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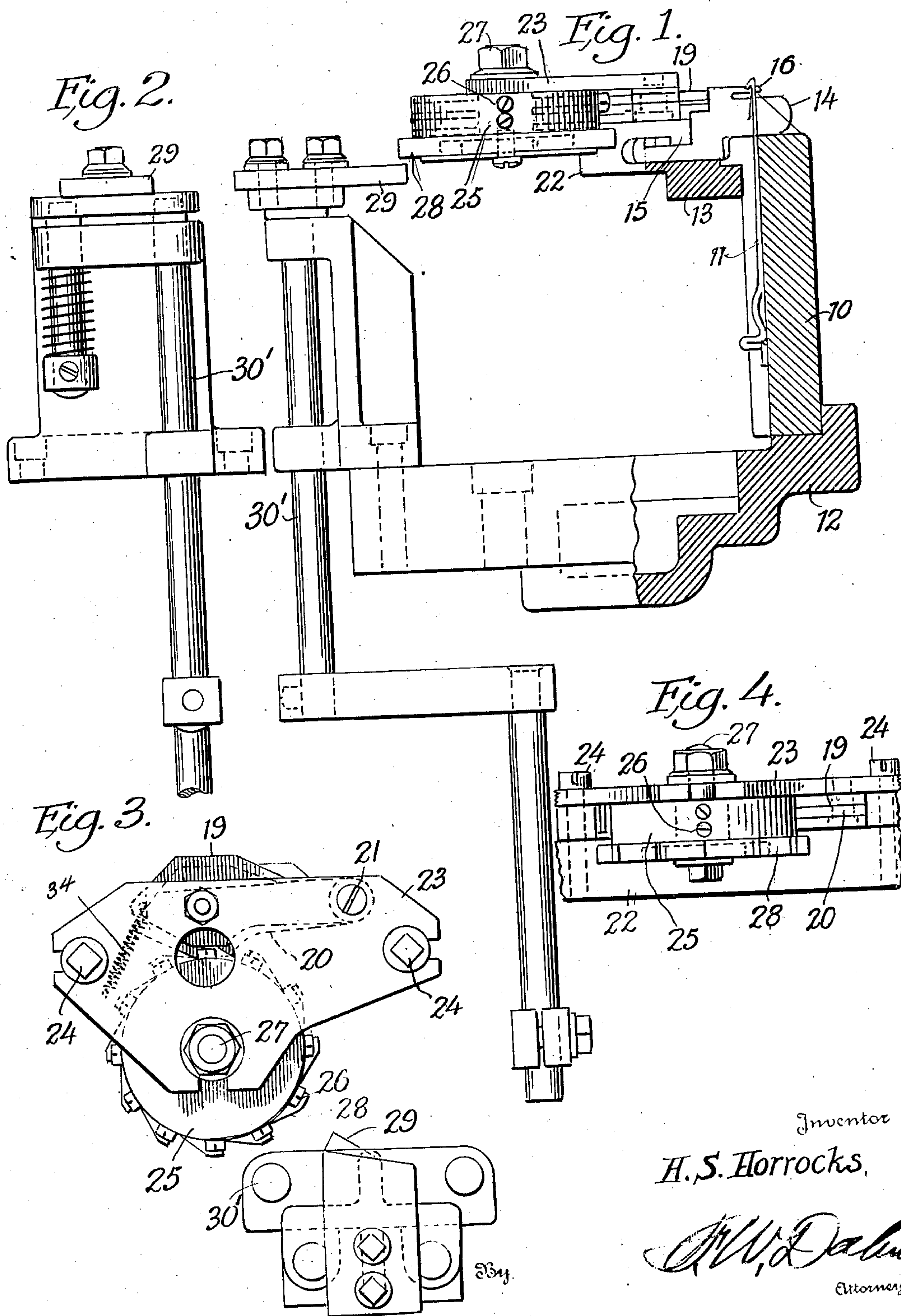
H. S. HORROCKS

