

No. 631,788.

Patented Aug. 29, 1899.

C. W. & M. J. GREENWOOD.

WOOD BENDING MACHINE.

(Application filed Jan. 17, 1898.)

3 Sheets—Sheet 1.

(No Model.)

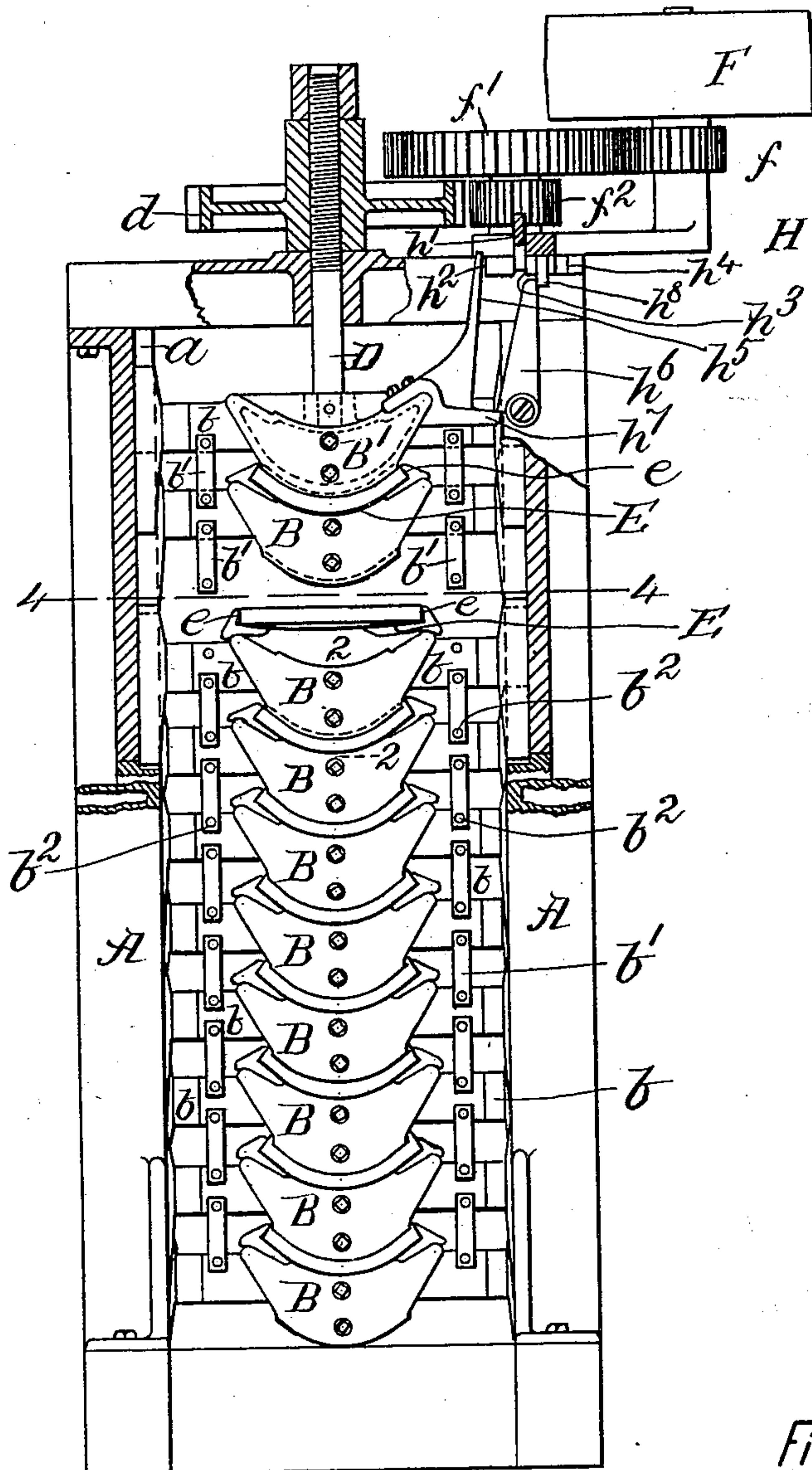


Fig. 1.

