(No Model.)

4 Sheets—Sheet 1.

H. S. HART.

MACHINE FOR ASSORTING CARBONS.

No. 597,646. Patented Jan. 18, 1898.

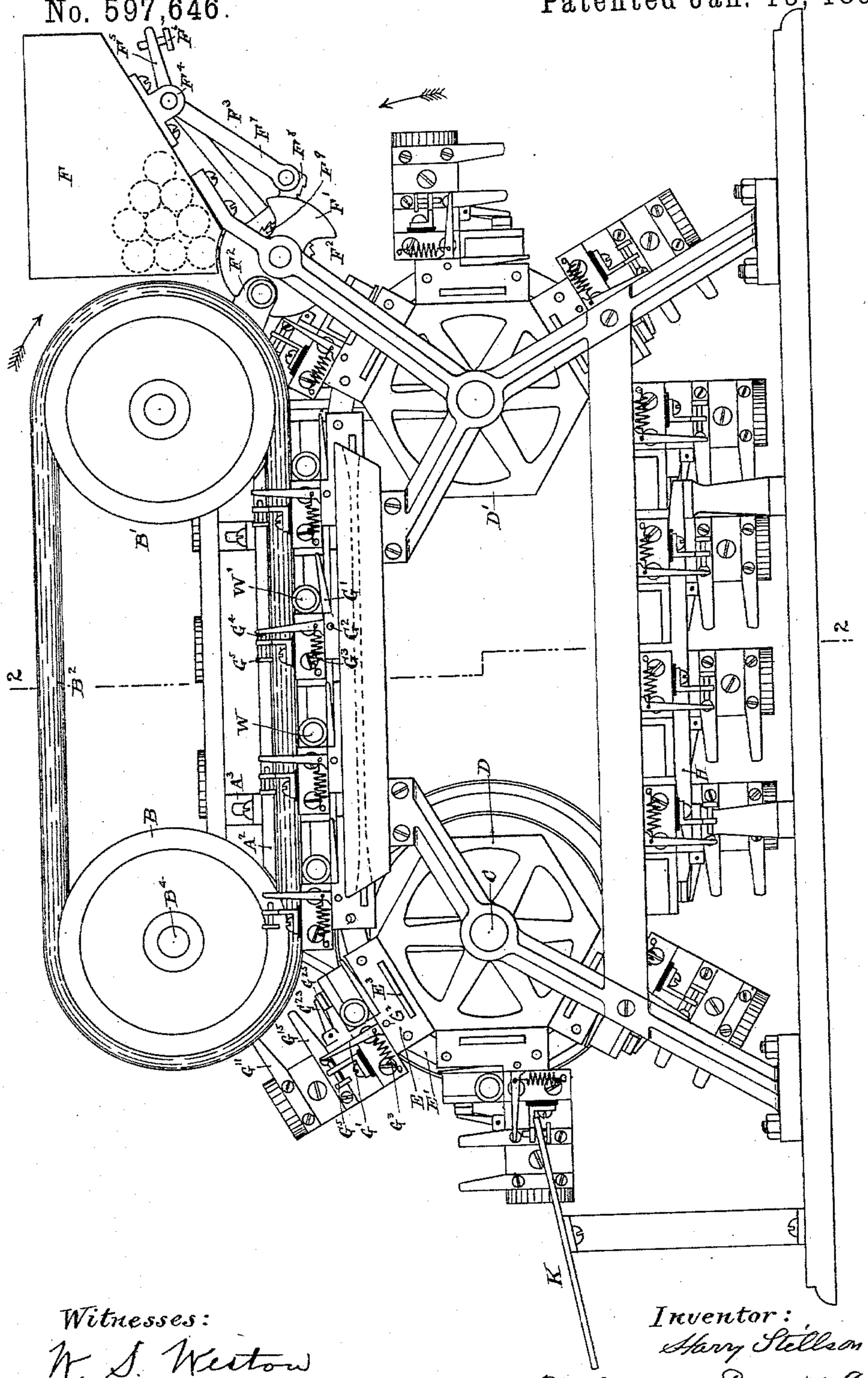

Fig. 1

Witnesses:
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H. W. Munday.

