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PATENTED JUNE 16, 1908.

E. H. HEATH.

PATTERN DEVICE FOR WARP KNITTING MACHINES.

APPLICATION FILED JUNE 29, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

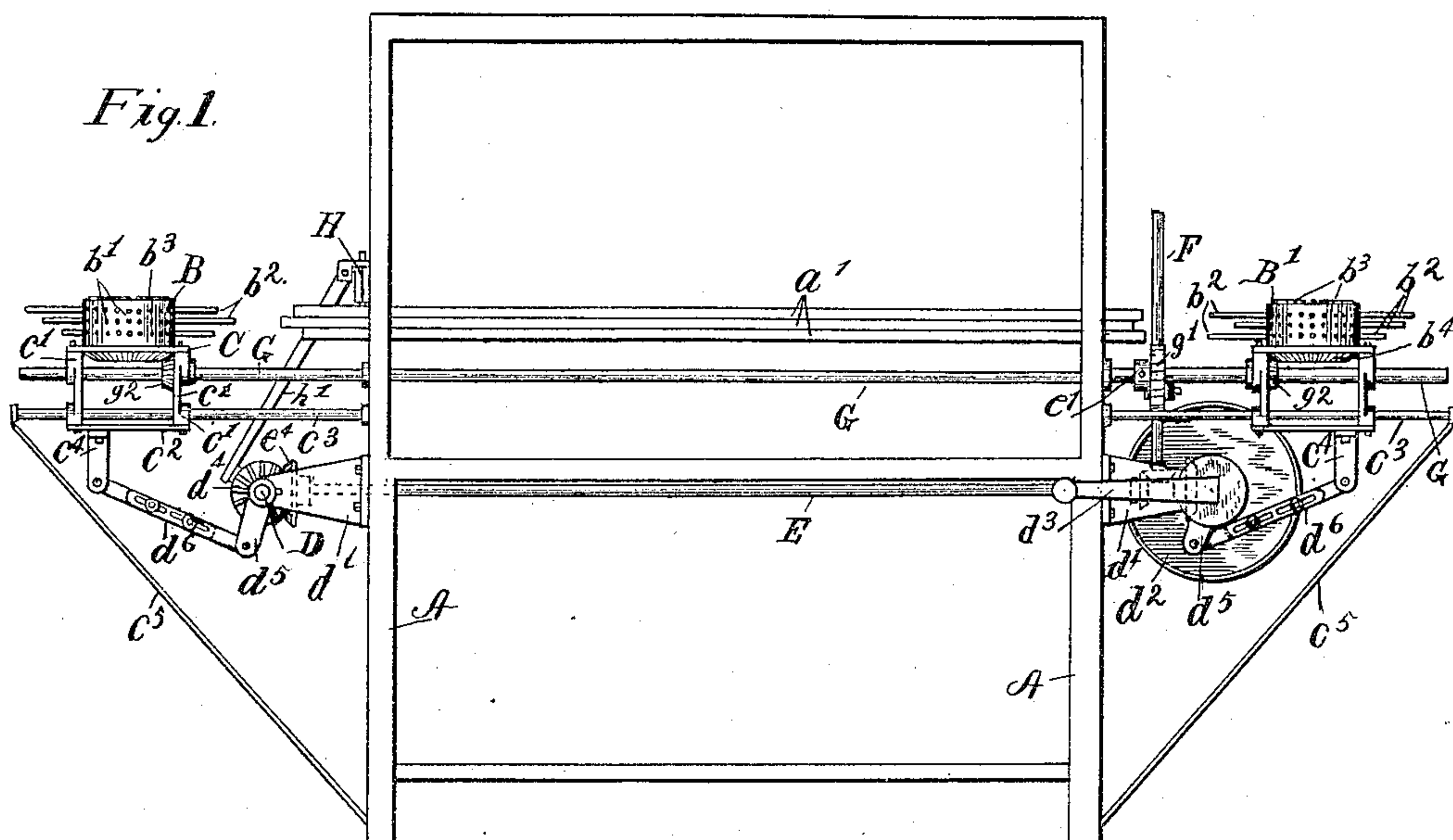


Fig. 3.

