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ROTARY HOPPER FOR FILLING REPLENISHING LOOMS

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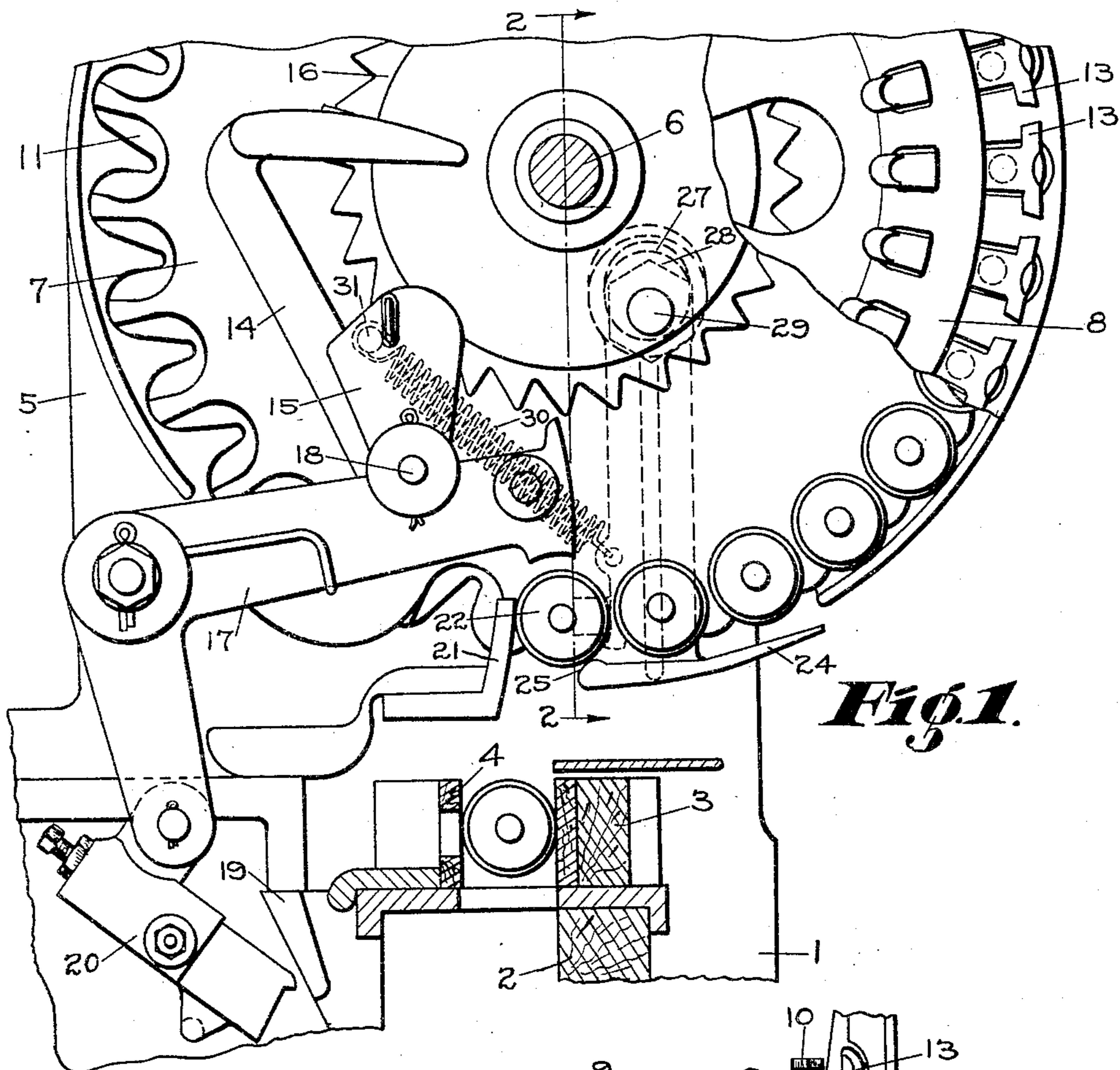


Fig. 1.

