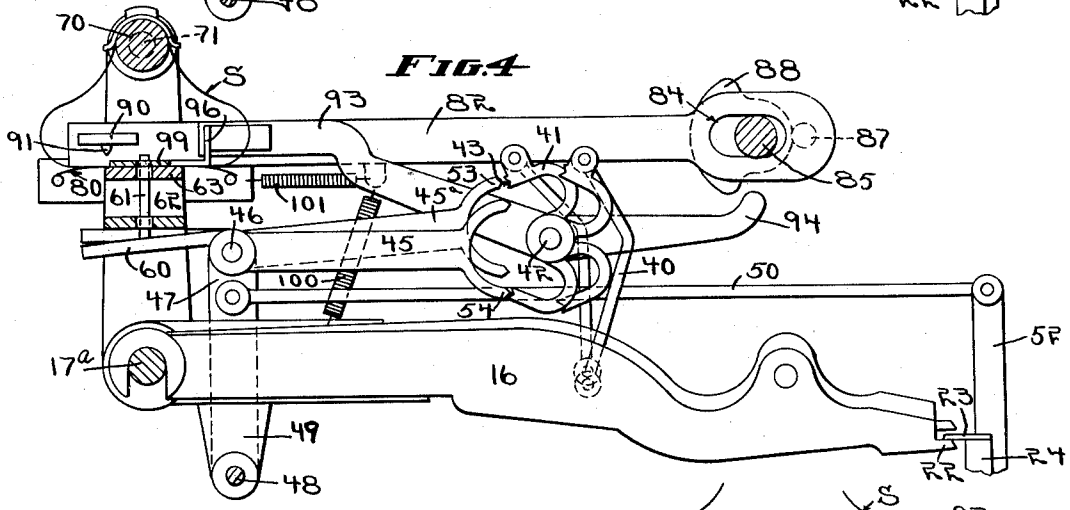
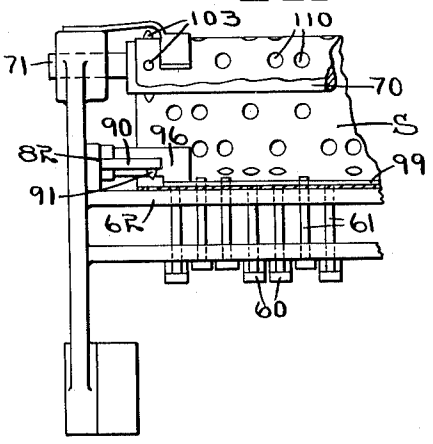


FIG. 5



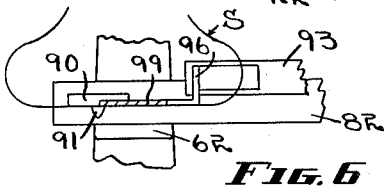


FIG. 6

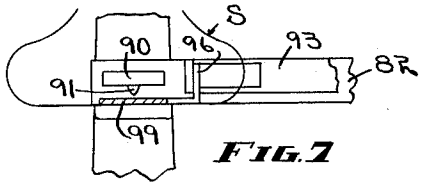


FIG. 7

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Patented May 29, 1934

1,961,042

UNITED STATES PATENT OFFICE

1,961,042

HARNESS MOTION AND PATTERN CONTROL THEREFOR

Albert A. Gordon, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application January 4, 1933, Serial No. 650,127

6 Claims. (Cl. 139—77)

This invention relates to looms equipped with a harness motion of the general type known commercially as a "Knowles head" or with other similar motion.

It is the general object of my invention to provide mechanism by which the movements of the harness and box levers in such a harness motion may be controlled from a perforated pattern sheet.

A further object of the invention is to provide improved devices for intermittently advancing the pattern sheet, together with improved means for transmitting indications from the pattern sheet to the vibrator levers which determine the movements of the harness and box levers.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a side elevation of a harness motion of Knowles head embodying my improvements;

Fig. 2 is a plan view thereof, looking in the direction of the arrow 2 in Fig. 1;

Fig. 3 is a sectional side elevation, taken substantially along the line 3—3 in Fig. 2;

Fig. 4 is a view similar to Fig. 3 but showing certain parts in a different position;

Fig. 5 is a partial end elevation, looking in the direction of the arrow 5 in Figs. 2 and 3, with the record sheet in section, and

Figs. 6 and 7 are detail side elevations, illustrating the operation of the sheet feeding mechanism.

Referring to the drawings, I have shown portions of a harness motion of Knowles head of a usual commercial construction, and comprising frame members 10 and 11 in which an upper cylinder gear 12 and a lower cylinder gear 13 are rotatably mounted. The cylinder gears 12 and 13 are continuously rotated through bevel gear connections from a vertical drive shaft 14 (Fig. 2). A series of vibrator levers 16 are pivoted on a cross rod 17^a which connects the frame members 10 and 11. Each vibrator lever 16 rotatably supports a vibrator gear 17, pivoted thereon and provided with an arcuate slot 18 to receive a stud 19 fixed in the associated vibrator lever.