Inventor:
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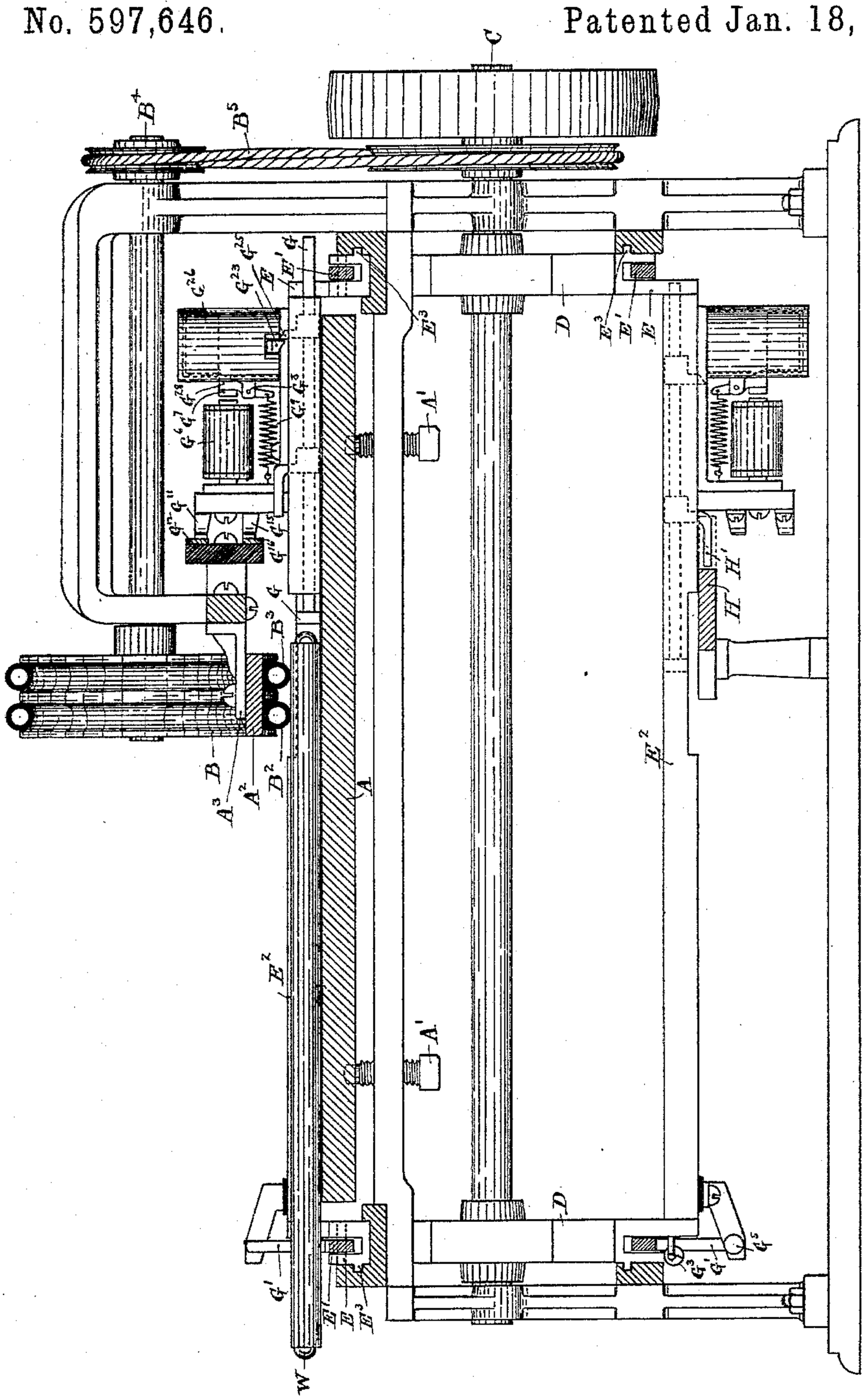

Fig. 2

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(No Model.) 4 Sheets—Sheet 3.