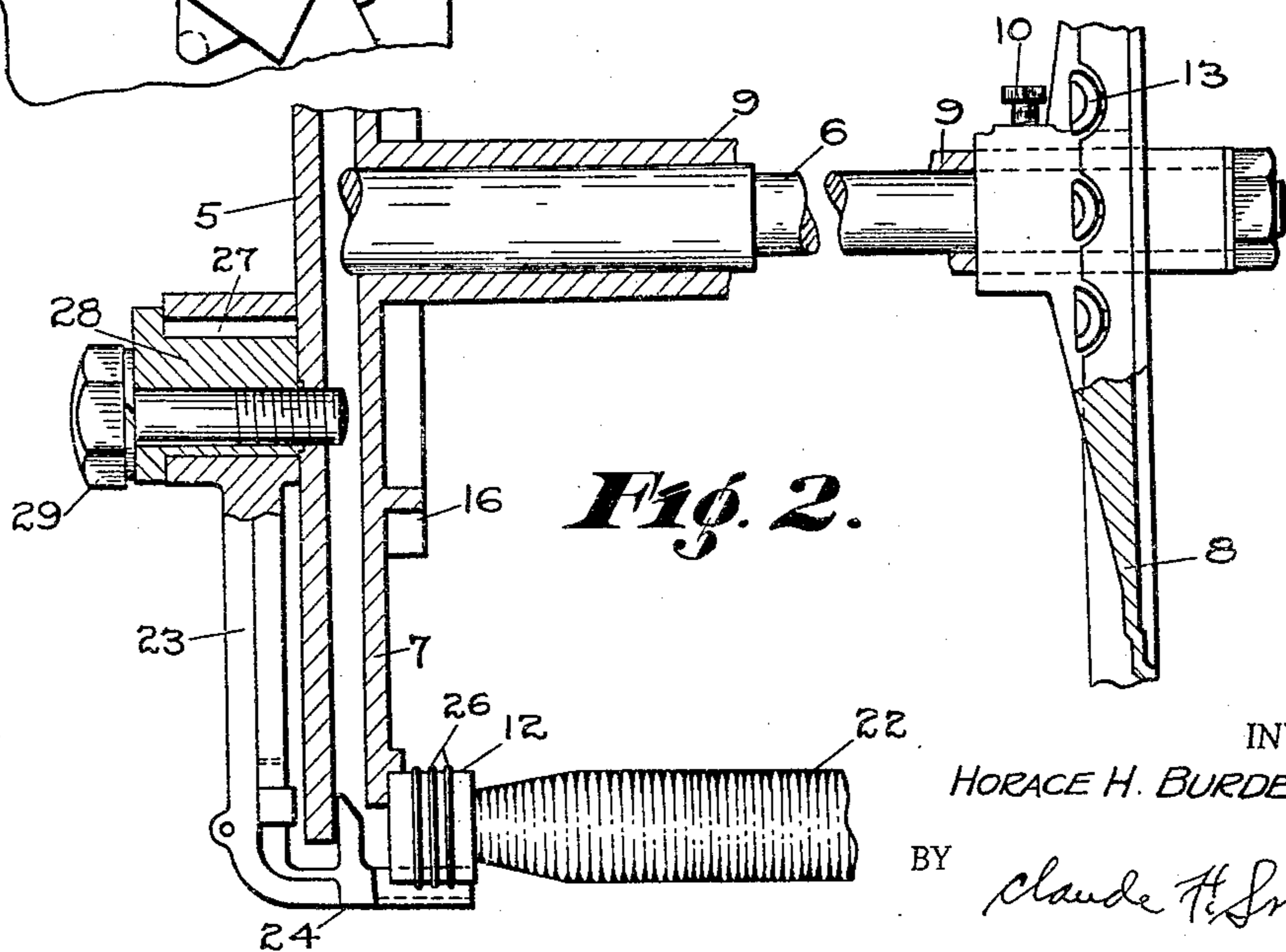


Fig. 2.

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ROTARY HOPPER FOR FILLING REPLENISHING LOOMS

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The present invention relates to filling replenishing looms, and more particularly to bobbin supporting means for use with the rotary hopper type of magazine commonly employed on such looms.

Such hopper usually includes a suitable stand supported on the loom frame and carrying a fixed stud or shaft on which is journaled a pair of axially spaced discs having means to support between them, about their circumference, a series of bobbins. The bobbin holding means in these discs is usually comprised of recesses or sockets in one disc to receive the butts of the bobbins and spring clips in the other disc to bear axially against the tips of the bobbins. The hopper is rotated, by suitable means, to successively position the bobbins against a combined stop and bobbin guide, thus presenting them in position for transfer to the shuttle.

