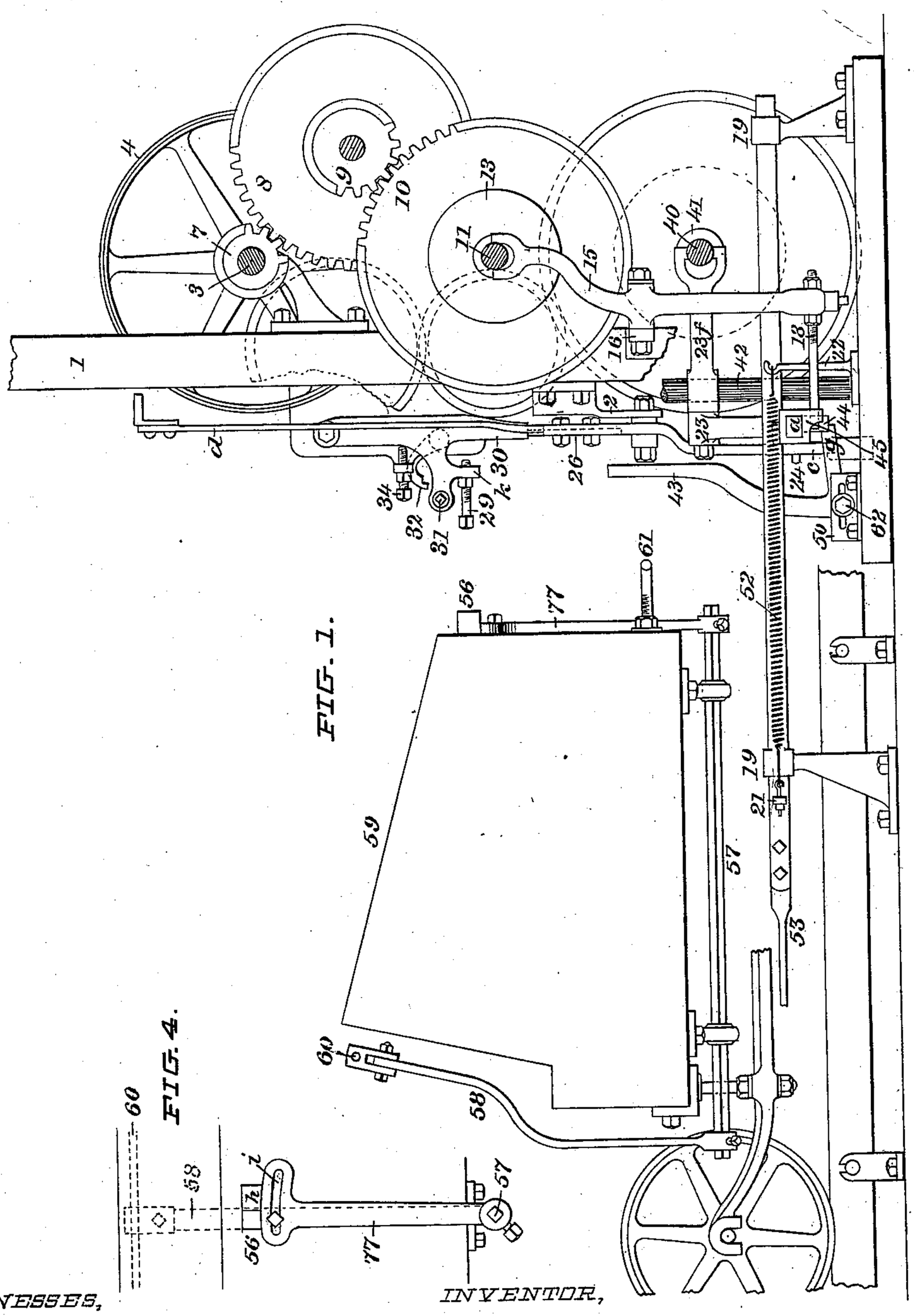
(No Model.) 3 Sheets—Sheet 1.

J. VENABLES.

SPINNING MULE.

No. 599,813. Patented Mar. 1, 1898.