H. S. HART.

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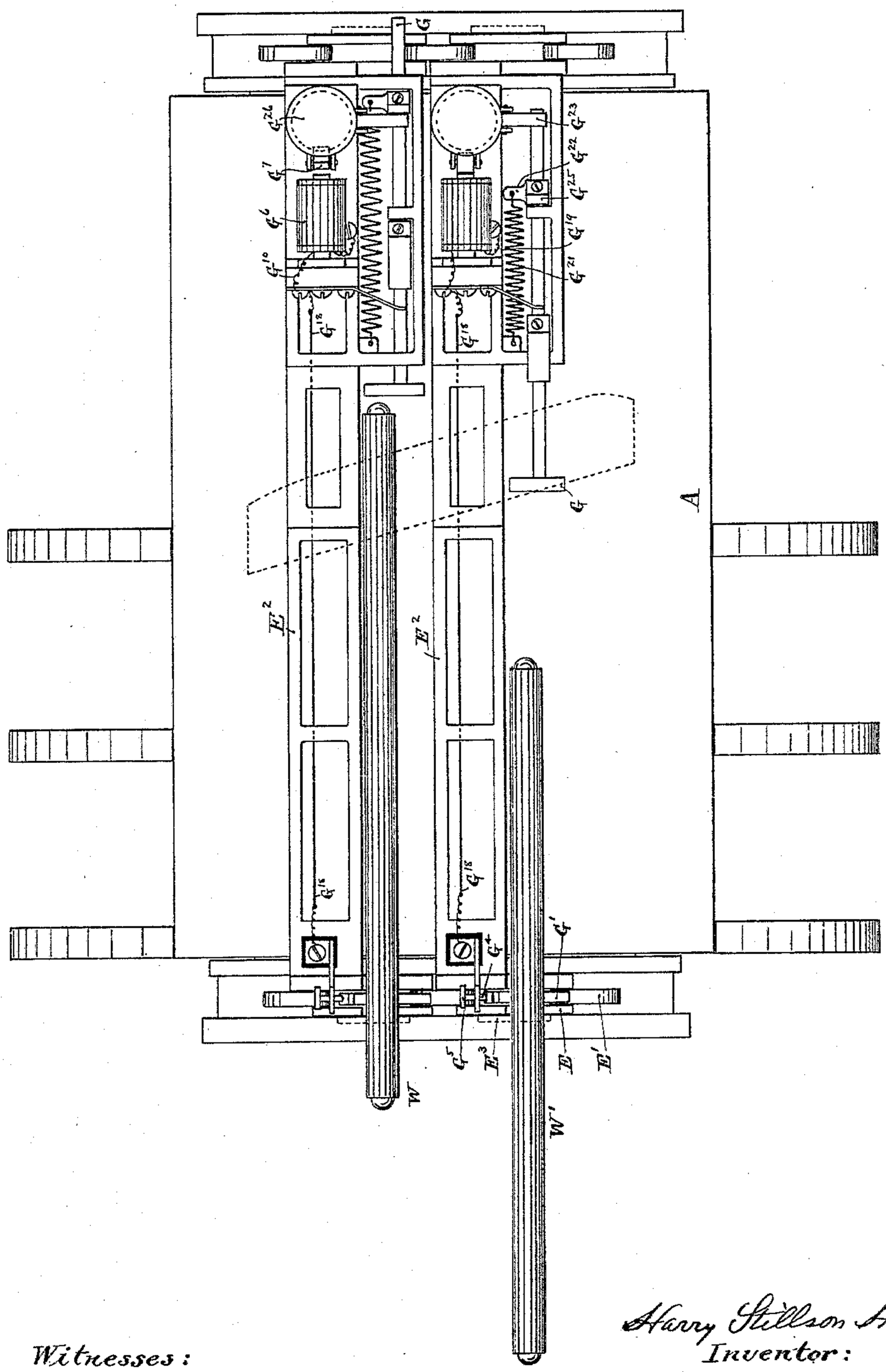

Fig. 3

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(No Model.) 4 Sheets—Sheet 4.

H. S. HART.

MACHINE FOR ASSORTING CARBONS.

No. 597,646. Patented Jan. 18, 1898.