Various means have been provided, in mechanisms of the aforementioned type, for retaining the bobbin in contact with the bobbin guide during the first part of the actual transferring operation. Of these, probably the most satisfactory has been the so-called "swinging bobbin support", comprised of a depending arm pivotally suspended from the hopper stand, at or adjacent to the axis of the hopper, and carrying at its lower end an inclined or cam surface adapted to bear against the rings on the butt of the bobbin during transfer. However, since this swinging bobbin support was capable of movement in one direction only:—i. e. approximately horizontally about its pivot point—it was necessarily positioned so that the top of its bobbin guiding surface was below the path of the largest diameter bobbin butt which the hopper was designed to accommodate, consequently, the butts of the bobbins were not supported against movement radially of the hopper and the bobbin in position for transfer would drop down until its butt contacted the bobbin support. Then, the constant vibration of the hopper, incident to operation of the loom, would cause the bobbin guide and bobbin support, acting with a pawl-and-ratchet effect, to rotate the bobbin either in a direction to tighten and break the

filling or to unwind it so that a loop could project down into the path of moving parts of the loom and be broken. Breakage of the filling between the bobbin and the end holder results, of course, in failure of the shuttle to thread up after transfer.

I have found that if the butt of the bobbin next to be transferred can be held up in its pocket in the disc and maintained firmly against the bobbin guide the bobbin will not rotate, and the aforementioned cause of improper operation of the loom will be eliminated. I propose to obtain this desirable result by a modification of the bobbin support.

Accordingly, it is a principal object of my invention to provide, in combination with a rotary hopper, a swinging bobbin support having a cam surface yieldingly urged upward and toward the bobbin guide to effectively maintain the butt of the bobbin next to be transferred up in its pocket and in contact with the bobbin guide.

A further object is to provide an adjustment for the said cam surface, taking the form of an eccentric from which the bobbin guide is pivotally suspended, which eccentric may be rotated to provide the desired adjustment, and clamped in adjusted position.

Further objects of my invention will in part be hereinafter more specifically enumerated and will, in part, become obvious as the description proceeds.

Referring to the accompanying drawing, which illustrates the preferred embodiment of my invention:

Fig. 1 is a vertical sectional view of a rotary hopper and associated parts, embodying my invention; and

Fig. 2 is a sectional view taken approximately on line 2—2 of Fig. 1.

Inasmuch as the present invention is concerned only with the bobbin support, its mounting and its mode of co-operation with the hopper and transferring mechanism, only such devices, and a fragment of one front corner of the loom need be herein illustrated or described.

Accordingly, the right front corner of the loom frame is illustrated generally at 1, the

lay at 2, the right hand shuttle box at 3 and the shuttle at 4, the latter parts being shown in section.

A hopper stand 5 is supported from the frame 1 in any suitable usual manner and supports a fixed shaft or stud 6 upon which are revolubly mounted discs 7 and 8. The hub of disc 7 may consist of an elongated sleeve 9 to which the hub of disc 8 is fixed, as by a set screw 10, whereby the two discs are restrained to revolve together. The disc 7 is provided with a series of recesses or pockets 11 for the reception of the butt ends 12 of a series of bobbins arranged about the circumference of the disc and extending parallel to the axis thereof. The tips of the bobbins are supported by spring clips 13 circumferentially arranged about disc 8 in axial alignment with the respective pockets 11. Thus, the stand 5 and the above described parts carried thereby constitute a rotary hopper.

The hopper is rotated, step by step, to successively present the bobbins for transfer, by the well known stop pawl 14 and feed pawl 15 operating on the teeth of a ratchet 16 fixed to or integral with disc 7. The feed pawl 15 is operated by transfer hammer 17 to which it is pivoted as at 18, the transfer hammer being operated by a bunter 19 on the lay, engaging dog 20 pivoted to the transfer hammer and controlled by the usual means, not shown.

A curved member 21, fixed to the hopper stand, serves as a stop, for limiting the rotation of the hopper and thereby properly positioning the bobbin 22 for transfer, and also as a guide, for guiding the butt of the bobbin during the first part of the actual transferring operation.

The swinging bobbin support, to which my invention particularly relates, includes an arm 23 suspended from above the bobbin 22 next to be transferred and carrying at its lower end a head 24 provided with an inclined or cam surface 25 adapted to bear against the rings 26 on the butt 12 of the bobbin 22, the point of engagement being below the center of the bobbin and on the opposite side thereof from the stop 21.

