No. 617,511. Patented Jan. 10, 1899.

W. C. PEIRCE.

ROVING MACHINE.

(Application filed Mar. 10, 1897.)

(No Model.) 4 Sheets—Sheet 1.

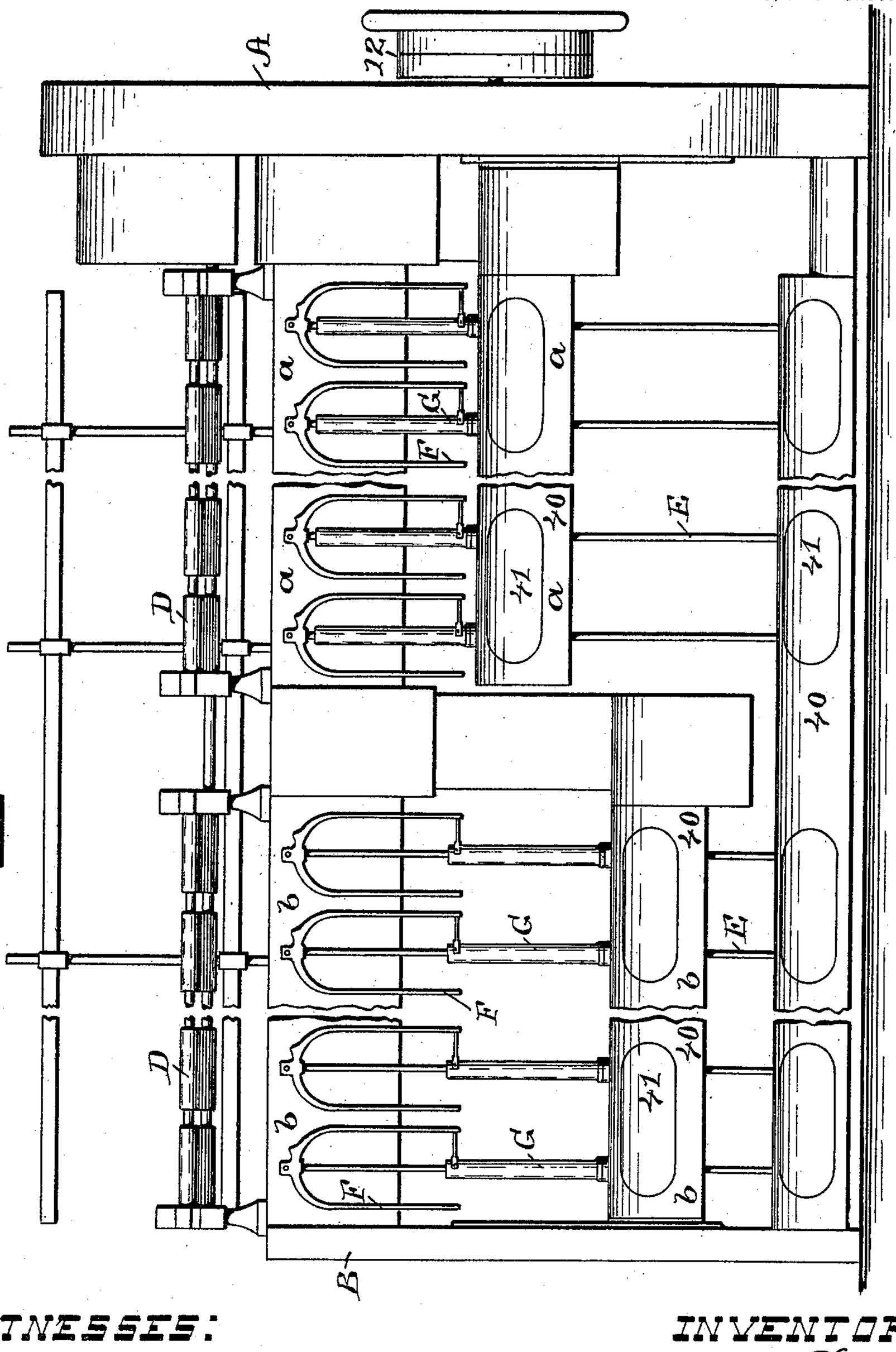

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

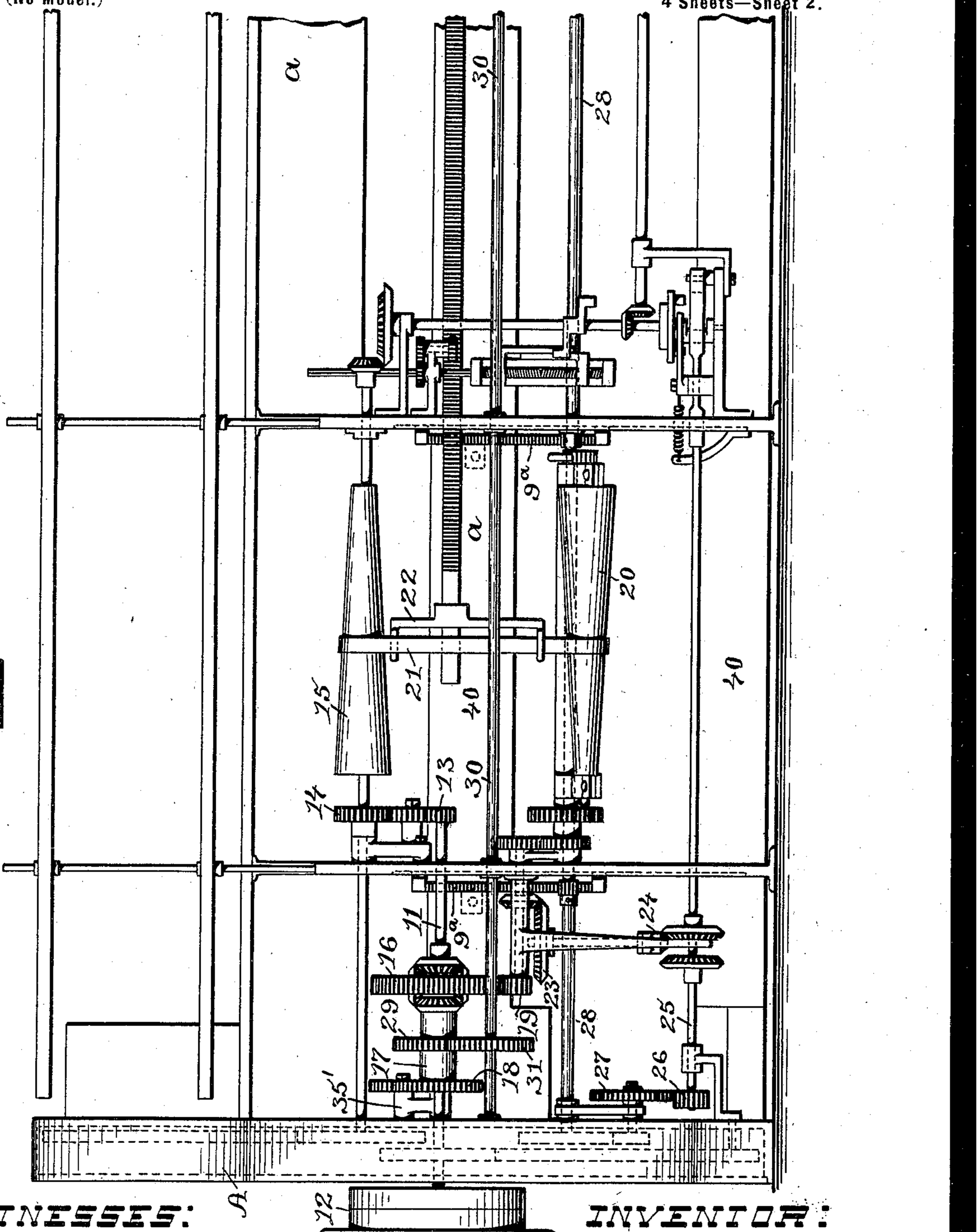

FIG. 2.