WITNESSES,

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(No Model.) 3 Sheets—Sheet 2.

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SPINNING MULE.

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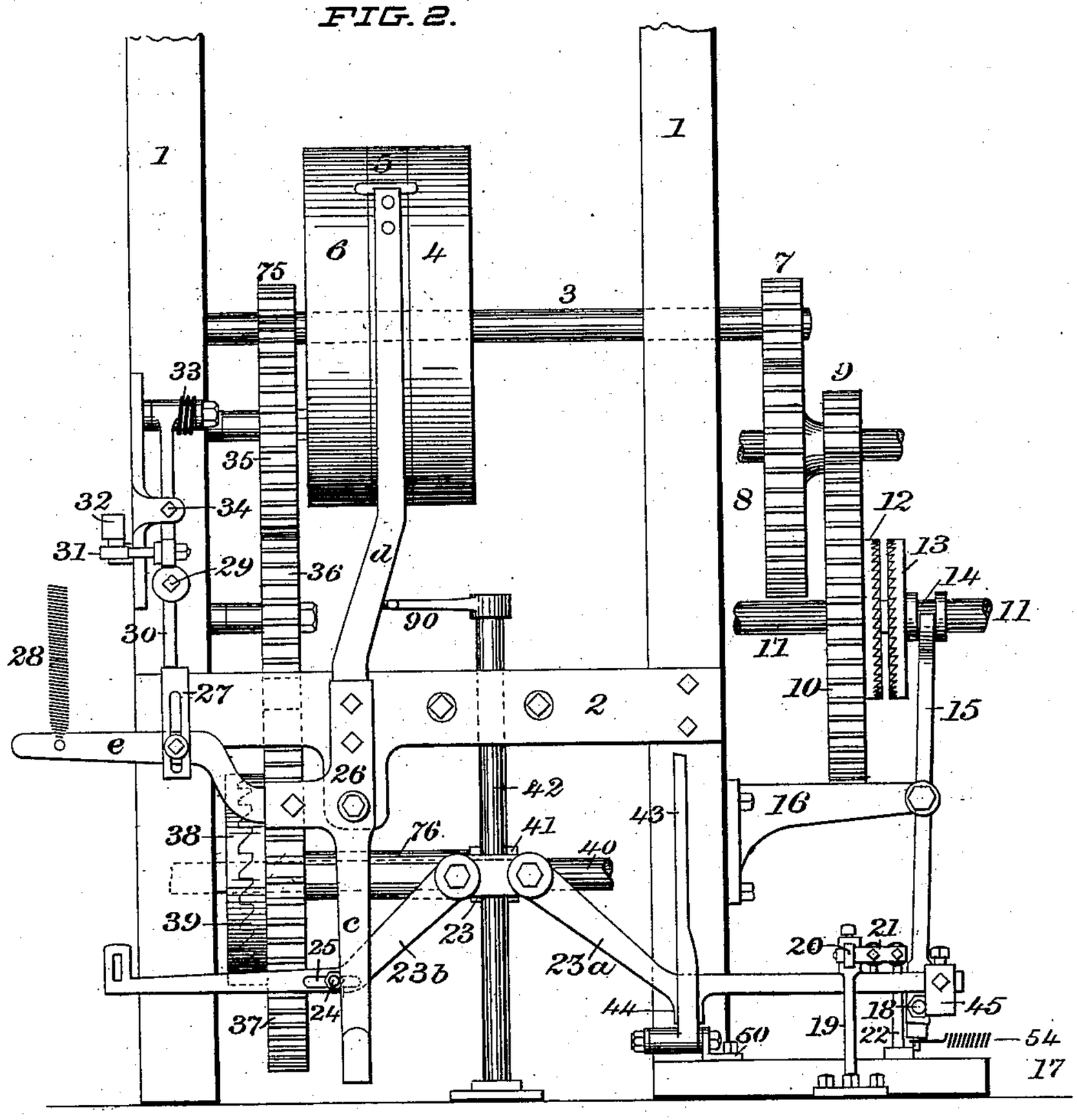
FIG. 2.