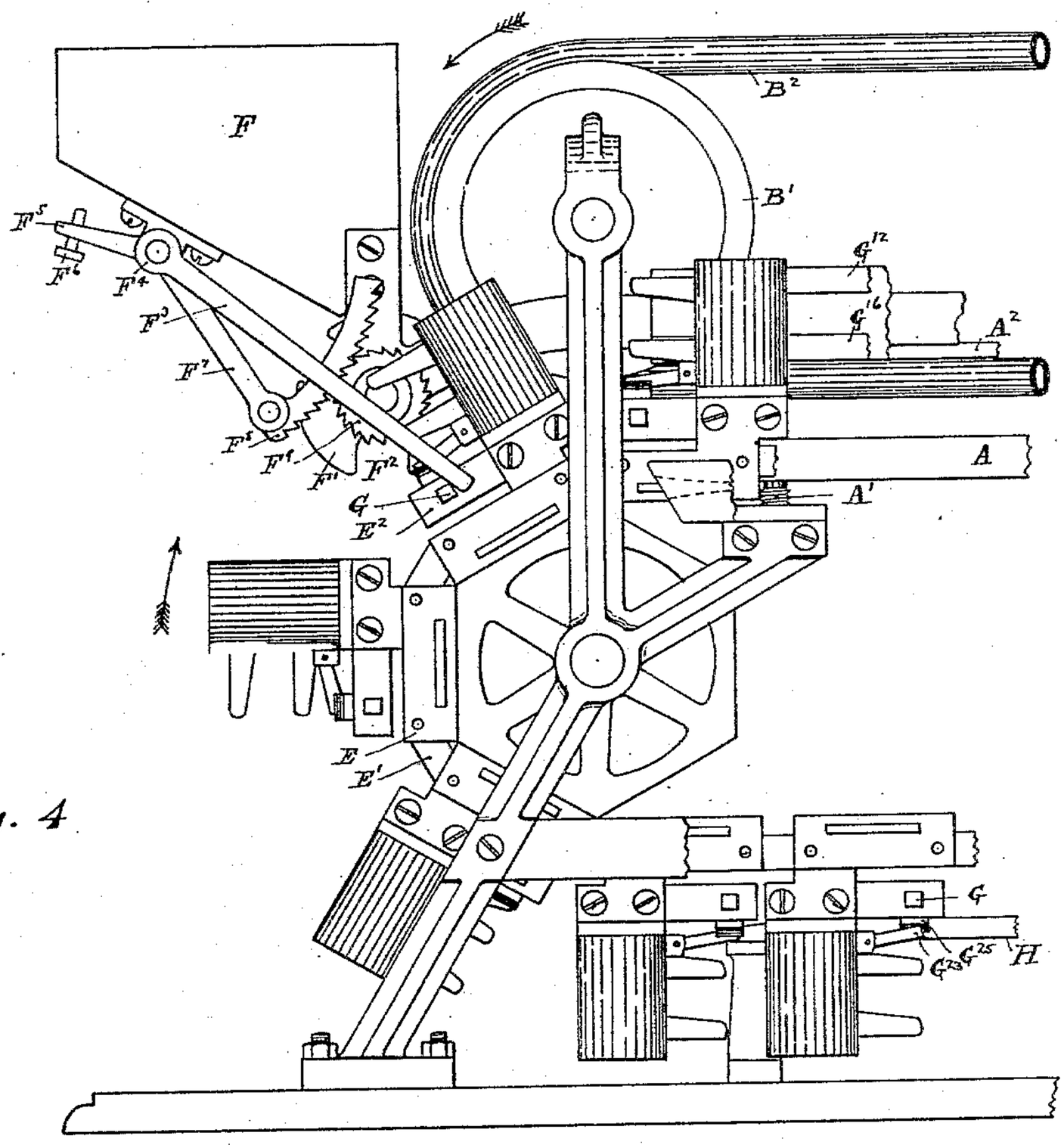

Fig. 4

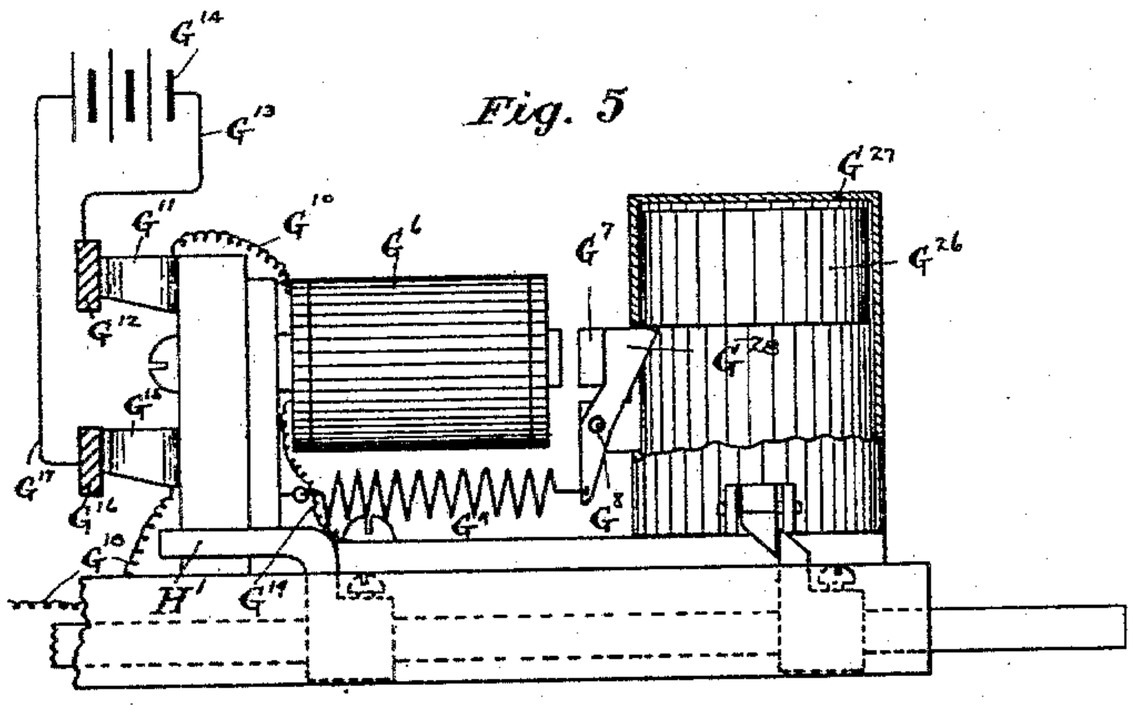

Fig. 5

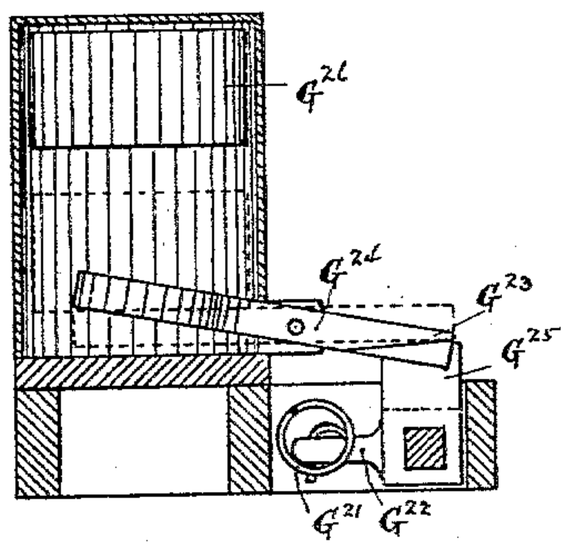

Fig. 6

Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

HARRY STILLSON HART, OF CHICAGO, ILLINOIS.

MACHINE FOR ASSORTING CARBONS.

SPECIFICATION forming part of Letters Patent No. 597,646, dated January 18, 1898.

Application filed August 2, 1897. Serial No. 646,774. (No model.)

To all whom it may concern:

Be it known that I, HARRY STILLSON HART, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Machines for Assorting Carbons, of which the following is a specification.

This invention relates to mechanism for automatically assorting the carbons used in electric-arc lamps. It is capable of being adjusted so it may be used for selecting any of the different grades of carbons. It embraces a stationary table over which the carbons may be rolled, a belt bearing upon the top of the carbons at one end thereof and causing them to roll over said table, carriers or pushers also moving over said table and serving as guides to keep the carbons in proper position and separated while they are moving over the table, means for gaging the imperfections in the carbons, ejectors for ejecting the imperfect carbons, and electrical devices for controlling the operation of the ejectors. The nature of the construction of these several devices, as well as other features of the invention, is fully set forth in the description given below and is also disclosed in the accompanying drawings, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is a partial enlarged plan. Fig. 4 is a partial elevation of the side of the machine opposite to that shown at Fig. 1. Figs. 5 and 6 are detail sections, taken at right angles to each other, of the ejector-controlling mechanism.