The upper end of arm 23 is provided with a vertically elongated slot 27 engaging over an eccentric 28 constituted by an eccentrically bored bushing supported on a bolt 29 threaded into the hopper stand. Thus, the bobbin support is mounted for vertical sliding movement, within a limited range, and pivotal movement about the axis of the bushing, parallel with the axis of the hopper.

The bobbin support, and thereby the cam surface 25 is yieldingly urged upwardly and toward stop 21 by a helically coiled spring 30 having one end fastened, as at 31, to the hopper stand and its other end fastened to the arm 23, the axis or direction of pull of

the spring being in the plane of swinging movement of the bobbin support but inclined at an acute angle to its vertical movement. By this structure, the cam surface 25 tends to always remain in contact with the rings on the bobbin next to be transferred, thereby holding the butt of the latter up in its pocket 11 and also in contact with stop 21 which effectually eliminates the possibility of the bobbin turning around.

The foregoing action of cam surface 25 is present regardless of small variations in the diameter of the various bobbins. However, should the bobbins shrink appreciably after prolonged usage, or should it be desired to employ bobbins of a different size the field of action of the cam surface must be vertically adjusted. This can readily be accomplished by merely loosening bolt 29, rotating eccentric 28 the desired amount, and then tightening the bolt, thus clamping the eccentric in adjusted position.

The comparatively short slot 27, in combination with the eccentric 28, is preferable to a longer slot as the latter construction would permit too great a vertical movement of the bobbin support, which might interfere with the movement of bobbins to transferring position, and would unduly delay the starting of the swinging movement of the bobbin support during the actual transfer.

It is to be understood, of course, that the construction herein disclosed constitutes but one of numerous ways in which the objects sought may be attained, the true scope of the invention being defined in the appended claims.

I claim:

1. In a filling replenishing loom, the combination of a rotary hooper arranged to support a series of bobbins about its circumference, a hopper stand, means for rotating the hopper to successively present the bobbins for transfer, a combined stop and bobbin guide engaging the bobbin next to be transferred, a pin in said hopper stand extending parallel to the axis of the hopper, a bobbin support suspended from said pin by means of a vertically elongated slot at its upper end, whereby said bobbin support is capable of vertical sliding movement and pivotal movement circumferentially of the hopper on said pin, said bobbin support at its lower end having an offset head provided with a cam surface engaging the said bobbin below its center on the opposite side thereof from said stop, and a spring extending at an acute angle to the direction of said sliding movements and having one end connected to the bobbin support below said slot and the other end connected to the hopper stand, the said spring constituting the sole means of urging the said cam surface upwardly and laterally about said pin toward said stop.

2. A rotary hopper for filling replenishing

looms, said hopper including axially spaced discs having means to support between them, about their circumference, a series of bobbins; a stand for supporting said discs; means
5 for rotating said discs to successively present the bobbins for transfer; a combined stop and bobbin guide engaging the front side of the bobbin next to be transferred; a pin in
10 said hopper stand, a bobbin support suspended from said pin, for vertical sliding movement and pivotal movement about said pin circumferentially of the hopper, said bobbin support having a cam surface engaging the
15 said bobbin below and rearwardly of its longitudinal axis; and a single spring having one end connected to the hopper stand and the other end connected to the bobbin support below the hopper stand, said spring extending
20 at an acute angle to the direction of said sliding movement and constituting the sole means for normally urging the cam surface upwardly and forwardly into contact with the bobbin to prevent the latter from dropping
25 down before it is transferred.

3. In a filling replenishing loom, the combination of a rotary hopper arranged to support a series of bobbins about its circumference, means for rotating the hopper to successively present the bobbins for transfer, a
30 combined stop and bobbin guide engaging the bobbin next to be transferred, an eccentric supported by the hopper, a bobbin support pivotally suspended from said eccentric on said hopper and having a cam surface engaging
35 and supporting the said bobbin, said eccentric being rotatable to vertically adjust the position of the said cam surface, and means for clamping the eccentric in adjusted position.

4. In a filling replenishing loom, the combination of a rotary hopper arranged to support a series of bobbins about its circumference, means for rotating the hopper to successively present the bobbins for transfer, a
45 combined stop and bobbin guide engaging the bobbin next to be transferred, a bobbin support having a vertically extending slot, at its upper end and a bobbin engaging and supporting surface at its lower end, an adjustable eccentric within said slot serving to adjustably limit the vertical position of the said
50 surface, and means for yieldingly urging the bobbin support upwardly and toward the said stop.

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