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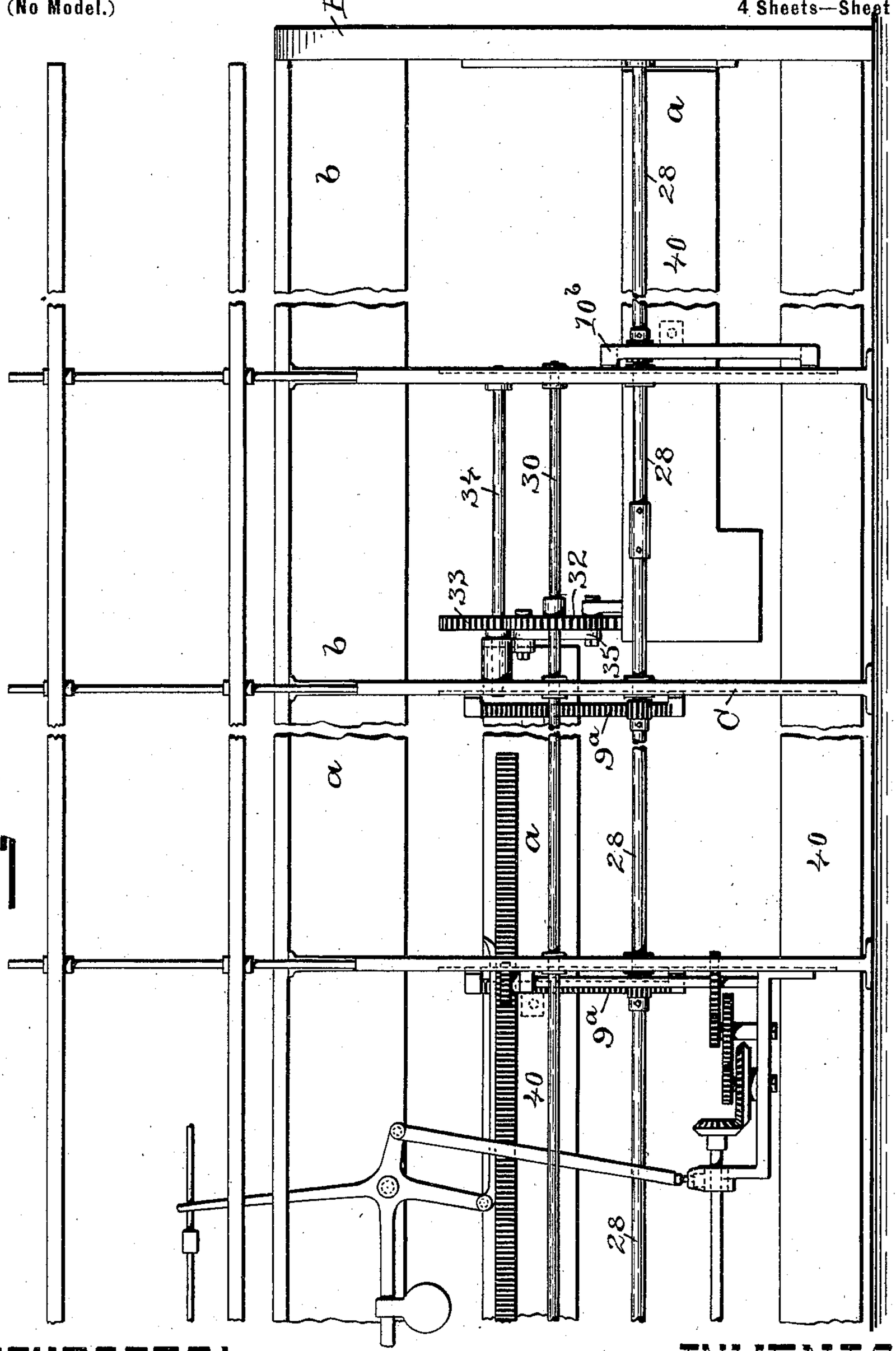

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 5.

