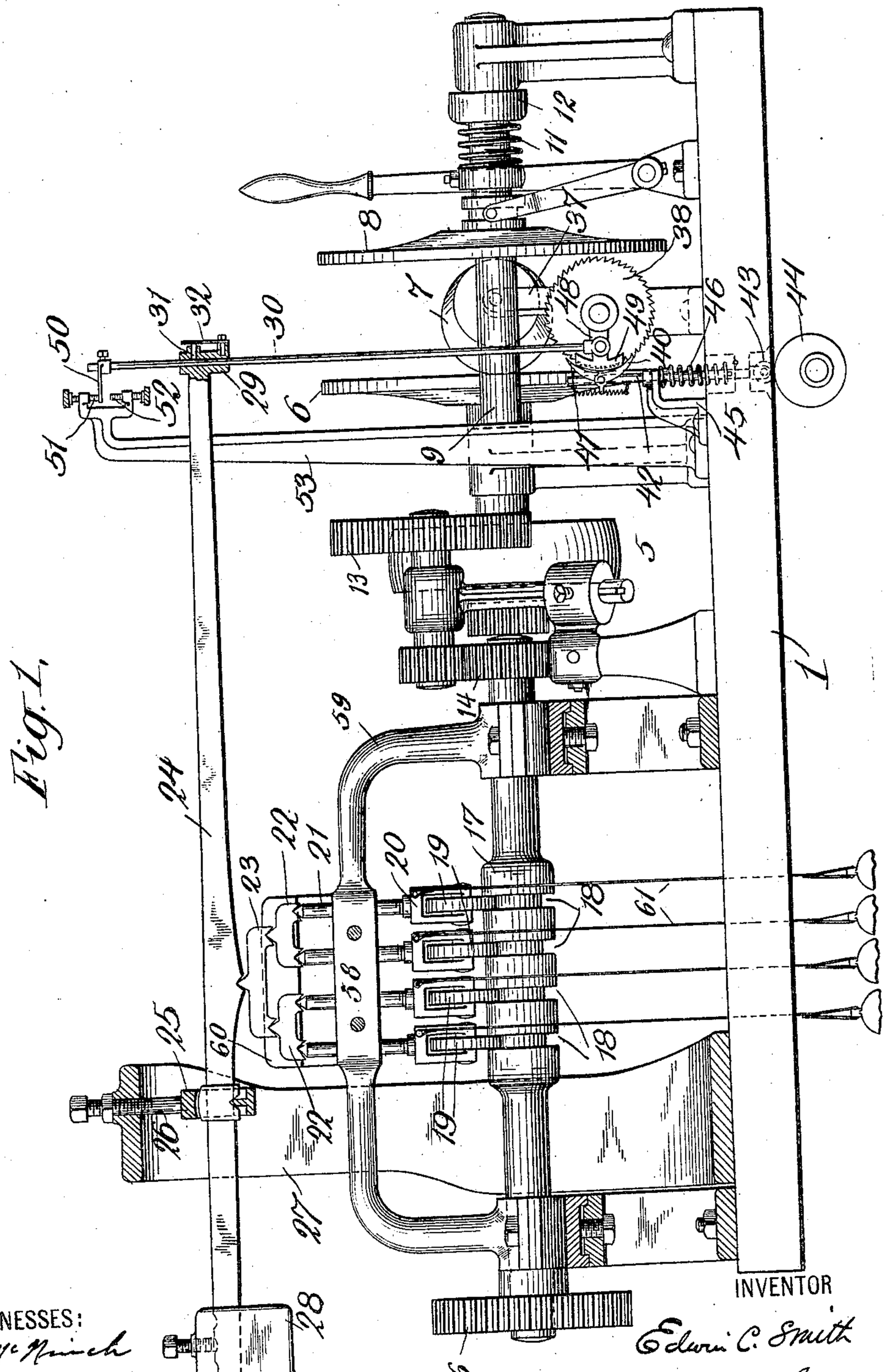
No. 887,280. PATENTED MAY 12, 1908.

E. C. SMITH.

SLIVER EVENING MECHANISM FOR DRAWING FRAMES.

APPLICATION FILED JAN. 5, 1907. 4 SHEETS—SHEET 1.

Fig. 1.



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M. S. Avery.

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Fig. 2.