The cylinder gears 12 and 13 are provided with gear teeth around a portion only of their cylindrical surfaces, and the vibrator gears 17 are provided with a series of gear teeth which is broken by the omission of one or more teeth at two opposite points on each gear.

The usual harness levers 20 are pivoted on a cross rod 21 and are connected by links 22 to the vibrator gears 17. As selected vibrator levers 16 are raised or lowered by mechanism to be described, the associated vibrator gears 17 engage the upper or lower cylinder gears 12 or 13 and are each given substantially a half revolution, thus swinging the associated harness lever from the position indicated at 20 in Fig. 1 to the position indicated at 20^a or vice-versa, depending on whether the vibrator lever is raised or lowered.

Each vibrator lever is provided with a projecting end portion 22 (Fig. 1) positioned for engagement by a lock knife 23 mounted on arms 24 secured to a rock shaft 25. A cam 27 is mounted on the shaft 28 which supports the lower cylinder gear 13, and engages a cam roll 30 at the outer end of an arm 31 adjustable transversely in an arm 32 which in turn is fixed to the cross shaft 25. A spring 33 moves the cam roll 30 yieldingly against the cam 27.

As the cam 27 is continuously rotated with the lower cylinder gear 13, the lock knife 23 is intermittently advanced to locking position and withdrawn therefrom. The knife is withdrawn during the shifting of the vibrator levers and is advanced to operative position before the harness levers are shifted. When the lock knife is in advanced position, the vibrator levers are locked in the position, either raised or lowered, which they occupy when the knife is advanced.

All of the parts thus far described are or may be of the usual commercial construction and in themselves form no part of my present invention, which relates more particularly to improved mechanism for controlling the raising or lowering of selected vibrator levers 16.

For this purpose, each vibrator lever 16 is connected by a link 40 with a rocking member 41, mounted on a fixed pivot or cross rod 42 and having V-shaped notches 43 and 44 formed in the upper and lower extremities of the rocking member.

An actuating member 45 for each rocking member is pivoted at one end to a cross rod 46, supported by arms 47 pivoted at 48 to brackets 49 secured to the sides 10 and 11 of the harness motion frame. One of the arms 47 is connected by a link 50 (Fig. 1) to an arm 52, secured to the locking lever cross shaft 25 and movable therewith. As the cam 27 rocks the shaft 25, motion will be transmitted through the arm 52, link 50, and arms 47 to the cross rod 46 and thus to the actuating members 45, which will be intermittently and positively advanced toward the rock-

ing members 41 and alternately yieldingly retracted.

During such advance movement, one of the arms 53 or 54 of the actuator 45 will be in alignment with one of the notches 43 or 44 of the associated rocking member 41 and may thus effect reversal of the rocking member 41, raising or lowering the corresponding vibrator lever 16.

In order to determine which actuators 45 shall be in raised position, and which in lowered position, I provide each actuator with an outwardly extending arm 60 underlying a pin or plunger 61 (Fig. 4) vertically slidable in bearings in a fixed frame member or platen 62.

A perforated pattern sheet S is mounted on a cylinder 70 of relatively small diameter, which cylinder is mounted on a cylinder shaft 71, supported in fixed bearings in the harness motion head. The cylinder shaft 71 is provided with a sprocket 72 (Fig. 1), connected by a chain 73 to a sprocket 74 rotatable on a stud 75 and having an enlarged gear 76 secured thereto. The gear 76 meshes with a pinion 77 on the shaft 28 of the continuously rotated lower cylinder gear 13.

Consequently, the pattern sheet cylinder 70 is continuously rotated at relatively slow speed and continuously advances the perforated record sheet S. The sheet S passes over the platen 63 in which the plungers 61 are mounted, but is normally supported in spaced relation above the platen by a light spring plate 80 (Fig. 3).

A feed bar 82 (Figs. 3 and 4) is slotted at 84 to receive the shaft 85 on which the upper cylinder gear 12 is mounted. The member 82 is also provided with a pin or stud 87, engaged by a cam 88 on the upper cylinder gear shaft 85. At its opposite end, the member 82 is provided with an offset projection 90 having a depending conical stud 91 inserted in its lower face.

A depressor lever 93 is pivoted on the cross rod 42 which supports the rocker members 41 and has a projecting end portion 94 positioned for engagement by the cam 88 on the upper cylinder gear shaft 85. The lever 93 has offset arms 96 which support a perforated depressor plate 99, which plate extends across the harness motion the full width of the pattern sheet S. Springs 100 and 101 (Fig. 4) are provided for effecting the return movements of the feed bar 82 and the depressor lever 93. The bar 82, lever 93 and cam 88 are preferably duplicated at the back of the harness motion.