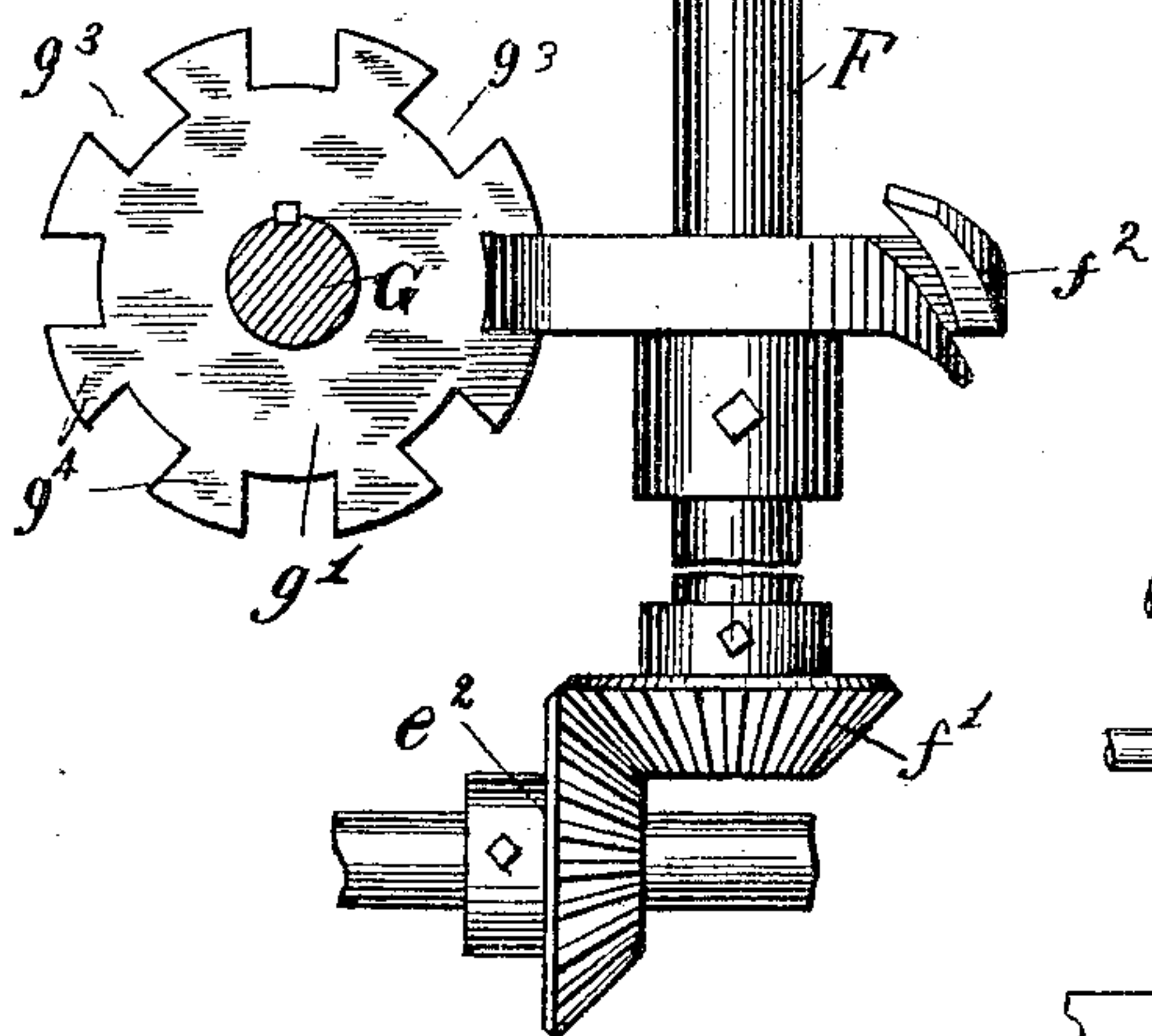