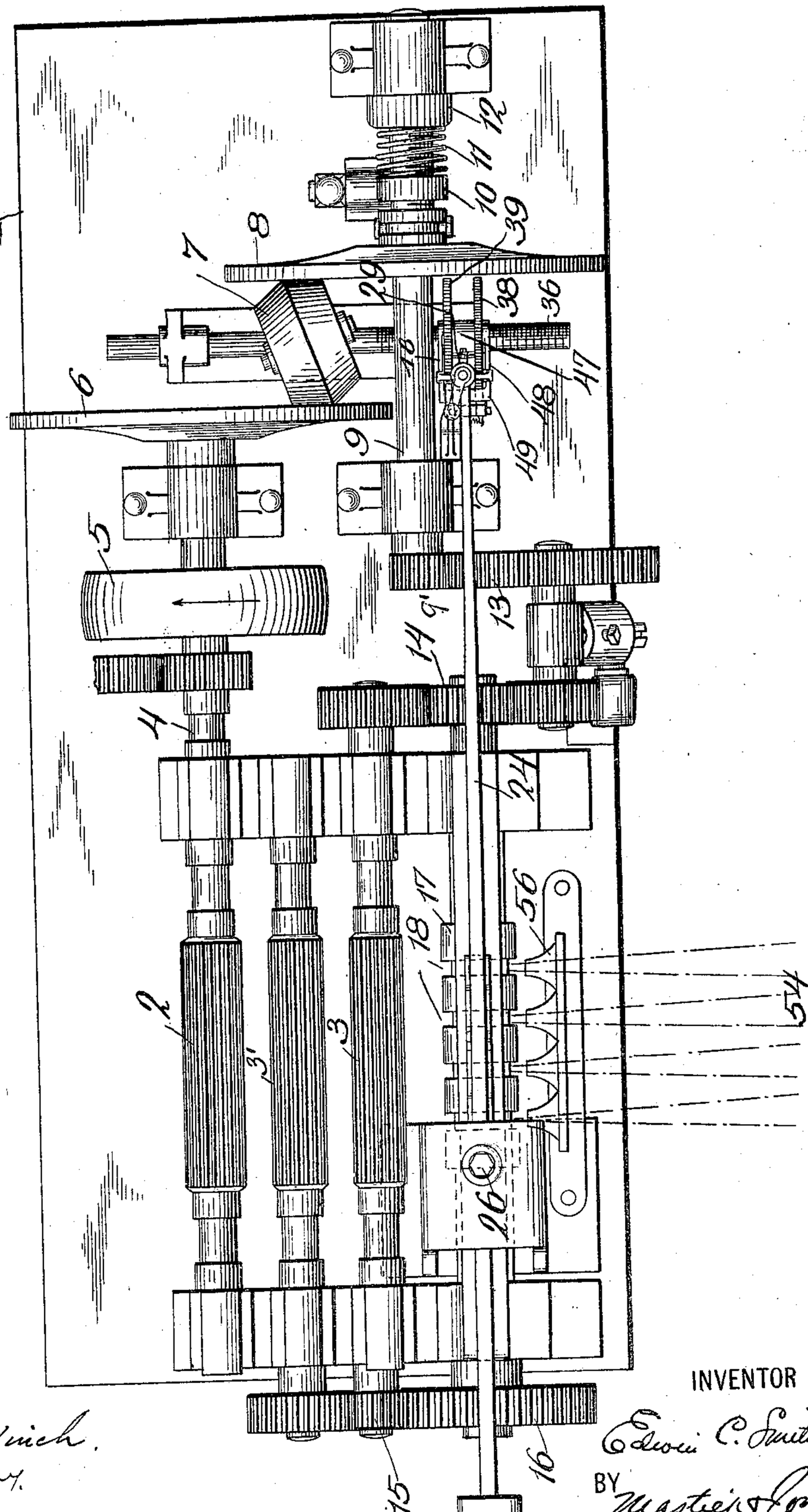

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Fig. 4.