**2,148,622**

KNITTING MACHINE

Filed Feb. 26, 1937

2 Sheets-Sheet 1



Inventor

H. S. Horrocks.

*W. L. Dabney,*  
Attorney

Attorneys,

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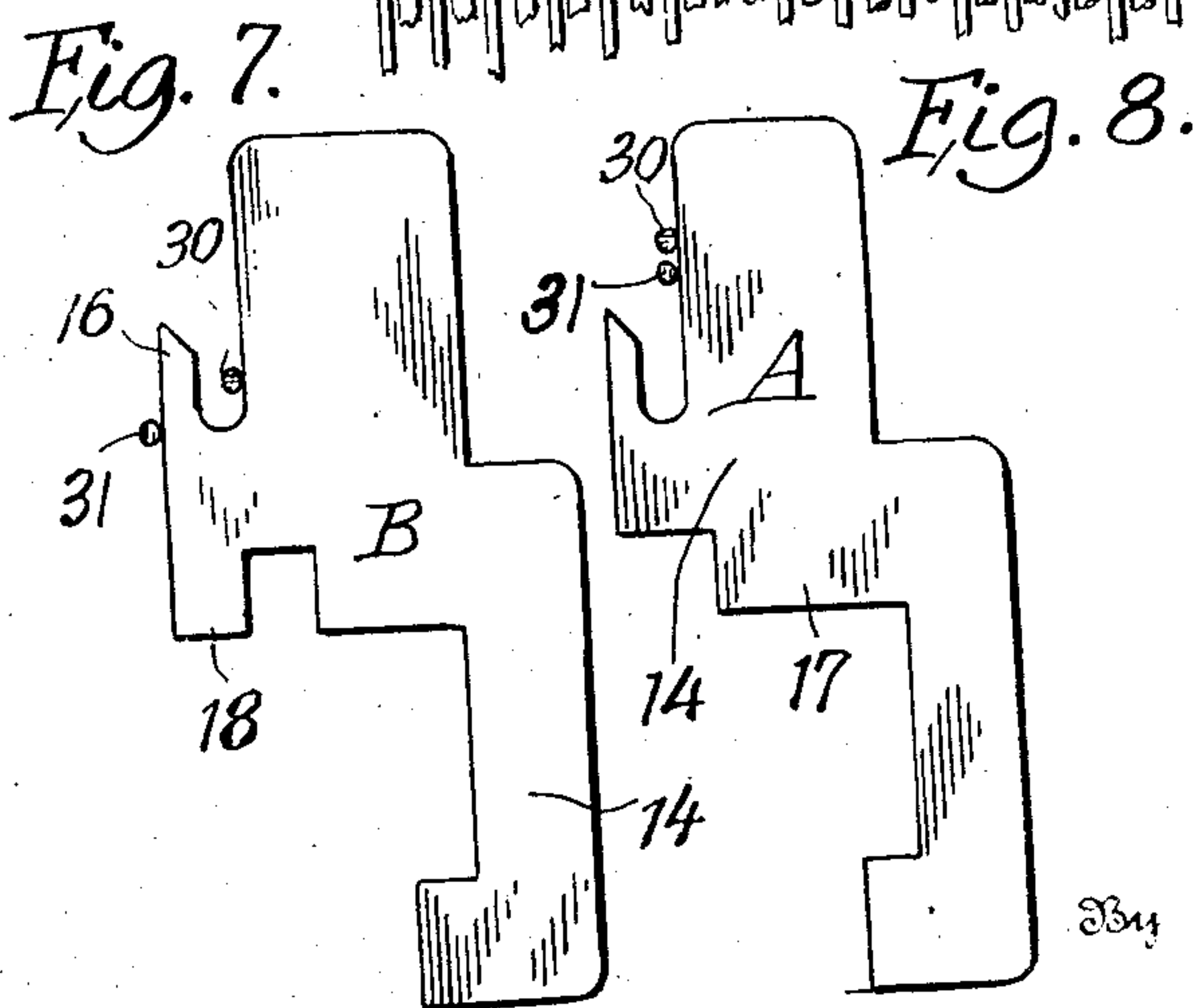
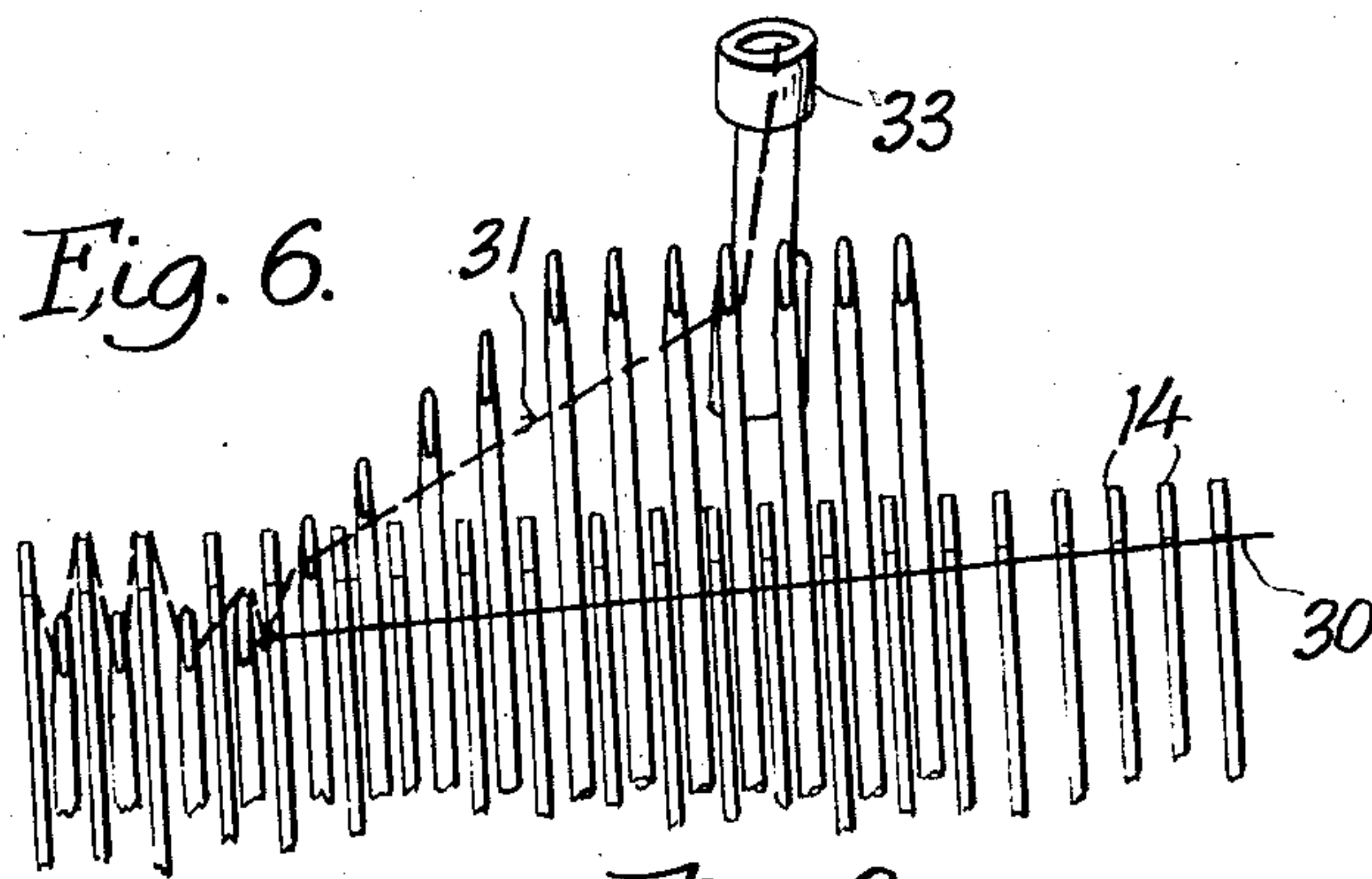
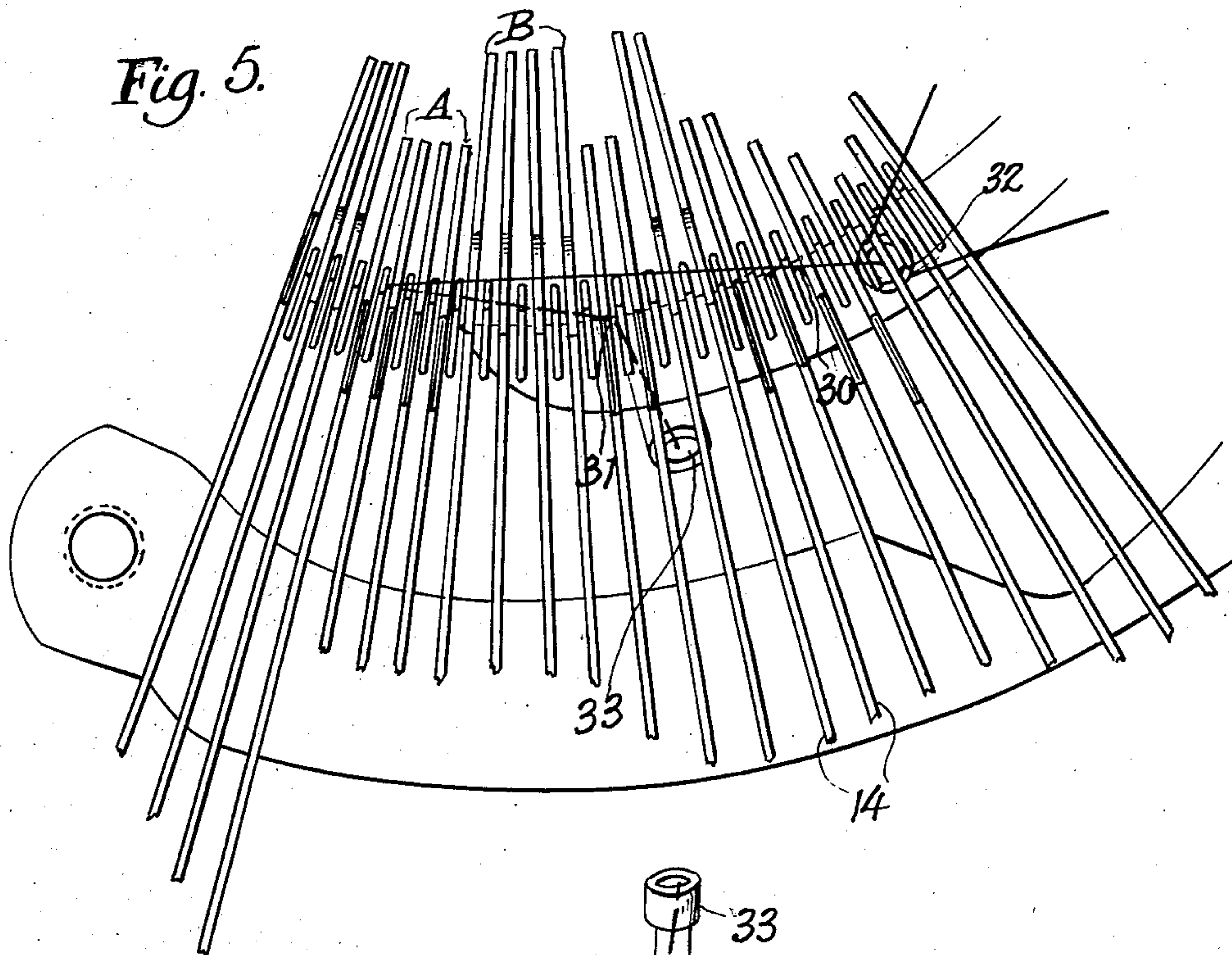
H. S. HORROCKS