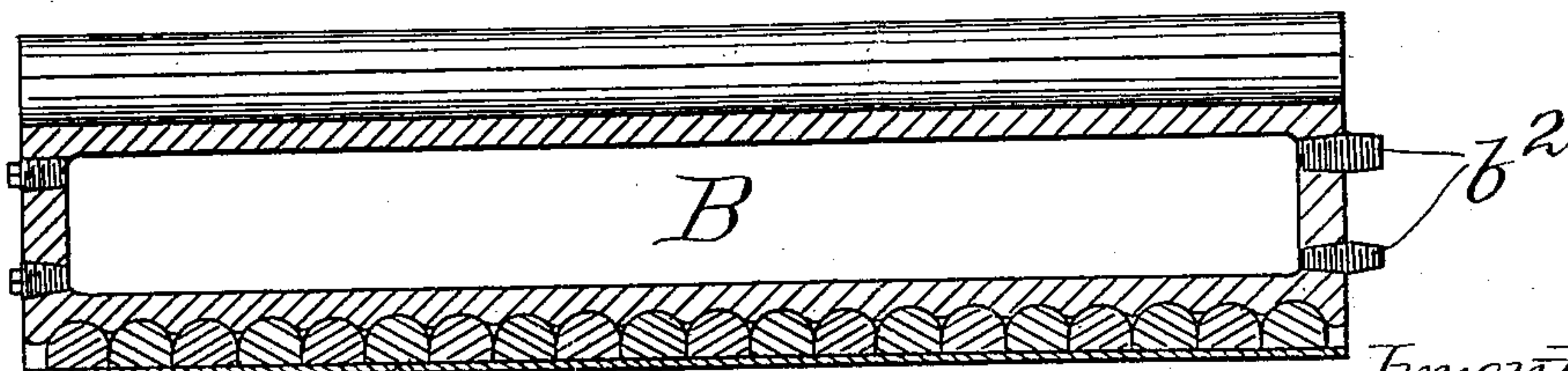


Fig. 2.