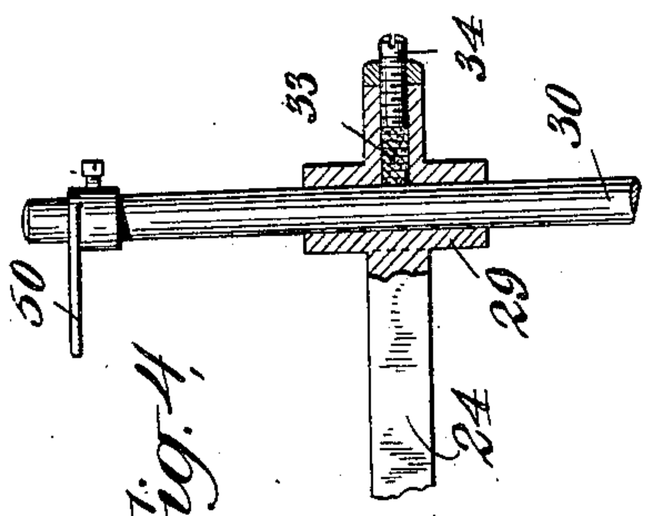

Fig. 5.

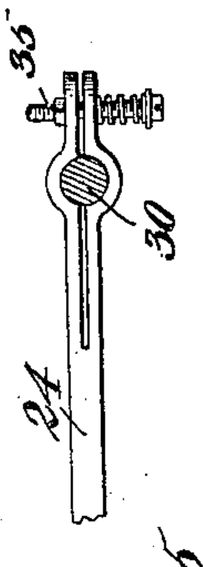

Fig. 3.

Fig. 6.