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KNITTING MACHINE

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2 Sheets-Sheet 2



Inventor,

H. S. Horrocks,

*P. W. Dakin,*

Attorney



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# UNITED STATES PATENT OFFICE

2,148,622

## KNITTING MACHINE

Harry S. Horrocks, Philadelphia, Pa., assignor to  
H. Brinton Co., Philadelphia, Pa., a corporation of Pennsylvania

Application February 26, 1937, Serial No. 127,993

### 1 Claim. (Cl. 66—93)

My invention relates to knitting machines, and it is an object of the same to provide means whereby the degree of variation possible in patterns made upon knitted pile fabric is made very extensive, yet by the use of simple and inexpensive means.

Referring to the drawings, which are hereby made a part of this application, and in which similar reference characters indicate similar parts:

Fig. 1 is a vertical section through the cylinder and associated parts of a circular independent needle knitting machine,

Fig. 2, an elevation, viewed from the left side of Fig. 1,

Fig. 3, a plan of certain parts shown in Fig. 1,

Fig. 4, an elevation of a pattern wheel and associated parts, viewed from the left in Fig. 1,

Fig. 5, a plan illustrating the operation of sinkers and related parts,

Fig. 6, an elevation of the same, and

Figs. 7 and 8, views illustrating the operation of the sinkers on the yarns.

In the drawings, reference character 10 indicates a needle cylinder provided with latch needles 11, the cylinder being supported on the usual base 12. A sinker bed 13 is secured to the upper portion of the cylinder and is provided with sinkers 14 which are adapted to be retracted by any conventional or desirable means such as the retracting cam 15 common to all the sinkers, but which are selectively advanced by the means now to be described.

The sinkers, as best shown in Figs. 7 and 8, have each a web-holding finger 16 and are otherwise alike except that those of one set or variety have advancing shoulders at 17, to-wit, at a relatively low level, while those of the other set have their advancing shoulders at 18, i. e., at a relatively high level. Advancing cams for the sinkers are shown at 19 and 20, they being pivoted at 21 on the sinker cam ring 22. A bracket 23 mounted on the sinker cam ring by means of screws 24, 24 engaging in slots in the bracket to provide limited capacity for circumferential adjustment carries the cams 19, 20 and their screw 21, and also supports a pattern wheel 25 for actuating the cams 19 and 20 to place them in sinker-advancing position. This pattern wheel is provided about its periphery with screw-threaded holes for receiving the threaded stems of studs 26, the holes being arranged in vertical rows to receive a pair of studs for advancing both cams 19 and 20, or either one of such cams, according to the pattern desired.