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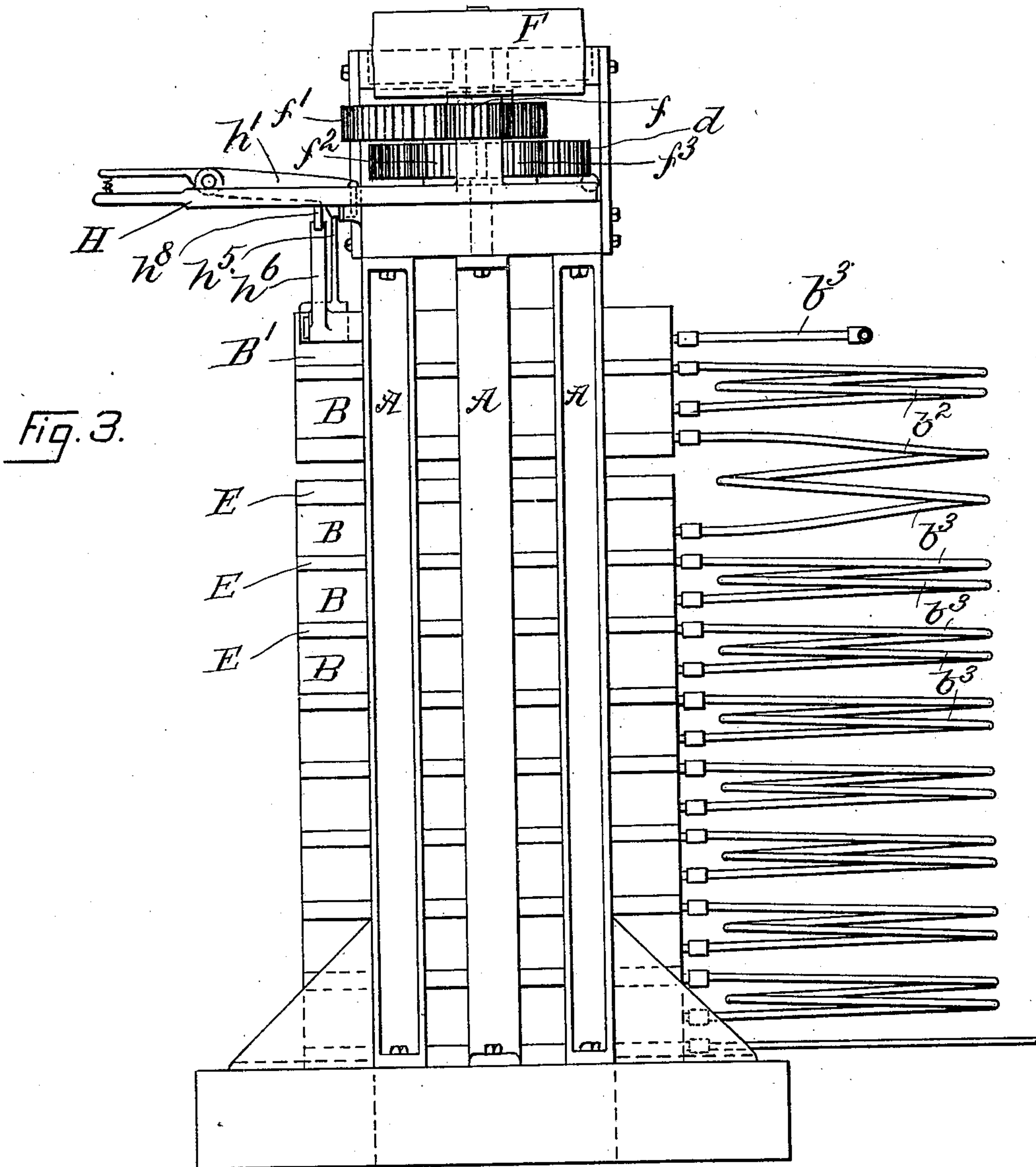
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Fig. 4.