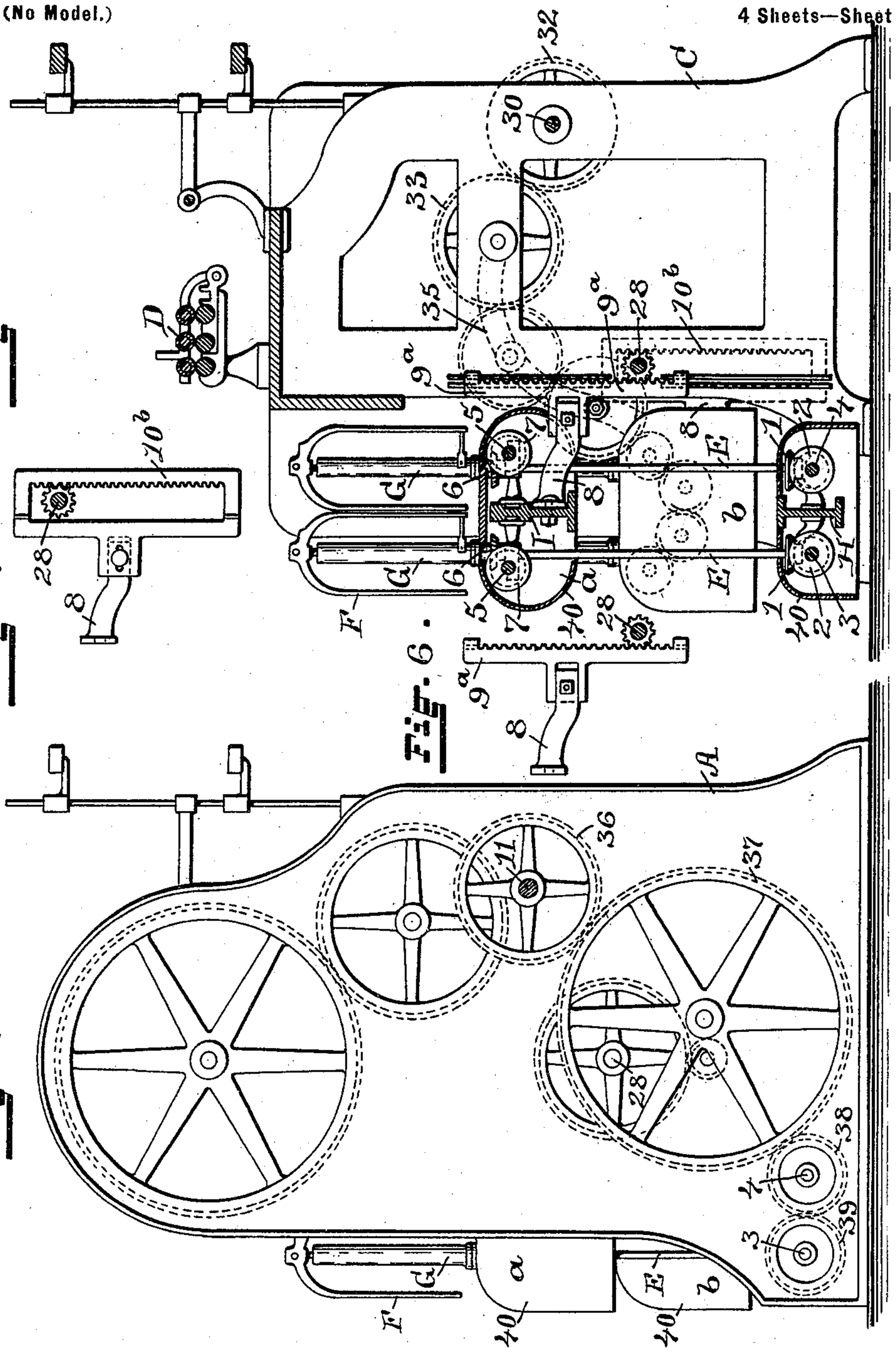

Fig. 7.

Fig. 6.

Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM C. PEIRCE, OF PROVIDENCE, RHODE ISLAND.

ROVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 617,511, dated January 10, 1899.

Application filed March 10, 1897. Serial No. 626,804. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. PEIRCE, of the city and county of Providence and State of Rhode Island, have invented a new and useful Improvement in Roving-Machines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

Roving-machines, also called "speeders," by which the initial twist is put into the carded and drawn-out fiber to prepare the same for spinning, are required to be made of continually-increasing lengths, so as to contain the greatest possible number of spindles.

In roving-machines the spindles on which the fliers are supported are driven at a constant speed by means of shafts connected by gears with the head-driving mechanism. These shafts being supported in fixed bearings below the spindles may be made of any required length and may be made to drive any desired number of spindles.

The bobbins in roving-machines are driven at constantly-varying speeds from shafts which have to reciprocate with the bobbins. The size of these shafts is limited, because they must be supported in bearings on one side of the spindles and drive the bobbins by skew-beveled gears.

Heretofore the shafts for driving all the bobbins in a roving-machine were driven through the compound from the driving-head of the machine. With the increase of the length of the machine and the number of spindles the bobbins of which have to be driven the load upon the bobbin-driving shafts and the train of gears transmitting the motion from the compound gear to the bobbin-driving shaft has been so much increased that the gears frequently break and soon wear out.

The object of this invention is to construct a roving-machine of two or more lengths or sections and to drive each section by a separate train of gears.

Another object of this invention is to counterbalance the reciprocating parts of one section of a roving-machine with another section, while the bobbin-shafts of each section are driven by a separate train of gears.

To this end the invention consists in the peculiar and novel construction whereby the bobbin-driving shafts are divided into two or more sections, a back shaft is connected by gears with the compound, the bobbin-driving shafts of the first section are connected by a swinging train of gears with the compound, and the bobbin-driving shafts of the other section or sections which are connected by a swinging train of gears with the back shaft, so that the power is transmitted from the compound to each section by separate trains of gears, as will be more fully set forth hereinafter.

Figure 1 is a front view of a speeder, showing the right-hand section of the bobbins at the upper traverse when winding on the bottom of the bobbins and the left-hand section at the lower traverse winding on the top of the bobbins. The figure is contracted lengthwise by cutting out the portions of the speeder between the first two and the last two spindles of each section. Fig. 2 is a rear view of the driving end of a speeder. Fig. 3 is a rear view of the speeder condensed lengthwise, the portion on the left-hand of the figure showing the end of the first section, the middle portion the beginning of the second section, and the right-hand portion the end of the second section. Fig. 4 is an end view of the driving-head of the speeder, the end plate or cover being removed to more clearly show the gears contained in the end frame. Fig. 5 is a transverse section of the speeder near the end of the first part of the machine. Fig. 6 is a side view of the rack used in the first part of the machine to operate the bolster-rail. Fig. 7 is a side view of the rack used on the second part of the machine.

Similar numerals and letters of reference indicate corresponding parts in all the figures.

In the drawings, A indicates the head-frame at the driving end of the machine; B, the opposite end frame; C, one of the intermediate frames; D, the drawing-rolls; F F, the fliers, secured to the upper ends of the spindles; G G, the bobbins; H, the step-rail; I, the reciprocating bolster-rails.

I have designated in the drawings the first half of the machine, extending from the head-frame A to the middle of its length, as *a*, and the other half, extending from the middle to the end frame B, as *b*, and use this designa-

tion for the two halves of the machine. All the spindles in both sections *a* and *b* are supported in step-bearings, preferably secured to the step-rail H, which extends the whole length of the machine. Each spindle is provided with a bevel-gear 1, which engages with a bevel-gear 2 on the shaft 3 for the front row of spindles or on the shaft 4 for the rear row of spindles. These shafts 3 and 4 extend the whole length of the machine.

The bolster-rails of both sections *a* and *b* are provided with brackets forming the bolster-supports for the spindles and the support for one of the shafts 5. A collar 6 turns on the bolster and is connected with the bobbin G. A skew-gear forms part of the collar 6 and engages with a skew-gear 7 on one of the two shafts 5. Both the bolster-rails I have secured to them the brackets 8 8. In section *a* the brackets 8 are secured to the racks 9^a, (shown in Fig. 6,) while in section *b* the brackets 8 are secured to the rack-frame 10^b. (Shown in Fig. 7.)