In said drawings, A represents a table, preferably supported upon vertical screws A′, so that it may be adjusted as desired, and serving as the surface over which the carbons W W′ are rolled.

B B′ are pulleys carrying the belt or belts B^2 B^3, which impart the rolling motion to the carbons and at the same time bear upon their ends with sufficient pressure to keep such ends in contact with the table. I prefer to make these belts of some soft material, such as rubber, and they may be made round in cross-section, and inflated rubber hose may be used. This latter construction is shown in the drawings. When hose or any narrow belt is used, the pulleys may be grooved to conform to the belt, substantially as in the construction illustrated. Obviously a single belt may be used instead of the two shown, inasmuch as the two move at the same speed and act alike in all respects. The belt or belts are held down to the work while passing over the table by a guide A^2, supported by brackets A^3. The pulleys B B′ are driven by power from the main shaft C communicated to the shaft B^4, upon which one of the pulleys is mounted, by the belt B^5 and the pulleys upon shafts C and B^4, over which said belt B^5 runs.

The main shaft C is located under one end of the table and also carries two sprocket or many-sided wheels D D, over which, in company with like wheels D′ D′, located at the other end of the table, pass two endless series of links E, connected together by other links E′ and carrying the pushers or guides E^2. The links E have side projections which move through grooved guides E^3 while moving horizontally between the wheels. The pushers extend from side to side of the machine, and they pass over the table and under the belts. That portion of them which comes under the belts is made of less height than the carbons, so as to give the belts full opportunity to bear upon and impart the rolling movement to the carbons. The pushers are spaced apart a sufficient distance to give room to the carbons, and they serve as guides to the carbons by keeping them in position at right angles to the line of movement and prevent any lagging by the end which is farthest from the pressure-belt.

The carbons are fed into the interspaces between the pushers from a hopper F by a feeding-cylinder F′, placed under the hopper and provided with longitudinal grooves F^2, each adapted to hold a single carbon. This cylinder is intermittently operated at proper intervals to discharge the carbons one at a time onto the table by appropriate tripping mechanism—such, for instance, as the arm F^3, (pivoted at F^4 and preferably provided with an extension F^5 at the farther side of the pivot carrying a set-screw F^6, whereby the motion may be limited,) a second arm F^7, fast upon the pivot F^4, a segment F^8, hinged to the arm F^7 and provided with ratchet-teeth, and a ratchet-wheel F^9, fast upon the shaft

of the cylinder. Each pusher is provided with a sliding ejector G, (more particularly described hereinafter,) and when such ejectors are in their normal positions (illustrated in the case of the upper one shown at Fig. 3) they project at one end sufficiently so that as they move around in their endless path such ends will come into contact with the arm F^3 of the tripping mechanism and carry said arm upward and thereby impart the movement to the feeding-cylinder necessary to feed a carbon. The arm F^3 and segment are then at once returned to their normal positions by gravity; but in so doing the segment moves over wheel F^9 without actuating it.

The carbon upon its delivery onto the table enters one of the spaces between two adjacent pushers and soon passes under the pressure-belt, which presses its end down upon the table and at the same time gives it a rolling motion. Any imperfection or crookedness in the carbon will now manifest itself at its other end by the raising of such end from the table, and I avail myself of this action as a means of determining when the carbons should be ejected as follows: Upon each of the links E, which are in proximity to this rising end of the carbons, I place an elbow-lever G′, pivoted at G^2 and with one limb extending horizontally under the carbon and the other or vertical limb attached to a light spring G^3, whose tension is constant in the direction which lifts the horizontal limb of the lever. This lever is therefore actuated by the spring whenever the carbon does not by its weight overcome the spring, and consequently whenever the carbon rises from the table the horizontal limb of the lever rises to the same extent as the carbon. Adjacent to the upper limb of the lever is a contact-point G^4, having an adjusting-screw G^5, against which the lever comes whenever it is permitted to move by the carbon beyond a predetermined extent. In Fig. 1 this contact is shown as having been established in the case of the lever controlled by the carbon marked W′, and this carbon will be ejected as imperfect—an operation more clearly shown at Fig. 3 and which I will presently describe. The carbons shown as moving over the table ahead of the carbon W′ are apparently perfect and will be carried along by the pushers and discharged onto the platform K, while the one behind carbon W′ has not proceeded far enough to be tested. The point at which the contact between the lever and the contact-screw G^4 shall take place may of course be varied by adjusting said screw, and this may be done whenever it is desired to change the work from one grade of carbons to another grade. The distance the levers G′ must move before effecting the contact can, however, be regulated by raising or lowering the table A, and the screws A′ are employed to effect such adjustments, and I prefer to make the changes from one grade to another in this way, because I thereby make the adjustment for all the levers at once instead of separately.