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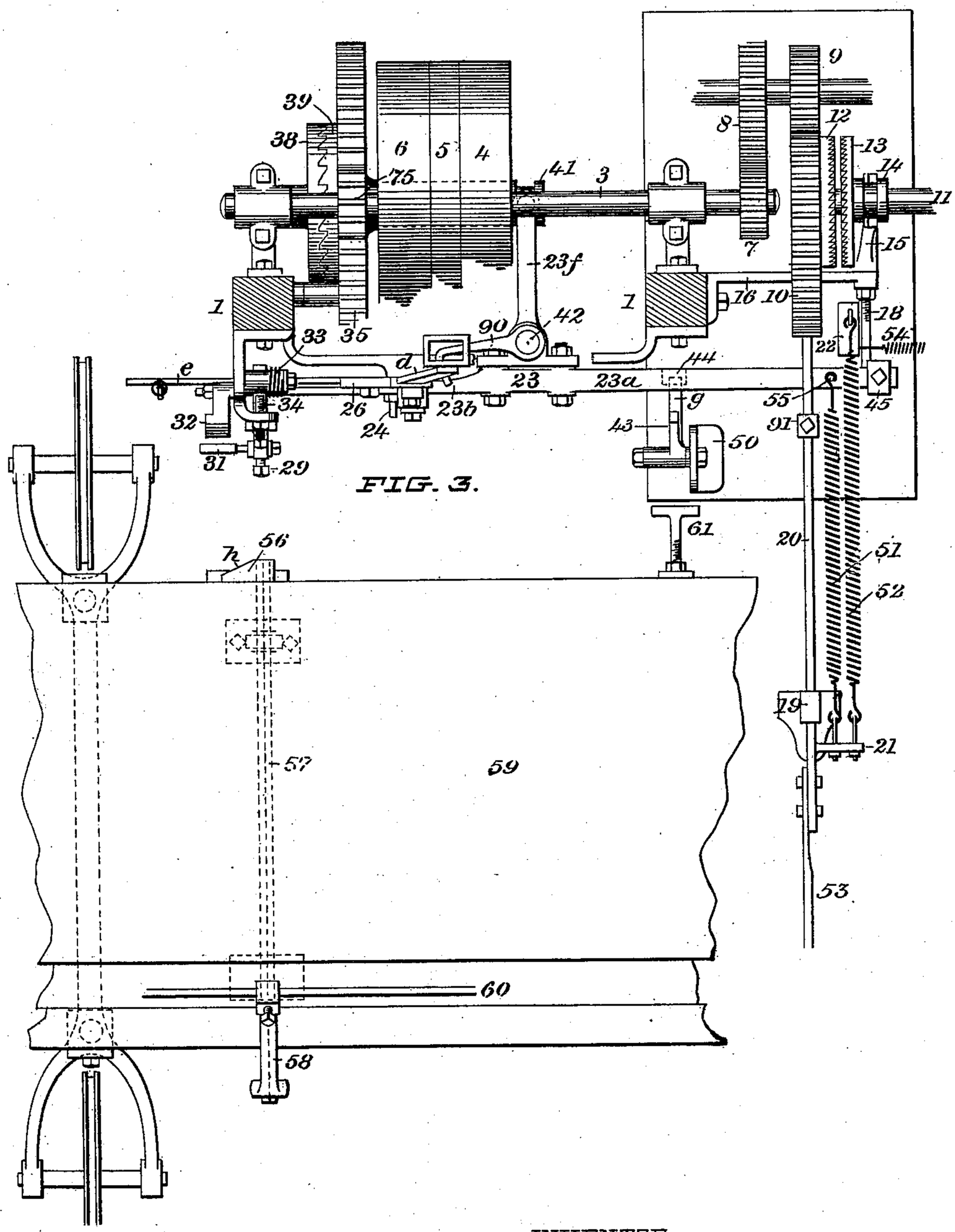

FIG. 3.

WITNESSES:

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UNITED STATES PATENT OFFICE.

JOSEPH VENABLES, OF BENNINGTON, VERMONT.

SPINNING-MULE.

SPECIFICATION forming part of Letters Patent No. 599,813, dated March 1, 1898.