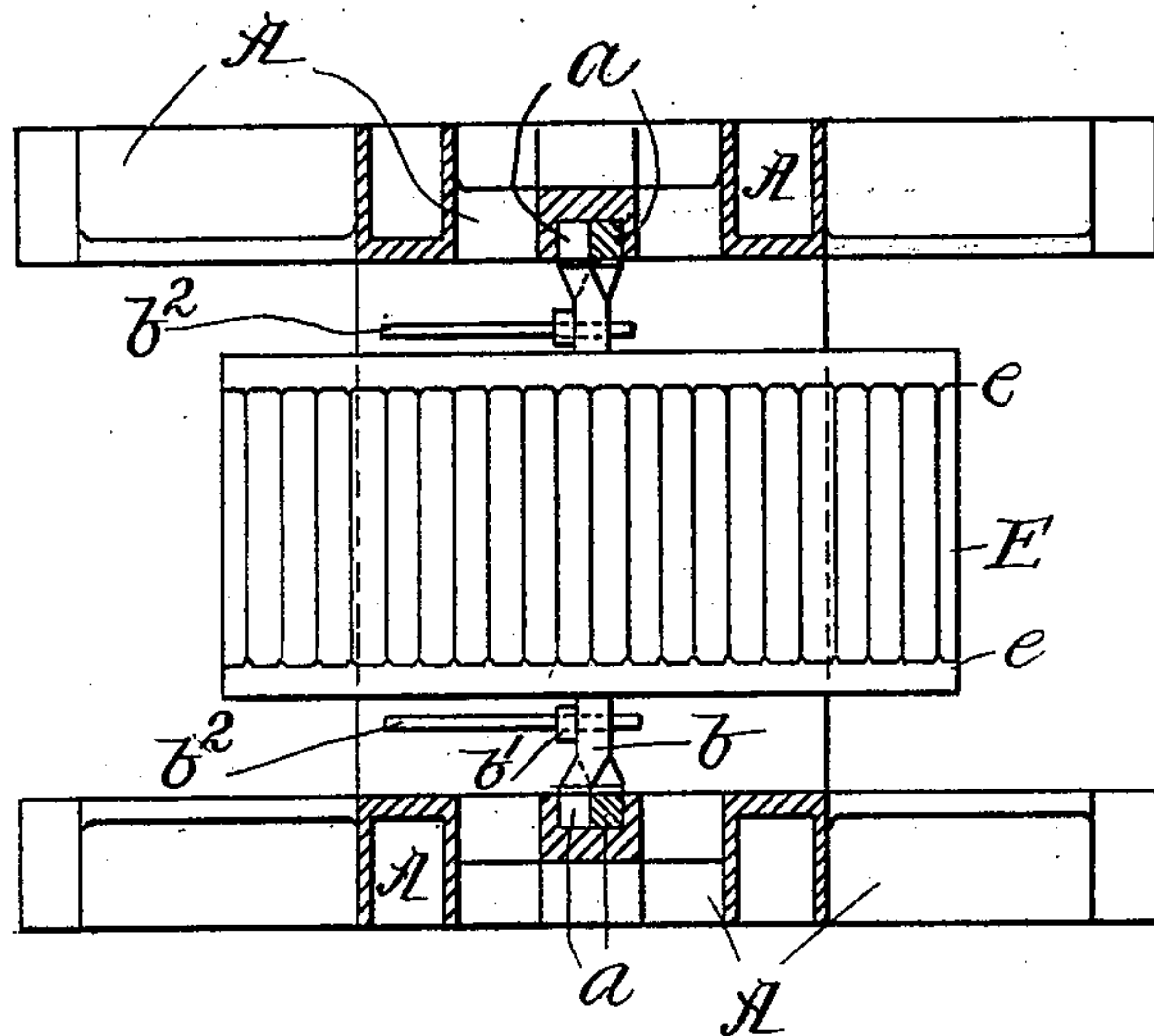
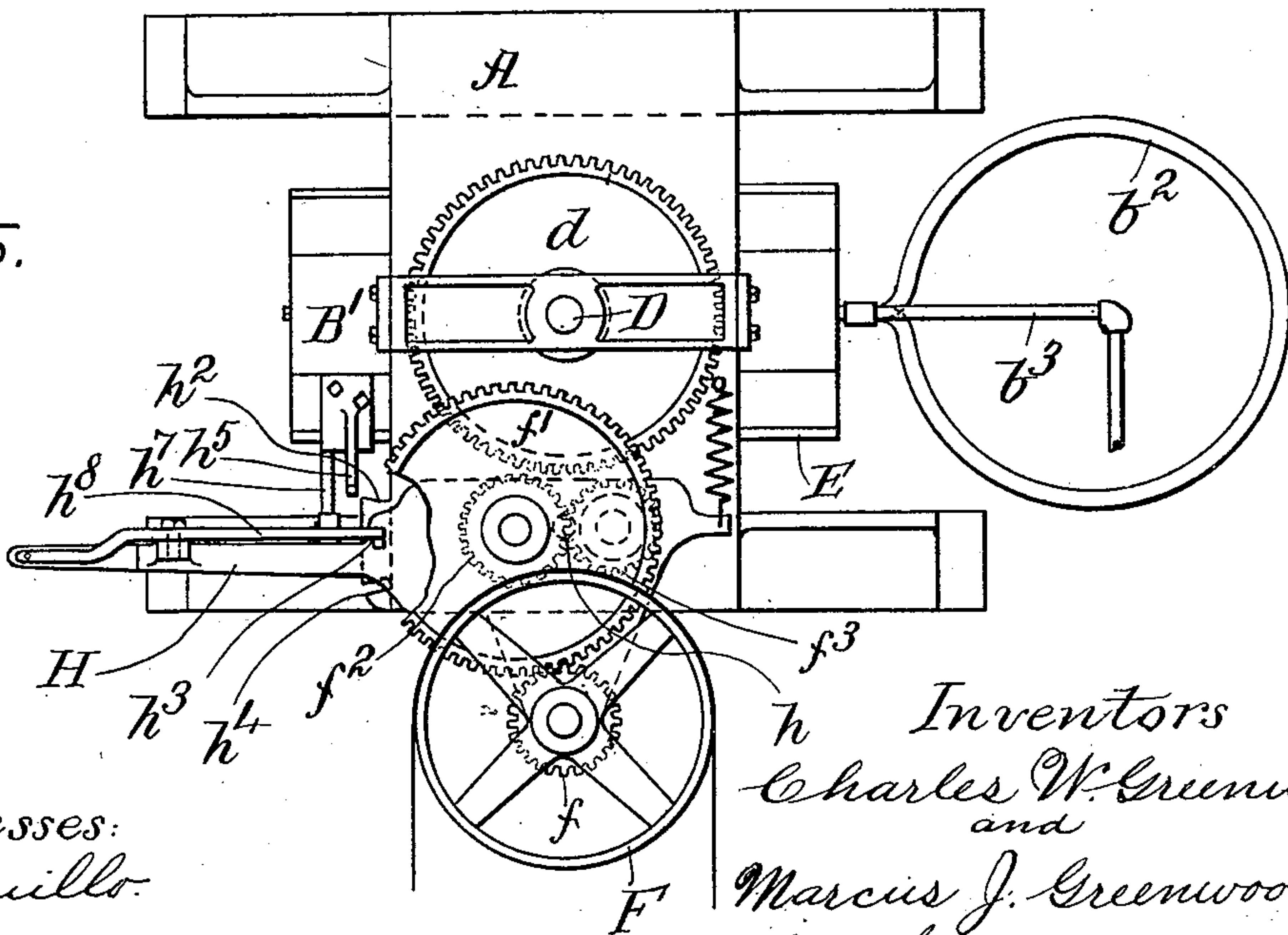