Each ejector G is controlled by electrical devices, the circuit of which is closed when the lever G′ touches the contact-screw. These devices are preferably constructed as follows: Each pusher carries an electromagnet G^6, the armature G^7 whereof is pivoted at G^8 and is normally swung away from the magnet by a spring G^9. The magnet is connected by wire G^{10} to a brush G^{11}, so located upon the pusher as to brush against a long contact plate or bar G^{12}, stationarily located above the table. This bar is in electrical communication by wire G^{13} with the battery G^{14}. The pusher also carries a second brush G^{15}, which wipes over a second bar G^{16}, joined to said battery by wire G^{17}, and this second brush is electrically connected to the contact G^4 by wire G^{18}, while the magnet is connected to the body of the pusher by wire G^{19}. A spring G^{21}, attached at one end to a stationary point on the pusher and to an arm G^{22} on the ejector, is distended when the ejector is in its normal position, (see Fig. 3,) and the ejector is held in this position by locking-catch G^{23} on the end of a centrally-pivoted lever G^{24}, engaging with a projection G^{25} on the ejector. (See Figs. 5 and 6.) The engagement between the catch G^{23} and the projection G^{25} is broken by the fall of a weight G^{26}, confined in a proper casing or cage G^{27} and acting upon the end of the lever G^{24} opposite to that engaging the catch. Said weight is normally held up in its cage by the projection G^{28} on the magnet-armature, as plainly shown at Fig. 5, and is released whenever the magnet is energized by the closing of the electric circuit through the elbow-lever G′ and contact-screw G^5. Upon the descent of the weight the ejector is released and immediately ejects the carbon by an endwise thrust against the latter, as seen in the case of carbon W′ in Fig. 3. To bring the ejectors back to their original positions after the ejecting operations, their arms H′ are brought against the inclined face of a stationary cam H while moving under the table, and the weights move back by gravity to their normal positions as soon as the pushers reach the lower part of their path and are immediately secured in such positions by the armature acting under the power of its spring.

The contact-bars G^{12} and G^{16} extend only the length of the table, so that the circuits can be closed only while the pushers are moving over the table, and I prefer that at the incoming end they be shortened somewhat to give the carbons time to begin their rolling movement and time to depress the elbow-levers, so as to destroy contact with the screws G^5 before the electrical circuit can be effected. Otherwise the ejector might be operated needlessly.

The pressure-belt should simulate the action of the hand in the heretofore customary way of assorting carbons by manual labor and should move at such a rate as will carry

the carbons over the table at the same speed as that given the pushers.

The end of the lever G^{24} which is acted upon by weight G^{26} is made heavier than the end which engages the catch G^{25}, and this heavy end by its superior gravity, after being operated upon and released by the weight, forces the lever again into position to engage the catch when the lever is carried to the under side of the table and is released from the weight. Upon the return of the lever to the upper side of the table it will be held in engagement with the catch by the pressure exerted by the latter under the power of the ejector-spring. Instead of depending upon gravity to position this lever a spring may be used.

Instead of using the pushers as part of the electric circuits wires may be substituted should any tendency to short-circuit the current manifest itself.

While I have shown devices which I believe to be practical for effecting the various operations described, it will be understood that I do not wish to be limited to them except where my claims are laid specifically to them, as obviously many of them can be changed and other devices substituted without departing from the spirit of the invention.

The machine requires only slight changes to render it adjustable for all the different lengths of carbons; but as these changes are obvious I have not thought it necessary to describe or illustrate them.

I claim—

1. In a machine for assorting carbons, a table and means for rolling the carbons over the table, in combination with devices for gaging the imperfections of the carbons and ejectors controlled by said gaging devices, substantially as specified.