Application filed August 28, 1896. Serial No. 604,170. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH VENABLES, of the village of Bennington, in the county of Bennington and State of Vermont, have invented certain Improvements in Spinning-Mules, of which invention the subjoined description, in connection with the accompanying drawings, constitutes a specification.

These improvements relate to mules of the so-called "Davis & Furber" type and consist in the interposition of a safety-guard between the belt-shipping lever and the backing-off lever or with some other operative part of the backing-off apparatus, and their office is to suspend and defer the performance of the function of the belt-shifter after it has been released by the backing-off movement of the mule until the clutch which draws in the carriage has been disconnected and the clutch which effects the draft movement has been engaged. The operation of this guard is made dependent upon some part of the mechanism which operates the said clutches and preferably of the backing-off lever. Certain imperfections and difficulties attend the practical operation of this type of mules as at present constructed and operated, which may be described as follows: When the carriage is moving up to the head or is "backing off," as it is termed, one attachment of the carriage contacts with mechanism to operate the belt-shifter and another separate attachment contacts with other separate mechanism to effect disengagement of the drawing-in clutch and engagement of the draft-clutch by which the draft movement of the mule is initiated. The principal member of the latter train of mechanism or that which controls the action of these clutches is the backing-off lever.

To secure correct and perfect operation of the mule, the belt-shifting and the clutch movements should be as nearly simultaneous as possible; but in no case should the belt be shipped onto the driving-pulley before disengagement of the drawing-in clutch and engagement of the draft-clutch have taken place, for if it does so occur all the operations of the mule for spinning will be started except the drawing, and the carriage will stand still. As a result of such conditions the drawing-rollers which will be running will deliver the roving to the spindles, which will twist it undrawn, and as a consequence "spindle tops" or lumps of twisted roving will be accumulated on the tips of the spindles, to remove which a "breakdown" of the yarn becomes necessary. There is no provision in mules of the class spoken of as they are now constructed for positively securing these clutch engagements concurrently with and positively not later than the shipping of the belt, and the object of this invention is to supply such mules with such a provision.

The drawings exhibit such parts of a mule as serve to show the application and mode of operation of my invention.

Figure 1 is a view in elevation of such parts of the head and carriage of a mule as carry the parts to which my invention applies. The view is as seen from the right-hand end of the mule. Fig. 2 is a partial front elevation of the head. Fig. 3 is a plan view of the parts seen in Fig. 1. Fig. 4 is an elevation of a lever which is attached to the carriage and is placed under the control of a hand-shipper to stop and start the mule at will.

A part of the frame of the head is seen in the uprights 1 1 and cross-girt 2. The main driving-shaft is seen at 3, and the pulley which does the spinning and drives the carriage out is shown at 4, while the backing-off pulley is shown at 5. The loose pulley is 6. The belt-shipping lever is shown at 26, and has an arm *d*, which extends to the belts, another, *e*, to which is attached a retractile spring which acts to throw the shipper from left to right, and another, *c*, which by means of my improvement coöperates with the backing-off lever 23. The backing-off lever is shown at 23 and consists of the two arms 23^a and 23^b, which extend in opposite directions from the fulcrum-shaft 42, to which it is firmly bolted. A third arm 23^f extends to the rear and acts as a shipping-fork to operate the drawing-in clutch 41. From the under side of arm 23^a depends a lug 44, with which the locking-lever 43 engages. The horizontal arm of lever 43 is notched to hold the lug 44 when the arm 23^a is thrown toward the head. The bar 61 on the carriage unlocks this lever when the carriage moves up against it. On the outer end of arm 23^a is an adjustable lug 45, with which the arm 18 of the draft-clutch fork 15

coacts. To this arm a spring 54 is connected, which acts when the fork is released to throw the sliding member 13 of the draft-clutch into engagement with the fixed member 12. The spring 51 connects the backing-off lever with the latch-rod 20 by means of the bracket 21. When the backing-off lever is released, the spring acts to draw arm 23^a back until it strikes the stop-lug 91, which is provided for that purpose.