The mechanism for operating the first half or section *a* of the machine is the usual mechanism used for driving the spindles and bobbins of roving-machines. The driving-shaft 11 has on the outside of the head-frame A the tight and loose pulleys 12. The shaft extends into the frame and has secured to it the gear 13, which through an intermediate gear communicates motion to the gear 14, secured to the shaft of the upper cone-pulley 15. A gear on the shaft of the upper cone (shown in broken lines in Fig. 2) communicates motion to the drawing-rolls. One of the gears of the compound gears 16 is secured to the driving-shaft 11, and to the sleeve 17 of the compound the gear 18 is secured, which communicates motion through the usual set of gears, journaled in a swinging frame, to the shafts 5 5, by which the bobbins are driven. The large gear of the compound 16 is connected, through the pinion 19 and connecting-gears, with the cone 20, which is driven by means of the belt 21 from the cone 15. The usual shipper mechanism is used for regulating the variation of the speed of the bobbins. On the shaft carrying the pinion 19 is secured a beveled pinion which gears with the bevel-gear 23 on the end of a vertical shaft, at the lower end of which the beveled pinion 24 connects with one or the other of two bevel-gears secured to the shipper-shaft 25, the longitudinal motion of which is controlled by the cop-builder mechanism. The long pinion 26, through the change-gear 27 and the gears indicated in broken lines in the head-frame A, transmits the alternately right-hand and left-hand motion of the shipper-shaft 25 to the pinion-shaft 28, and the pinions of this shaft engage with the racks 9^a to impart the reciprocating motion to the bolster-rail I and the bobbins in section *a* of the machine.

The pinion-shaft 28 extends through the whole length of the machine and imparts reciprocating motion to both the bolster-rails; but the rack 9^a is in front of the pinions and the rack of the rack-frame 10^b is in the rear of the pinions, so that the weight of the bolster-rail I, the bolsters, the bobbins, with their varying loads, and the bobbin-driving mechanism of the section *a* is supported on one side of the pinions and the shaft 28, to which they are secured, and the bolster-rail I of section *b*, with its fixed as well as its varying load, is supported on the opposite side of the pinions and the shaft 28, the weight of one counterbalancing the other.

As above described, any of the usual forms of mechanism used to drive the bobbins of a roving-frame or speeder may be used to drive the bobbins of section *a* of my improved machine. The mechanism selected to show the application of my invention (shown in the drawings and hereinbefore sufficiently described to enable one skilled in the art to understand the same) contains as one of its essential elements the sleeve 17 of the compound 16. From this sleeve 17, through the gear 18 and a train of gears journaled in what is usually termed the "swing," motion is imparted to the bobbins of section *a*. To transmit this motion with the variations in speed to the bobbins of section *b*, I place on the sleeve 17 the gear 29, which is an exact duplicate of the gear 18. I support a back shaft 30 in suitable bearings and extend the same through the length of section *a* and into section *b* of the machine. To this back shaft 30 I secure the gear 31, which, like the gear 29, is an exact duplicate of the gear 18, and engage it with the gear 29 on the sleeve 17 of the compound, and on the same back shaft 30, in section *b*, I secure the gear 32, so as to mesh with the gear 33 on the short shaft 34, which is the pivotal support of the swing 35. (Indicated in broken lines in Fig. 5.) As the gears 29, 31, 32, and 33 are all of the same diameter and have the same number of teeth as the gear 18 the gear 33 moves at exactly the same speed and in the same direction as does the gear 18. From the gear 33 the motion is transmitted, through the usual gears journaled in the swing or swinging frame 35, as indicated in broken lines in Fig. 5, to the shafts 5 5, from which the bobbins are driven. The swing or swinging frame 35 is in all respects like the swing 35′, (shown in Fig. 2,) pivotally connected with the driving-shaft 11 close to the head-frame and both swing up and down with the bolster-rail, transmitting motion to the bobbins of both the sections *a* and *b* and at the same speed, both sections being controlled by the same speed-changing mechanism.