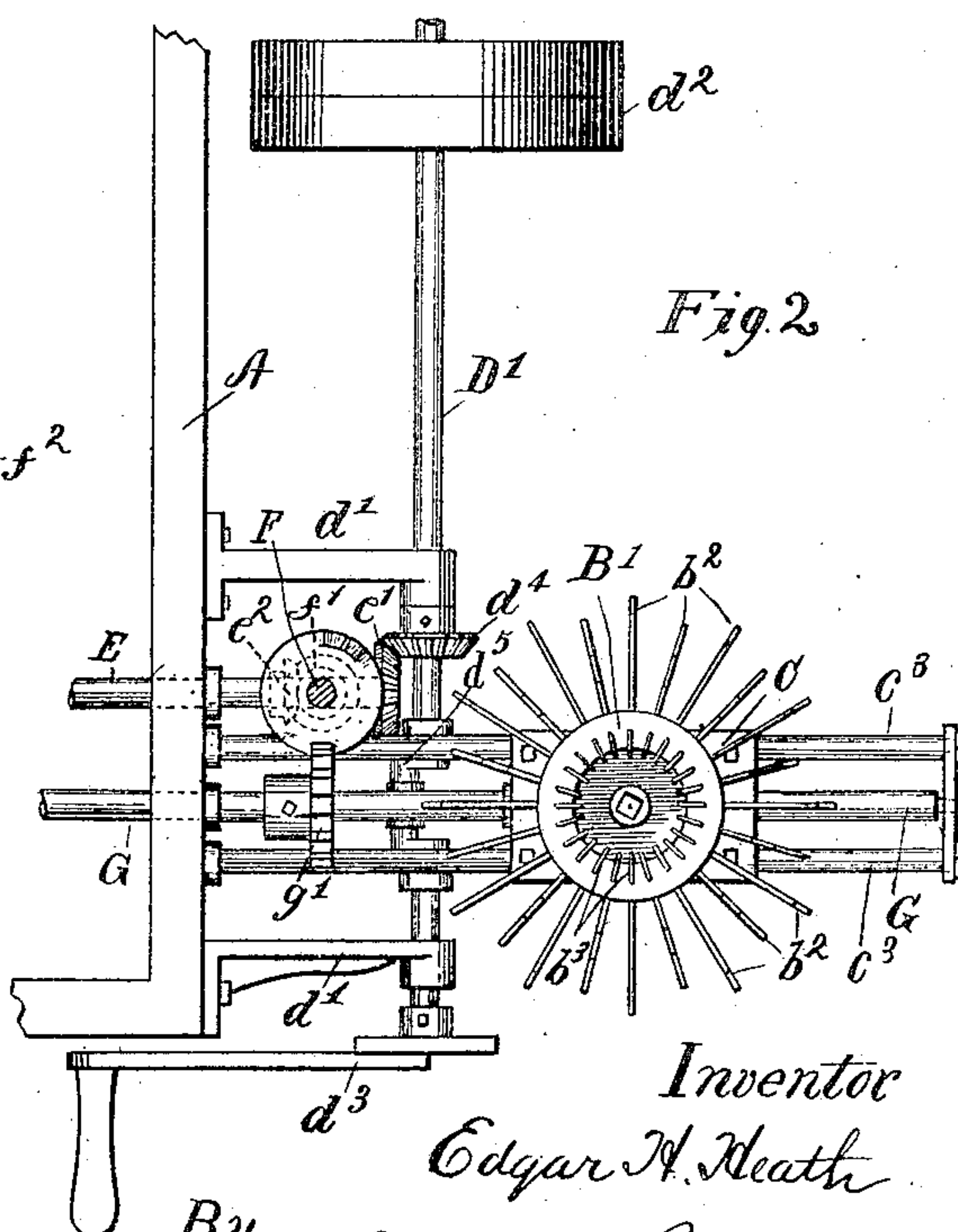