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES WALTER GREENWOOD AND MARCUS JUDSON GREENWOOD, OF
GARDNER, MASSACHUSETTS.

WOOD-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 631,788, dated August 29, 1899.

Application filed January 17, 1898. Serial No. 666,887. (No model.)

To all whom it may concern:

Be it known that we, CHARLES WALTER GREENWOOD and MARCUS JUDSON GREENWOOD, of Gardner, in the county of Worcester and State of Massachusetts, have invented an Improved Wood-Bending Machine, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation, partly in section, of our machine. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a side elevation. Fig. 4 is a section on line 4 4 of Fig. 1. Fig. 5 is a plan.

The main feature of our invention is a machine made up of formers and flexible sheets of metal, each sheet having abutments for the ends of the strips of wood to be bent, and means by which each former can be separated from the one acting with it on a "pan," as the sheet of metal and its abutments are called, so that that pan can be removed, emptied, refilled, and replaced between the two formers which act upon it and the wood in it, this operation taking place while the other pans and the wood in them remain under compression between two of the formers, so that the attendant can remove the pan which has been longest exposed to heat and pressure, replace it filled with new wood to be bent, and again clamp it between its pair of formers, then repeat that operation with a second pan, and so on continually, the number of formers and the number of pans making up each machine being such that when the attendant has filled, say, ten formers with nine pans, as shown in the drawings, the wood in the first pan will be set and ready to be removed. The attendant then separates the formers between which the first pan is clamped, removes it, replaces it filled with fresh wood, and reclamps it, repeats that operation as to the second pan, and so continues.

Other features of our invention are means whereby each former may be detachably secured in operative position to the one next it and automatic means whereby the power may be cut off and the upward motion of the formers stopped at the proper moment.

In the drawings, A is the frame of the machine, which carries the formers B, with cross-heads *b*, sliding in ways *a* in the frame A.

Each cross-head *b* is provided with a link *b'*, which is permanently secured to it and is adapted to be secured to the cross-head below by slip-pins *b²*.

The former B' at the upper end of frame A is secured to screw-threaded shaft D, the screw-threads on which are engaged by the screw-threads in hub of gear *d*, so that the rotation in one direction or the other of gear *d* will move shaft D endwise.

The pans E, provided with abutments *e* for the ends of the strips of wood, are made of strong pliable sheet material, preferably sheet-brass, so that they will conform under pressure to the shape of the formers B.