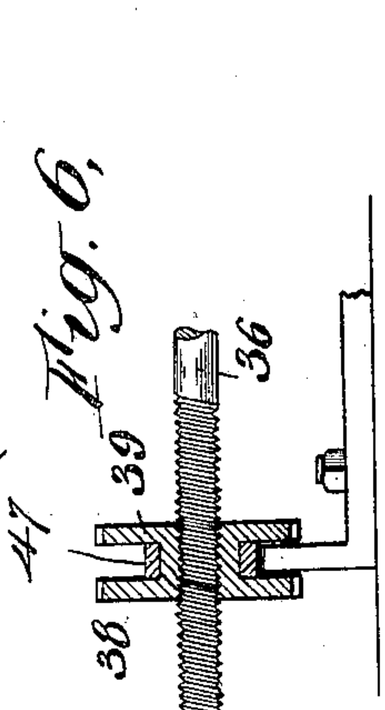

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Fig. 8

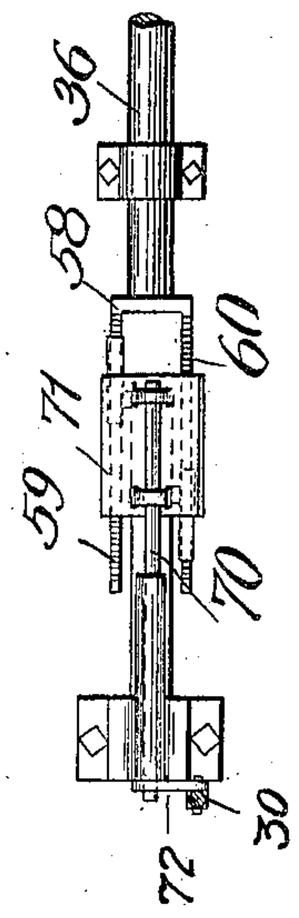


Fig. 9, 30

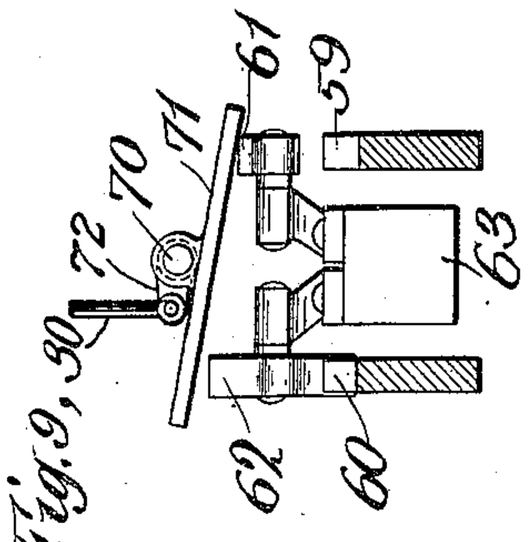
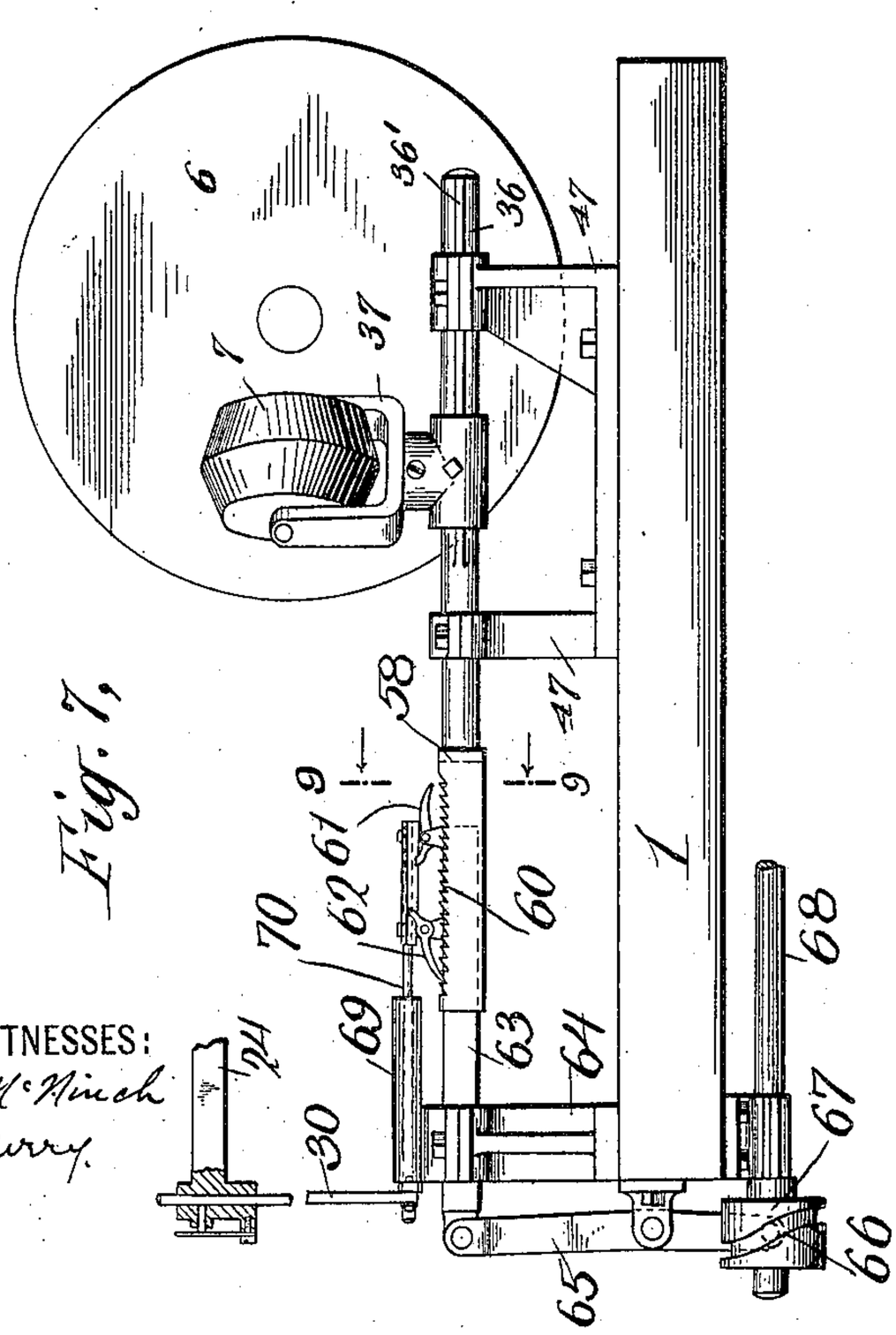


Fig. 7.



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UNITED STATES PATENT OFFICE.

EDWIN C. SMITH, OF SEEKONK, MASSACHUSETTS.

SLIVER-EVENING MECHANISM FOR DRAWING-FRAMES.

No. 887,280. Specification of Letters Patent. Patented May 12, 1908.

Application filed January 5, 1907. Serial No. 350,975.

To all whom it may concern:

Be it known that I, EDWIN C. SMITH, residing at Seekonk, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Sliver-Evening Mechanism for Drawing-Frames, of which the following is a specification.