Fig. 2



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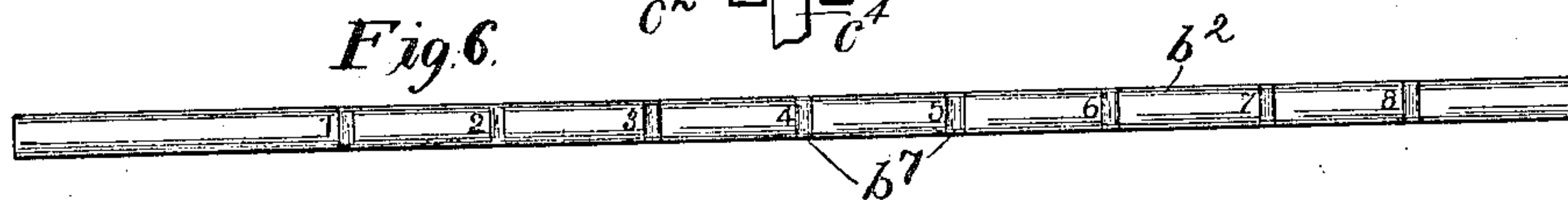
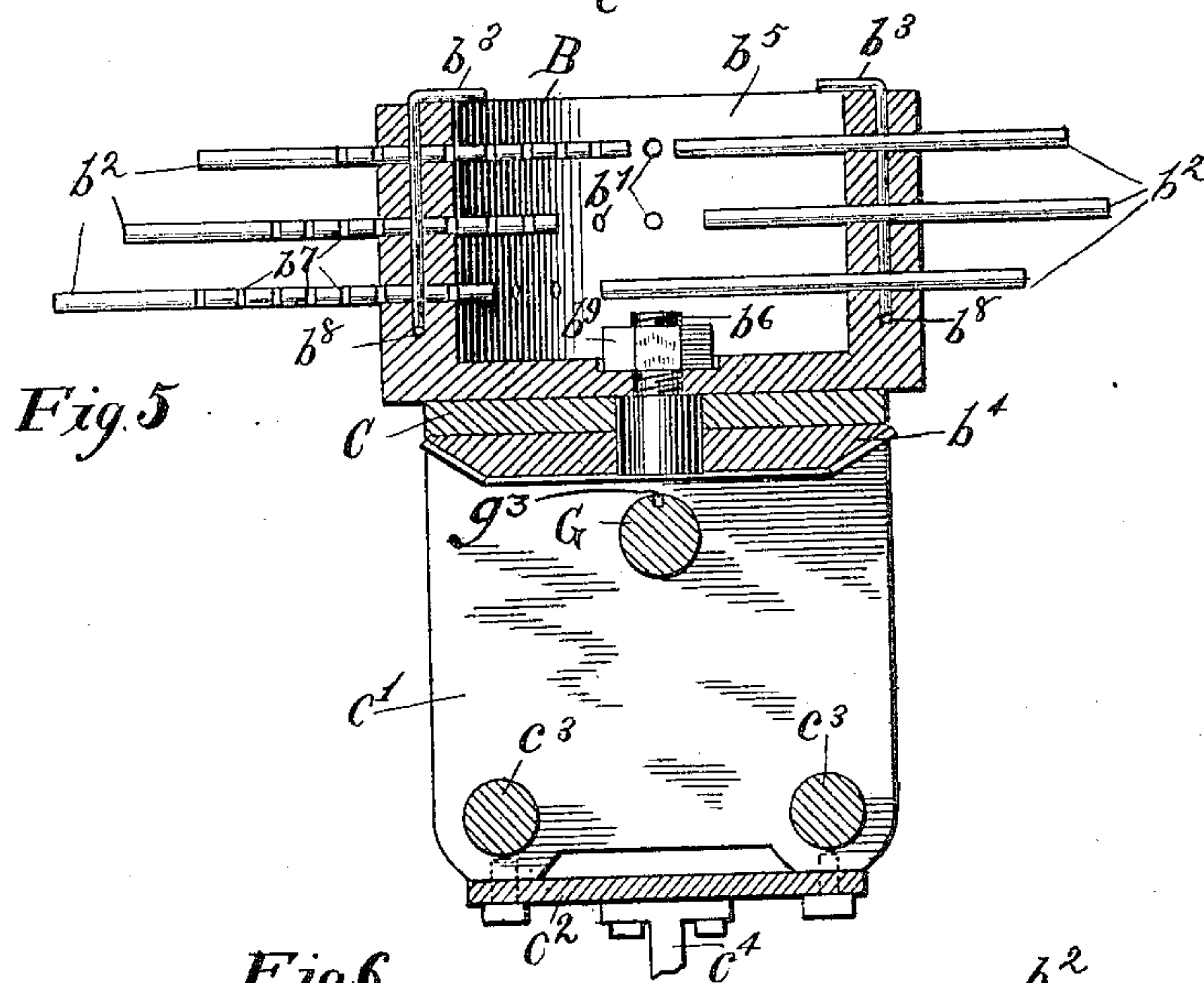
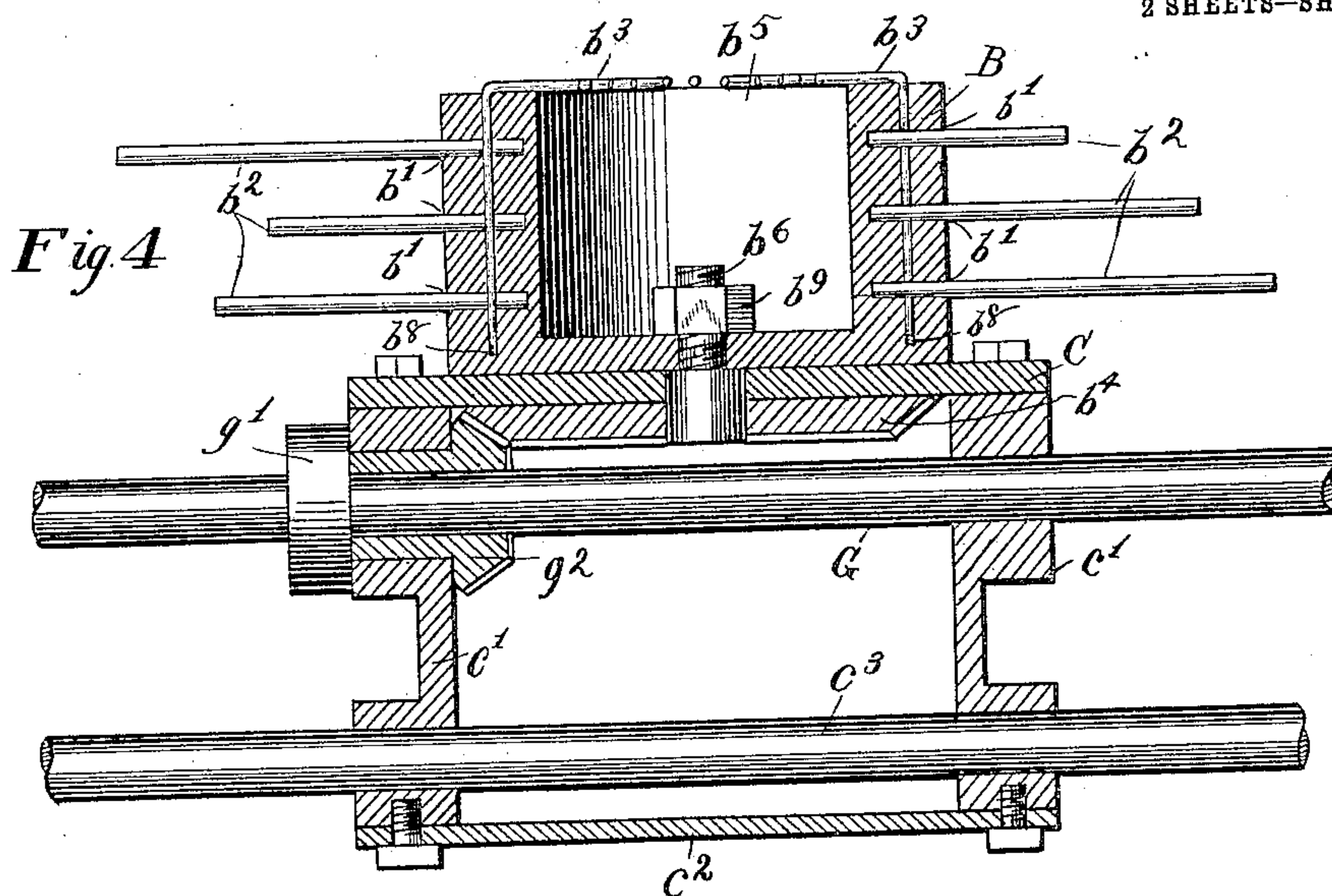
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PATTERN DEVICE FOR WARP KNITTING MACHINES.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