2. In a machine for assorting carbons, a table and a pressure-belt acting to roll the carbons over the table, in combination with devices for gaging the imperfections of the carbons and ejectors controlled by said gaging devices, substantially as specified.

3. In a machine for assorting carbons, a table and means for rolling the carbons over the table, in combination with devices for gaging the imperfections of the carbons, ejectors for ejecting the imperfect carbons, and electrical devices set in operation by the gaging devices and acting to control the ejectors, substantially as specified.

4. In a machine for assorting carbons, a table and means for rolling the carbons over the table, in combination with devices for gaging the imperfections of the carbons and ejectors controlled by said gaging devices and acting to eject the imperfect carbons by an endwise thrust, substantially as specified.

5. In a carbon-assorting machine, the combination of a table over which the carbons may be rolled, and a soft belt passing over the table and bearing upon one end of the carbons and acting to impart the rolling movement thereto, with means for gaging the crookedness of the carbons, substantially as specified.

6. In a carbon-assorting machine, the combination of a plane-surfaced table, means for rolling the carbons over said table, and means for gaging the imperfections of the carbons by the extent of their rise from the table while rolling thereover, substantially as specified.

7. In a carbon-assorting machine, the combination of a plane-surfaced table, a soft belt moving over the table and bearing upon one end of and imparting a rolling motion to the carbons, and means for gaging the imperfections of the carbons by the extent of rise from the table at their free ends while rolling, substantially as specified.

8. In a carbon-assorting machine, the combination of a plane-surfaced table, a soft belt moving over the table and bearing upon one end of and imparting a rolling motion to the carbons, means for gaging the imperfections of the carbons by the extent of rise from the table at their free ends while rolling, and means for ejecting the carbons whose ends rise beyond the predetermined extent, substantially as specified.

9. In a carbon-assorting machine, the combination of a plane-surfaced table, means for rolling the carbons over said table, means for gaging the imperfections of the carbons by the extent of their rise from the table while rolling thereover, and means for keeping the carbons separate while moving over the table, substantially as specified.

10. The combination with the table and means for rolling the carbons thereover, of a gage for gaging the extent of the rise of the carbons above the table, such gage consisting of a pivoted lever and a light spring tending to keep the lever in contact with the carbon, substantially as specified.

11. The combination with the table and means for rolling the carbons thereover, of a gage for gaging the extent of the rise of the carbons above the table, such gage consisting of a spring device acting to maintain constant contact with the carbon while rolling and to follow it as it rises from the table, substantially as specified.

12. The combination with the table and means for rolling the carbons thereover, of a series of gaging devices noting the imperfections in the carbons, a series of ejectors, a series of magnets controlling said ejectors, and an electric circuit into which said magnets and gaging devices are brought as they move over the table, and which is completed by said gaging devices when the imperfect carbons allow a certain amount of movement to said devices, substantially as specified.

13. The combination of the table, the belt, the pushers, the ejectors, the devices controlling the ejectors, the magnets, gaging devices acting also as circuit-closers, brushes carried

by the pushers and electrically connected to the magnets and the gaging devices, and the stationary contact-bars connected to a source of electric energy, substantially as specified.

14. The combination with the table and means for rolling the carbons thereover, of a gage for gaging the extent of the rise of the carbons above the table, such gage consisting of a spring device maintaining constant contact with the carbon while rolling and following it as it rises from the table, and also acting as a circuit-closer, a device for ejecting imperfect carbons, and an electric circuit embracing a magnet and said gage device and acting to control said ejector, substantially as specified.

15. The combination in an assorting-machine, of a hopper for the carbon, a feed wheel or cylinder below said hopper and provided with grooves or pockets each adapted to hold a single carbon, tripping mechanism for actuating said wheel, and assorting mechanism receiving the carbons from said wheel and engaging said tripping mechanism, substantially as specified.

16. The combination in an assorting-machine, of a hopper for the carbon, a feed wheel or cylinder below said hopper and provided with grooves or pockets each adapted to hold a single carbon, tripping mechanism for actuating said wheel, and assorting mechanism receiving the carbons from said wheel and provided with ejectors adapted to engage said tripping mechanism, substantially as specified.

17. The combination in an assorting-machine, of means for gaging the crookedness of the carbons with means for selecting and ejecting the carbons whose crookedness exceeds a predetermined degree, substantially as specified.

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