The present invention relates to a sliver evening mechanism for drawing frames in which the movements of a detector due to variations in the weight of a sliver are caused to automatically effect a variation in the rate of feed of the sliver.

For the purpose of illustration I have selected the type of evener mechanism described in reissued Letters Patent No. 12,478 to V. S. Westcott and F. W. Potter, dated May 8, 1906. In the type of machine described in said reissued patent a variable speed motion is employed comprising two oppositely disposed disks one of which is driven by the other through an interposed friction wheel, the driven disk being connected through a train of gears with the back drawing rolls and the evener roll. This friction wheel, the positioning of which determines the speed of rotation of the driven disk, is connected in such manner to the detectors that the whole duty of effecting the movements of said wheel is imposed upon the slivers. While the movements of the friction wheel are confined within narrow limits, a movement of about one-sixteenth of an inch resulting in a difference of about five or six grains per yard of sliver, any feature which lends itself towards lessening the duty required of the sliver is of advantage.

The essence of the present invention resides in providing independent power actuated means to perform the actual work of shifting the friction wheel and requiring of the sliver the duty only of permitting such means to become operative for the desired purpose, and especially in means whereby a slight movement of a detector arm moved by variations of the sliver causes instant action of the speed controlling devices.

The invention will be understood by reference to the accompanying drawings in which Figure 1 is a rear elevation of a drawing frame showing the application of my improvement thereto; Fig. 2 a top plan view of the same; Fig. 3 an end elevation partially in section with some of the parts omitted; Figs. 4 and 5 detail views of modified means of connecting the lever directly actuated by the detectors with a rod connected to the means for shifting the friction wheel; Fig. 6 a detail view of the bar which carries the friction wheel and the ratchet wheels mounted thereon; Fig. 7 a side view of a modified arrangement to effect the shifting of the friction wheel; Fig. 8 a top view of the left hand part of Fig. 7; and Fig. 9 a detail elevation, partly in section, of the ratchet actuating pawls and the shield controlling the same of Fig. 7.

Referring to the drawings the numeral 1 designates the table of a frame on which the mechanism herein described is mounted. 2 designates the front, and 3 and 3′ the back drawing rolls which have bearings in standards secured to the frame. The shaft 4 of the front drawing roll is driven by a belt passing around a pulley 5 said belt being connected to a power shaft, the speed of rotation of said shaft 4 being practically uniform. On shaft 4 is keyed a disk 6 from which power is transmitted through an interposed friction wheel 7 to an oppositely disposed disk 8 keyed or otherwise secured to a shaft 9 which shaft is longitudinally shiftable in its bearings. By means of an adjustable nut 10 engaging a threaded portion of the shaft, a spring 11 interposed between said nut and a thrust bearing 12 presses the disk 8 into frictional engagement with the friction wheel 7. By adjusting the nut 10 in position the degree of spring pressure can be adjusted thus controlling the degree of frictional contact between the disk 8 and friction wheel 7 as desired. On shaft 9 is keyed a gear 9′ meshing with a gear 13. The latter through the train of gears shown in Fig. 2 rotates the evener roll and the back drawing rolls 3 and 3′, the last one of the gears of the train being designated 14. On the shaft of the evener roll 17 is a gear 16 which through intermediate gear 15 drives the back drawing rolls 3′. The method of driving the evener roll and the back drawing rolls is substantially the same as illustrated and described in said reissued patent.

The purpose of the present invention being to automatically vary the rate of feed of the slivers passing through the evener roll I mount the friction wheel 7 of the variable speed motion upon a spindle having mechan-