EDGAR H. HEATH, OF CHICAGO, ILLINOIS.

PATTERN DEVICE FOR WARP-KNITTING MACHINES.

No. 891,216.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed June 29, 1906. Serial No. 323,983.

To all whom it may concern:

Be it known that I, EDGAR H. HEATH, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pattern Devices for Warp-Knitting Machines, of which the following is a specification.

My invention relates especially to improvements in that class of knitting machines which is used in making trimmings of varied weaves, and in which it is desirable to quickly and easily change the patterns by altering the throw or longitudinal movements of the thread guide-bars.

The improvements which form the subject matter of this application consist in the construction, arrangement and operation of the elements for moving the thread-bars, whereby the reciprocation of said bars will be effected with certainty and accuracy and with no appreciable lost motion or unnecessary movements of the operative mechanism.

Said improvements consist further in providing thread guide-bar actuating pins which can be quickly and easily adjusted to effect the desired variations in the patterns of the knitted fabrics.

General objects attained by my invention are, economy in the construction and number of parts employed, the noiseless operation of a machine equipped with said improvements, saving of loss incident to wear and breakage of parts, saving of power because of the anti-frictional and smooth operations of the elements employed, and saving of time in the production of goods because of the ability to adjust and operate the parts quickly, all of which will hereinafter more fully appear.

Inasmuch as my invention relates only to the means for operating the thread guide-bars, and is capable of being applied to any knitting machine using such bars, I have shown and will describe in connection with my improvements, only so much of a knitting machine as may be essential to make plain the construction and operation of my invention.

In the accompanying drawings which form a part of this application, Figure 1 is a front elevation of my invention as applied in an approved form to a knitting machine. Fig. 2 is a detail in top plan view on an enlarged scale of the mechanism which appears at the right-hand side of Fig. 1. Fig 3 is a detail on a magnified scale of driving means preferably

employed as a part of my invention. Fig. 4 is a vertical section on an enlarged scale taken through the pin holding turret which forms an essential feature of my machine. Fig. 5 is a vertical section on a plane at right angles to Fig. 4 and showing a slightly modified form of the device. Fig. 6 is a detail of one of the pins which form an important element of my improvements.

Referring to the details of the drawing, A represents so much of the main frame of a knitting machine as is necessary to illustrate the operative connection of my improvements, a^1 represents three thread guide-bars of any preferred construction, which are suitably mounted on the main-frame to reciprocate in a horizontal plane in the usual manner.

H, and h^1 represent means for locking the guide-bars in their adjusted positions, and as such means form no part of the invention herein referred to, they are not shown nor described in detail.

B and B^1 represent the turrets which form important elements of my invention. As shown in Fig. 4, the turret consists of a hollow-cylindrical steel casting having a flat bottom, and open at the top. The walls of the turret are vertical, and have formed therein a plurality of horizontal openings b^1 which extend part way therethrough. These openings are arranged annularly in horizontal planes and in vertical alinement and are adapted to receive with a close fit, the guide-bar operating pins b^2 . Holes b^3 are drilled vertically in the walls of the turret to intersect the openings b^1 , and to leave sufficient space for locking pins b^3 which are inserted in the holes b^3 and frictionally engage the pins b^2 thereby preventing the latter from becoming accidentally displaced during the operation of the machine. The upper ends of the locking pins are bent at right angles and such portions are arranged to project over the well b^5 of the turret, where they can be readily grasped for removal when it is desired to adjust or displace the pins b^2 . The pins are pushed into the openings b^1 until their inner ends abut against the wall of the turret at the end of such openings.