The pattern sheet cylinder 70 is provided with pointed studs 103 (Fig. 5) which cooperate with perforations at the edges of the pattern sheet S and thus positively and continuously feed the pattern sheet forward. It will be noted, however, that substantial slackness is provided in the pattern sheet between the continuously driven cylinder 70 and the intermittent feeding bars 82, so that a portion of the sheet S may be advanced continuously while another portion is advanced intermittently.

Having described the details of construction of my improved pattern control mechanism, the operation thereof is as follows:

At each rotation of the upper cylinder shaft 85, the feed bars 82 are moved to the left to the position indicated in Fig. 4, and the depressor levers 93 and perforated plate 99 are then raised to the position indicated in Fig. 6. When the plate 99 is thus raised, the springs 80 lift the sheet S away from the plunger 61 to the elevated position shown in Figs. 3 and 6.

As the sheet S is thus lifted, the pointed studs 91 enter certain openings along the edges of the sheet S and the parts are then in a position to feed the sheet forward. The feed bars 82 then move to the position indicated in Fig. 3, advancing the pattern sheet one step. The depressor levers 93 then come into action and move to the position shown in Fig. 7, thus depressing the sheet S and freeing the sheet from the studs 91 of the feed bars 82.

When thus depressed, the sheet S will correspondingly depress all of the plungers 61 which do not have sheet perforations 110 (Fig. 5) aligned therewith.

The actuating members 45 associated with the depressed plungers 61 will be raised as indicated at 45^a in Fig. 4, and all of the other actuating members 45 will remain in the lowered position indicated at 45 in Figs. 3 and 4. The actuating members are then advanced, reversing the rocking members 41 where the indication has been changed, and thus raising or lowering the selected vibrator levers 16.

I have thus provided very simple and reliable mechanism for intermittently advancing the record sheet S, and for giving indications from the sheet to the vibrator levers after each advance movement of the sheet S.

It will be understood that a separate rocking link 40, rocking member 41, actuator 45 and plunger 61 is provided for each vibrator lever 16 and for each longitudinal row of perforations in the pattern sheet S.

Having thus described my invention and the use and advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. In a harness motion having cylinder gears, vibrator levers and vibrator gears, in combination, a positioning member associated with each vibrator lever, an actuator for each positioning member, a plunger to selectively move each actuator, a perforated pattern sheet, means to feed a portion of said sheet intermittently, means to feed another portion of said sheet continuously, and means to move said sheet toward said plungers after each advance movement of said sheet.

2. In a harness motion having cylinder gears, vibrator levers and vibrator gears, in combination, a positioning member associated with each vibrator lever, an actuator for each positioning member, a plunger to selectively move each actuator, a perforated pattern sheet, means to feed a portion of said sheet intermittently, means to hold said portion intermittently from advance movement, means to feed another portion of said sheet continuously, and means to move the intermittently actuated portion of said sheet toward said plungers after each advance movement thereof.

3. In a harness motion having cylinder gears, vibrator levers and vibrator gears, in combination, a positioning member associated with each vibrator lever, an actuator for each positioning member, a plunger to selectively move each actuator, a perforated pattern sheet, means to feed said sheet intermittently, means to move said sheet toward said plungers after each advance movement of said sheet, and spring means to raise said sheet from said plungers before each advance movement of said sheet.

4. In a harness motion having cylinder gears, vibrator levers and vibrator gears, in combination, a positioning member associated with each vibrator lever, an actuator for each positioning

member, a plunger to selectively move each actuator, a perforated pattern sheet, a feed bar, means to reciprocate said feed bar in the line of movement of the sheet, a depressor lever, and means to move said lever transversely to the line of movement of said sheet.

5. In a harness motion having cylinder gears, vibrator levers and vibrator gears, in combination, a positioning member link-connected to each vibrator lever and having spaced notched portions, an actuator for each positioning member having spaced engaging portions and having a normal lowered position to which it is moved by gravity, a perforated pattern sheet, means to intermittently advance said sheet, and means controlled by said sheet for raising selected actuators above normal position.

6. In a harness motion having cylinder gears, vibrator levers and vibrator gears, in combination, a positioning member link-connected to each vibrator lever and having spaced notched portions, an actuator for each positioning member having spaced engaging portions and having a normal lowered position to which it is moved by gravity, a perforated pattern sheet, means to intermittently advance said sheet, and means controlled by said sheet for raising selected actuators above normal position, said latter means including a plunger for each actuator aligned with a separate longitudinal row of perforations in said record sheet.

ALBERT A. GORDON.