ism connected thereto which is adapted to be thrown into operation by the movements of the detectors upon any variation in the weight of the slivers from a normal. This is accomplished through the following instrumentalities. The evener roll 17 is provided with a series of peripheral grooves 18 adapted to receive without binding upon the side walls thereof a corresponding number of detector disks 19 revolubly supported on studs carried by yokes 20. These yokes are secured to the ends of vertical rods 21 the upper ends of which form bearings for the saddles 22, the latter in turn supporting the upper saddle 23 which is connected with the lever 24 by the following instrumentalities. The parts are so adjusted that in the absence of a sliver a given disk 19 will rest upon the bottom of its groove 18 of the evener roll, and when a sliver is passing through the evener roll any variation thereof from a normal weight will be indicated by the rising and falling movements of the disk 19, such movements being communicated to lever 24 through the system just described. The lever 24 is fulcrumed on a knife edge carried by a stirrup 25 attached to a vertically adjustable rod 26 secured to a standard 27. The lever 24 is balanced by an adjustable weight 28, and at the end of its longer arm is formed with a transversely placed longitudinally bored head 29 through which passes a rod 30. The rods 21 which carry the detector rolls are guided in their movements between plates 58 forming part of a yoke 59 seated upon suitable standards. This yoke also carries upwardly the extending cheek pieces 60 to prevent any lateral movement of the saddles 22 and 23. The rod 30 is held in frictional engagement with lever 24 by any suitable means. Thus in Fig. 1 I provide a pin 31 seated loosely in an opening in head 29 and made to bear against rod 30 by a spring 32. Or, as shown in Fig. 4, the head 29 may be bored transversely to receive a packing 33 adapted to be forced against rod 30 by a screw plug 34. Another method of securing the rod 30 is shown in Fig. 5 in which the end of lever 24 is split so as to embrace said rod, the two sections of the lever being held together by a suitable spring clamp 35. The method of connecting lever 24 and rod 30 is a mere matter of detail the purpose being to provide a good frictional connection which will be sufficient to secure the desired movements of rod 30 to permit of the adjustment of friction wheel 7, and to permit lever 24 to slide along said rod when the limit of movement of the latter is reached.

Supported in standards secured to the bedplate 1 is a spindle 36 screw threaded for a portion of its length and having a spline 36′ by which rotation in its bearings is prevented, as indicated in Figs. 2, 3 and 6. On said spindle is mounted a yoke 37 which carries the revolving friction wheel 7 it being obvious that as the spindle is moved longitudinally in one direction or the other the said wheel will be carried toward or away from the axis of the driving disk 6 thereby effecting a change in the speed of rotation of the driven disk 8 and consequently of shaft 9 and the rolls connected thereto. To effect the movement of spindle 36 I provide two ratchet wheels 38 and 39 which may be formed integrally on a single hub as shown in Fig. 6 or on independent hubs. In either case the hub or hubs is or are interiorly screw threaded to engage the threaded section of spindle 36. These ratchet wheels have their teeth inclined in opposite directions and are actuated respectively by spring pressed pawls 40 and 41, said pawls being pivoted on a rod 42 carrying at its lower end a follower 43 which engages a continuqusly rotating cam 44 whereby a reciprocating movement is imparted to said rod. The rod 42 has a bearing in a bracket 45 by which it is guided in its movements. A spring 46 interposed between said bracket and a pin on rod 42 holds the follower 43 in contact with cam 44.

As indicated in Figs. 3 and 6 the ratchet wheels 38 and 39 are supported by a bracket 47 conveniently formed as to embrace the hub of said wheels. Having loose bearings on spindle 36 outside of the ratchet wheels are two forwardly projecting arms 48 the outer ends of which carry a shield 49 extending over a portion of the teeth of said wheels.

As shown in Figs. 1 and 3 the rod 30 is bifurcated near its lower end and the two sections connected to the respective arms 48. The relation of the shield and actuating pawls is such that when the slivers passing through the evener roll are of normal weight the shield 49 will prevent engagement between the actuating pawls and the ratchet wheels, and when a sliver runs above or below normal weight the shield 49 will be moved sufficiently to permit the proper pawl to feed its ratchet wheel to effect the desired movement of friction wheel 7. In practice the teeth of the ratchet wheels 38 and 39 should be of small pitch so that a single reciprocation of rod 42 will effect a feed on only one or two teeth. At the upper end of rod 30 is secured a laterally projecting finger 50 adapted to contact with adjustable stops 51 and 52 carried in arms of a standard or bracket 53.

In Fig. 1 I have shown weighted cords 61′ attached to yokes 20 to insure sufficient contact between the detector rolls and the slivers passing thereunder.

The method of operation of the machine above described is as follows. The slivers indicated at 54 (see Fig. 2) passing in pairs from the rear tension roll 55 are directed by the stationary trumpets 56 to the grooves of the evener roll 17. They pass thence to the

back drawing rolls 3 and 3′, front drawing rolls 2 and are then delivered to the condenser rolls 57.