As shown in Fig. 5, the openings b^1 are drilled entirely through the walls of the turret, so that the pins b^2 may project into the well b^5 . Where this construction is employed, the pins b^2 are formed with a plurality of regularly spaced notches b^7 which

are numbered and are adapted to be engaged by the locking-pins b^3 . This permits the employment of fewer pins, as each pin b^2 is susceptible of many adjustments, it being understood that the distance a pin projects from the turret controls the extent of the movements of the thread guide-bars and hence the fabric pattern. It also enables the operator to make the changes from one pattern to another more quickly than is possible where a pin of a certain length must be removed and a new pin inserted in its place. The numbers on the pins serve as a guide in setting the pins uniformly.

Each turret is rotatably supported on a horizontal plate C, which is bolted to two vertical plates c^1 . A bolt b^6 passes through a suitable opening in the center of the turret is screwed into a boss on the center of the bevel gear b^4 , and carries a nut b^5 on its upper end. The gear b^4 meshes with and is driven by a bevel pinion g^2 provided with a feather which slides in a spline g^3 formed in a shaft G and journaled in one of the plates c^1 . A collar g^1 on the hub of pinion g^2 abuts on one side of one of the plates c^1 , and serves to hold the pinion against movement independent of said plate. The plates c^1 are slidably mounted on the shaft G and on non-rotatable or fixed guide-rods c^3 , c^3 , which are secured at their inner ends in the main-frame, and at their outer ends are supported by brace rods c^5 the lower ends of which are suitably secured near the bottom of said main frame.

To the lower edge of the plates c^1 is secured a flat plate c^2 to which is rigidly secured an arm c^4 . The lower end of this arm is pivotally connected by an adjustable link d^6 with the end of a crank-arm d^5 which is fixed on the shaft D which is journaled in the hangers d^1 bolted at right angles to the side members of the frame A. On one end of the shaft D is fixed a bevel-pinion d^4 which meshes with and is driven by a corresponding pinion e^4 on the end of the shaft E, thus transmitting rotary motion to said shaft D which, through the crank-arm d^5 , link d^6 and arm c^4 , causes the plates c^1 and the turret B carried thereby, to be reciprocated on the shaft G and the guide-rods c^3 . The range of the reciprocal movements of the turret is controlled by letting out or taking up the link connection d^6 in a manner that will be apparent. The shafts E and G extend across the main frame and are suitably journaled in its vertical members. A turret B^1 identical in construction with that described is arranged on the other end of the shaft G and on corresponding guide-rods c^3 which are supported at their outer ends by braces c^5 . This second turret is also rotated and reciprocated by elements identical with those described in connection with the turret B.

The shafts E and G are driven by the following means:—In the horizontally arranged

hangers d^1 , d^1 , on the right-hand side of the main-frame, is journaled a main-drive shaft D^1 , which carries at one end, tight and loose drive-pulleys d^2 , which may be belted to any suitable driving means, and on the other end of the shaft is secured a crank-handle d^3 by which the shaft may be manually driven. Fixed on the shaft D^1 adjacent to one of the hangers d^1 is a bevel-pinion d^4 which meshes with and drives a corresponding pinion e^1 on the adjacent end of the shaft E, thus transmitting motion to the latter. Near the end of the shaft E is fixed a bevel pinion e^2 which meshes with and drives a corresponding pinion f^1 on the vertical shaft F which is suitably journaled in the main frame of the machine. On the shaft F is fixed a disk f^2 having its periphery split and bent at one point to form a cam groove between the split portions as shown in Fig. 3. This disk stands at right-angles to a special gear g^1 on the shaft G the periphery of which is cut with spaced notches g^3 , and between such notches with teeth g^4 . The disk f^2 is set to rotate in the notches g^3 , and the teeth g^4 are adapted to be engaged by the split portions of the disk f^2 , whereby, at each revolution of the disk, the gear g^1 will be moved one step and give corresponding movement to the shaft G by which it will be communicated to the pinion g^2 and hence to the turret gear b^4 . These step-by-step or intermittent movements of the shaft G are controllable as to number and time by varying the number of notches in the gear g^1 or the cam points on the disk f^2 , or by changing both, as will be readily understood by those skilled in mechanical movements.