The spindles are driven, usually, at a constant speed from the driving-shaft 11, to which, within the head-frame A, the gear 36 is secured, which engages with the gear 37 and transmits the motion to the gear 38 on the shaft 4, by which the rear row of spindles are

driven, and the gear 38 engages with the gear 39 on the shaft 3, by which the spindles of the front row are driven.

The bolster-rails I of both sections and the step-rail H, with the driving-gears connected with these rails, are inclosed in the casings 40, provided with the doors 41, each one of these doors giving access to the driving-gears connected with two spindles.

The modern tendency is to lengthen out spinning and similar machines, so as to increase their production. In many instances it becomes important to extend the roving-machine or speeder across the whole width of a mill, and in such cases it is desirable to place the main driving-shaft on one side, so as to leave the rest of the room free from all obstructions. In the old form of these machines the bolster-rail was required to extend the whole length of the machine, and the machine could not be materially lengthened without increasing the dimension and the weight of the bolster-rail. A machine constructed after my invention may be made of any length desired, and two, four, or more sections, each of moderate length, used and connected with the back shaft, so that the bolster-rails of one half the number of sections in the machine will counterbalance the bolster-rails of the other half of the number of sections. All the bobbins in the longest machine will be driven from one end of the machine, and the changes in speed of all the bobbins will be regulated by the speed-regulating mechanism in the first section next to the driving-head of the machine.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a roving-machine, the combination of the following instrumentalities: a bolster and bobbin support divided into two or more lengths or sections, independent bobbin-driving mechanism for each section, mechanism comprising a compound for driving the bobbins at varying speed, a swinging train of gears for each section, and connections between the compound and the swinging trains of gears of the sections; whereby the varying speed of the compound is transmitted to each section by a separate train of gears, as described.

2. In a roving-machine, the combination with two sets of rails and two sets of bobbin-driving mechanism one for each rail, of a compound mechanism for varying the speed of the bobbins, a train of gears connecting the compound with the bobbin-driving mechanism of one rail, a back shaft connected with the compound by suitable gears, a train of gears connecting the back shaft with the bobbin-driving mechanism of the other rail, and mechanism, substantially as described, for reciprocating the two rails; whereby the weights carried by the two rails are counterbalanced one by the other and the bobbins of the two sections are driven each by a separate train of gears, as described.

3. In combination, a roving-frame divided lengthwise into two sections, each section provided with a bolster-rail and bobbin-driving mechanism, traversing mechanism for moving the bolster-rails in opposite directions, a compound for varying the speed of the bobbins, two gears on the sleeve of the compound, a swinging train of gears connecting one of the gears on the sleeve of the compound with the bobbin-driving mechanism of one section, a swinging train of gears connecting with the bobbin-driving mechanism of the other section, and a shaft connecting the train of gears of the second section with the other gear on the sleeve of the compound; whereby each section is driven by an independent train of gears, and the speed of the bobbins of each section is controlled by the compound, as described.

4. In a roving-machine, the combination with the driving mechanism and the compound for regulating the varying speed of the bobbins, of two or more sections of bolster-rails each provided with a separate bobbin-driving mechanism, a swinging train of gears connecting a gear on the sleeve of the compound with the bobbin-driving mechanism of one rail, a back shaft driven from the sleeve of the compound, and a train of gears connecting the back shaft with the bobbin-driving mechanism of the other section or sections, racks connected with the sections of bolster-rails, a longitudinal shaft provided with pinions engaging with the racks of the different sections of the bolster-rails on opposite sides; whereby a series of sections of a roving-machine may each be driven by a separate train of gears controlled by the compound, and the weight of one section counterbalanced by another section, as described.

In witness whereof I have hereunto set my hand.

WILLIAM C. PEIRCE.

Witnesses:
JOSEPH A. MILLER, Jr.,
M. F. BLIGH.