The gear *d* is driven by the pulley F through pinion *f*, gear *f'*, which carries pinion *f²*, which is in mesh with pinion *f³*.

The gear and pinions *f'*, *f²*, and *f³* are mounted on lever H, fulcrumed at *h*, so that swinging lever H on its fulcrum *h* to the right or left will bring the pinion *f³* or *f²* into mesh with gear *d* and cause the shaft D to move down and up, as will be clear from Figs. 1 and 5. The lever H is held in its different position by latch *h'*, which fits into slots *h²*, *h³*, or *h⁴*.

The upper former B' carries a finger *h⁵*, which just before the upper former reaches its highest position (shown in Fig. 1) engages latch *h'* and pushes it out of slot *h²*, and a bell-crank lever *h⁶*, actuated by a second finger *h⁷* on the upper former B', engages stud *h⁸*, fast to lever H, and moves the lever back to the position shown in Fig. 5, thus preventing an excessive upward motion of the upper former.

We have shown the formers B cored out and connected by pipes *b²*, bent to form a helix between each former to allow the formers to be moved apart, and we prefer to heat our formers by steam conveyed by these pipes and supplied to them by pipes *b³*.

The operation is as follows: The various parts of the machine being in the position shown in the drawings—that is, the spaces between all the formers except the second and third being filled with pans full of strips in the process of drying and each former except the second and third being held to the one above it by the links *b'* and slip-pin *b²*—

the operator inserts into the space between the second and third formers a pan full of steamed strips of wood. The latch h' on lever H is then lifted out of slot h^3 and the lever moved to the left until the latch h' engages slot h^2 , thus bringing pinion f^2 into mesh with gear d and giving to shaft D a downward motion and with it the first and second formers. This downward motion of shaft D is allowed to continue until the strips in the pan just inserted are bent into proper shape between the second and third formers, when the latch h' is lifted out of slot h^2 and the lever H moved to the right until the latch h' engages slot h^3 , bringing pinion f^2 out of mesh with gear d and stopping the motion of shaft D. The second and third formers are then locked together by means of links b' and slip-pins b^2 . The operator then removes the slip-pins holding the links which connect the third and fourth formers, and the lever H is moved to the right until latch h' engages slot h^4 , thus bringing gear f^3 into mesh with gear d and giving to shaft D an upward motion, carrying with it the first, second, and third formers. This upward motion is continued until finger h^5 pushes latch h' out of slot h^3 and bell-crank lever h^6 moves lever H to the left until the latch h' engages slot h^3 . The pan between the third and fourth formers is then removed and a fresh pan is inserted, when the operation just described is repeated, and so on around the machine, the number of formers being such that the strips in the pan first inserted will be bent and dried by the time the operator has inserted pans between all the rest of the formers.

We are aware of patents to Smith, No. 250,953, dated December 6, 1881; to Meyer, No. 281,104, dated July 10, 1883; to Sullivan,

No. 589,759, dated September 17, 1897, and to Burgett and Brown, No. 588,743, dated August 24, 1897, and disclaim all that is shown in these patents, for our machine is the first known in which the wood to be bent or embossed, or both, is clamped between formers in such wise that each pair of clamping-formers can be separated without separating any of the others.

What we claim as our invention is—

1. The wood-bending machine above described made up of formers and means to connect each former with its neighbor with the wood to be shaped between them, and to disconnect each former from its neighbor to make up clamps for the wood to be shaped, which can be clamped and unclamped, each without clamping or unclamping any of the others.

2. In a wood-bending machine, a plurality of formers; means to connect and disconnect each former with and from its neighbor; and means to reciprocate the outermost former; all combined as set forth to enable any two contiguous formers to be separated and brought together, while the rest are connected, substantially as described.

3. In combination frame A, formers B B' mounted to be moved in frame A; links b' secured at one end each to its former, slip-pins b^2 to detachably secure the pin ends of links b' to the former next the one to which the links are secured; and means to reciprocate the outermost former, substantially as described.

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Witnesses:

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