The relative arrangement in this machine of the thread guide-bars and turrets B, B^1 , is such that the pins b^2 will successively strike the ends of the bars and slide the latter longitudinally in their bearings, as the turrets are rotated and moved toward the main-frame, the extent of such movements of the bars being controlled by the length of the outwardly projecting portion of the pins, it being understood that each guide bar is acted on by oppositely placed pins in the turrets.

From the foregoing description of the construction of my machine, its operation is so apparent as not to require extended explanation. It is plain that the rotation of the turrets will bring the pins b^2 which project radially therefrom, successively in position to engage the ends of the thread-guide bars arranged in the same horizontal planes with the pins, without loss of motion. As the pins are rigidly held in the turrets and in true alinement with the guide-bars, the danger of breakage due to a well known construction which involves the sliding of the pins in their respective bearings, is avoided. The longitudinal movements of the turrets on the guide-bars c^3 and shaft G are con-

trolled with exact nicety through the adjustable connections afforded by the links *d*⁶. These movements of the turrets, as well as their rotary movements, are effected noiselessly, as will be apparent, thus avoiding the nerve racking noises incident to a construction in which there are loose parts.

It will be apparent that various modifications may be made within the scope of my invention in the means for reciprocating and intermittently rotating the turrets, as well as in the devices for controlling the travel of the turrets, so that I do not wish to be limited to the precise means shown, but

What I claim is:—

1. In a knitting machine, the combination with thread bar operating means, of a slidable turret, pins projecting therefrom, means for adjusting said pins radially, and means for operating said turret whereby said pins will be pressed longitudinally against the thread-guide bars.

2. In a knitting machine, the combination with thread bar operating means, of a slidable turret, pins removably arranged in said turret and projecting radially therefrom, means for adjusting said pins radially, and means for operating the turret whereby said pins will be alternately pressed in a longitudinal direction against the ends of the thread guide bars.

3. In a knitting machine, thread-guide bar operating means, comprising a turret, pins removably and adjustably arranged in said turret and adapted to project radially therefrom and means for rotating the turret step by step, and means for sliding said turret whereby said pins will be successively pressed against the ends of the guide-bars.

4. In a knitting machine, thread-guide bar operating means, comprising a rotatably and slidably mounted turret, pins removably arranged in said turret, and adapted to project radially therefrom at varying distances, means for rotating said turret, and means for sliding the turret, for the purpose set forth.

5. In a knitting machine, thread-guide bar operating means, comprising a rotating and

reciprocating element, pins rigidly and removably arranged in said element, means for rotating said element, and means for reciprocating the element said last named means adapted to change the extent of the reciprocal movements of the turret.

6. In a knitting machine, the combination with thread guide bar operating means, of a slidable turret, pins removably arranged therein, and adapted to be adjusted radially, means for locking the pins in position, and means for operating the turret whereby said pins will be pressed longitudinally against the ends of the guide bars.

7. In a knitting machine, thread-guide bar operating means, comprising a turret having a plurality of radial holes formed therein, and mounted to rotate on a vertical axis, pins removably arranged in said holes, means for adjusting said pins radially, and means for intermittently operating said turret whereby said pins will be pressed longitudinally against the guide-bars.

8. In a knitting machine, thread-guide bar operating means, comprising pins having notches therein, locking means adapted to engage said notches devices for removably supporting said pins, and means for reciprocating said supporting devices whereby said pins will be pressed against the ends of the guide-bars.

9. In a knitting machine, thread-guide bar operating means, comprising a cylindrical turret having series of radial holes formed therein, pins arranged in said holes and projecting at varying distances from said turret, removable means for locking said pins against accidental displacement, means for rotating and reciprocating said turret whereby said pins will be pressed longitudinally against the guide-bars.

In testimony whereof I affix my signature in presence of two witnesses.

EDGAR H. HEATH.

Witnesses:

C. F. BAUM,

WM. B. MOORE.