The wheel 25 is mounted for rotation on a bolt 27 on said bracket and is rotated by means of a ratchet 28 fixed to the wheel and rotated at intervals as desired by means of a pawl 29 mounted on a vertically movable rod 30 which is operated by means of pattern mechanism of known character.

A main yarn 30 and a pile yarn 31 are fed to the needles at the feed herein shown from eyes 32 and 33, the course of their movements being shown in Figs. 5 and 6. For convenience of description of operation the sinkers of the two varieties herein shown are marked A and B in Figs. 5 to 8.

Aside from the special means for moving sinkers the machine is provided with the usual cams 15 for moving them to hold down the web, etc., and the cams 19, 20 are provided with springs 34 for retracting them and holding them out of action except when advanced by said cams 19, 20, as above described.

In the operation of a machine equipped with sinker controlling means and sinkers as above related a body yarn 30 and a pile yarn 31 are supplied to the needles, as illustrated in Figs. 5 to 8. Now if yarn 30 is black and yarn 31 is red and if the sinkers indicated at B be advanced by the upper cam 19, a vertical row of pile loops will be made at each point where sinkers B occur, thus forming a vertical red stripe whose width is determined by the number of adjacent sinkers B at that part of the needle circle. The parts knitted at sinkers A will have no pile loops, as these sinkers are not advanced and so the red yarn does not come to lie on the web-holding fingers 16, but lies on the regular level of the sinker below the finger, and so both yarns will be knitted together to form plain or Jersey stitches. If both cams 19 and 20 are advanced, pile loops will be made by all the needles, while if both cams at a feed are held back by their springs 34 plain fabric will be produced. If only cam 20 is advanced, vertical red stripes of pile loops will be made by needles corresponding to the sinkers indicated at A.

If the machine has a plurality of feeds equipped as above described, and if the cams 19 and 20 are correspondingly actuated the cloth knitted will be as above set forth. By operating these cams differently at different feeds various figures may be produced, consisting of pile loops spaced by plain areas.

A further variation may be produced by providing, e. g., a red body yarn and a black pile yarn at alternate feeds, while leaving a black body yarn and a red pile yarn at the intermediate



feeds. Now if cam 19 is advanced at one of two adjacent feeds and cam 20 at the other, the sinkers B will cause red pile loops to appear at the corresponding wales at one feed and the sinkers A will cause black pile loops to appear at the remaining wales, thus making a vertically striped fabric. By reversing the relation of the cams, red loops will be made to appear at wales A at the first-named feed and black pile loops at the second-named feed at wales B, thus producing a broken or checked design. If both cams are advanced at all the alternate feeds while the cams of intermediate feeds are retracted, horizontal red stripes will appear, while if both cams are advanced at all the intermediate feeds while at the alternate feeds both cams are retracted, horizontal black stripes will appear.

It will thus be seen that I have made provision for making a wide variety of designs by the use of pile loops, and for changing with ease from one design to another by changing the location of studs 26 and by providing such studs at positions indicated or leaving the same blank, and further by altering the pattern control of the ratchet driving means.

It will be obvious to those skilled in the art that many variations may be made in the devices shown in the drawings and described in the specification, all without departing from the spirit of the invention; therefore I do not limit myself to

the means so shown and described but only as indicated in the accompanying claim and as necessitated by the state of the art. For instance, while I have shown two levels of shoulders on the sinkers, it is obviously within the scope of my invention to provide additional levels, with appropriately located actuating cams and corresponding abutments on the wheel, etc.

Having thus fully described my invention, what I claim is:

In a machine for knitting patterned pile fabric, the combination of a needle cylinder, a circular series of needles therein, a plurality of series of sinkers cooperating with said needles, said sinkers having web-holding fingers and the sinkers of each series also having sinker-advancing shoulders at an individual level, means for feeding a main yarn and a pile yarn in such relation to said sinkers as to form pile loops over said fingers on fully advanced sinkers, cams each positioned to engage with the advancing shoulders at one of said levels, a wheel in a fixed parallel relation to the axis of said cylinder, removable studs on the periphery of said wheel at levels corresponding to those of said cams, and pattern-controlled means for rotating said wheel, whereby changes in patterns may be effected automatically.

HARRY S. HORROCKS.