As my invention may be carried out in innumerable ways, I have shown in this case a only two modifications of the same, both of which operate on identically the same principle; but I do not confine myself to any particular embodiment of it in specially-constructed mechanism, but claim all devices, however made or applied, which operate to take control of the belt-shipping apparatus after it has been released by the drawing-in action and hold the shipping action in suspense or abeyance until it is itself released automatically by the drawing-in action exerted through the movements of the backing-off lever or some appurtenance or dependency thereof. One means of carrying out my invention is to attach to the upper part of the fulcrum-shaft 42 an arm 90, which has its end bent around at right angles, so as to stand across the path of movement of the belt-shipper arm, as the backing-off lever stands while the carriage is running in. Another and equivalent provision is shown at 24, which consists in attaching an adjustable stud to the arm 23^b, so as to come in the path of movement of the arm *c* of the belt-shipper under the same conditions. These are only similar provisions to accomplish the same object by operating on opposite arms of the same lever.

The operation of my invention is as follows: Assuming the carriage to be in the act of moving toward the head, the cam 56 and the bar 61 should respectively strike the bolt 29 and lever 43 at the same instant if everything is properly adjusted. The contact of 56 with 29 will force the lever 30 back, so as to throw its bottom end out of contact with the adjusting-clip 27, which is attached to arm *e* of the shipping-lever. When such contact is broken, spring 28 will exert its tension to pull arm *e* upwardly, and thus tend to throw arm *d* toward the tight pulley; but if the backing-off lever has not fully acted either arm *d* will strike arm 90 and be blocked in that position, or arm *c* will strike lug 24 on arm 23^b and be similarly blocked. Thus the belt-shipper will be restrained from further action until one or both of these obstacles is or are removed; but the moment the further advance of the carriage or of bar 61 forces the locking-lever 43 over to the point where the lower arm breaks contact with the under side of lug 44 the spring 51 will retract and, through arm 23^f, throw the drawing-in clutch out of engagement. This movement at the same time releases the end of the arm 18 of the draft-clutch 4, whereupon, and after the disengagement of the drawing-in clutch, the spring 54 acts to throw the draft-clutch into engagement. The same movement of the backing-off lever also throws the blocking devices 90 and 24 out of the path of movement of the shipping-lever, which is thus left free to shift the belt onto the driving-pulley 4 and thus start the machine on a new stretch. By the adoption of this safety-guard I am enabled to gear the mule to run much easier and thus avoid any recoil, which would damage the yarn, as well as leave the mule so much out of adjustment as to require assistance to start it properly again.

I therefore claim as my invention—

1. In a mule of the character described the combination with the belt-shipper and the backing-off lever of an interposed safety-guard adapted to block the action of the belt-shipper at and during the time and for the purpose specified.

2. The combination in a spinning-mule with the draft-clutch the draft-clutch shifter, the driving-pulley and the drawing-in pulley of a belt-shipper for shipping the driving-belt from the drawing-in pulley to the driving-pulley and a belt-shipper holder for arresting and holding the belt-shipping devices until the draft-clutch engagement has been effected.

3. The combination in a spinning-mule with the drawing-in pulley, the driving-pulley and the drawing-in clutch, of a belt-shipper for shipping from the drawing-in pulley to the driving-pulley, means for effecting disengagement of the drawing-in clutch and a belt-shipper-holding device interposed between the belt-shipper and the means for disengaging the drawing-in clutch, adapted to arrest and hold the belt-shipper until said disengagement has been effected.

4. The combination in a spinning-mule with the draft-clutch the drawing-in clutch, the driving-pulley and the drawing-in pulley, of a belt-shifter for throwing the belt from the drawing-in to the driving pulley, a shifter for disengaging the drawing-in clutch, a shifter for engaging the draft-clutch, and a belt-shipper holder interposed between the belt-shipper and the said clutches for arresting and holding the belt-shipper pending the completion of the several clutch actions preparatory to entering upon a new stretch.

In testimony whereof I have hereto subscribed my name in the presence of two witnesses.

JOSEPH VENABLES.

Witnesses:
FRANKLIN SCOTT,
EMILY SCOTT.