The several parts are adjusted primarily for a sliver of normal weight, that is, rod 30 is maintained in such position by lever 24 that the finger 50 is substantially midway between the stops 51 and 52, and shield 49 bears against pawls 40 and 41 to hold them out of engagement with their respective ratchet wheels. Assume now that a sliver passing through one of the grooves of the evener roll increases in weight above the normal. In that case the corresponding detector roll 19 will be raised thus lifting its yoke 20, rod 21 and the long arm of lever 24. This movement of lever 24 will lift rod 30 and shield 49 thus permitting pawl 40 to drop into engagement with the teeth of ratchet wheel 38, and as said pawl is continuously actuated through cam 44 the ratchet wheel 38 will be fed so long as shield 49 is maintained in position to permit the engagement of pawl 40 with the teeth of said ratchet wheel. The rotation of ratchet wheel 38 effects a longitudinal movement of spindle 36 in its bearings in such direction as to carry friction wheel 7 toward the axis of the driving disk 6 thus decreasing the speed of rotation of the driven disk 8 and consequently of the back drawing rolls and evener roll thereby permitting the front rolls 2 to draw the sliver down to normal weight. On the other hand, should a sliver run below normal the corresponding detector will drop thereby lowering shield 49 and permitting pawl 41 to drop into engagement with its ratchet wheel 39 to effect a movement of spindle 36 in a reverse direction and, therefore, a movement of friction wheel 7 toward the periphery of the driving disk 6. This results in an increase in the speed of rotation of the evener roll 17 and back rolls 3 and a consequent increase in the amount of sliver fed to the front rolls, the resulting sliver which passes through the condenser rolls being practically constant in weight for a given unit of length, or varying within inconsequential limits. Should one of the detectors be raised due to an increase in weight of the sliver passing under it and at the same time another detector permitted to fall due to a decrease in the weight of the sliver passing under it, then the resultant movement of lever 24 will effect such adjustment of the parts above described as to produce a sliver which when delivered to the condenser rolls 57 will be of substantially uniform weight for a given unit of length.

From the above description it will be observed that the only duty imposed upon the sliver is to effect a change of position of shield 49 so as to permit pawls 40 and 41 to drop into engagement with their respective ratchet wheels, said pawls simply riding over shield 49 when not called upon to feed the ratchets. The parts entering immediately into consideration in this connection are so adjusted that the instant any movement is imparted to rod 30 by the variation of a sliver from normal weight the shield 49 will be moved one way or the other to permit one of the pawls to drop into operative engagement with its ratchet wheel. The function of the stops 51 and 52 is, therefore, to limit the movements of rod 30 beyond that which is necessary to effect the desired movement of shield 49. By reason of the frictional engagement between lever 24 and rod 30 a movement is permitted the former after the completion of the movement of the latter. By reason of this relation between said lever and rod a slight variation in the weight of a given sliver will shift shield 49 to permit either one or the other of pawls 40 and 41 to act.

In Figs. 7, 8 and 9 I have shown a modification in which the spindle 36 carries at its outer end a U-shaped extension 58 the respective upper sides of which are provided with ratchets 59 and 60, the teeth on which are inclined in opposite directions. Adapted to be brought into engagement with these ratchets are pawls 61 and 62 pivotally mounted in brackets carried by a bar 63 which is slidably mounted in a standard 64. To the outer end of bar 63 is secured a lever 65 fulcrumed on a stud carried by the bedplate 1. The lower end of lever 65 carries a follower 66 adapted to engage a cam 67 on a shaft 68 by which the said cam is continuously rotated, thereby reciprocating bar 63 and the pawls carried thereby.

Supported in a bearing 69 secured to or forming part of the standard 64 is a rock shaft 70 to which is attached a shield 71 extending over and in proximity to the pawls 61 and 62. The shaft 70 has secured thereto a lever 72 the outer end of which is carried by a stud on the lower end of rod 30. These parts are so adjusted that when the slivers 54 are running normal the shield 71 will be maintained in a substantially horizontal plane resting upon the tails of pawls 61 and 62 to hold them out of engagement with their respective ratchets. Should a sliver run above normal weight the lever 24 will be raised thus rocking the shaft 70 in such direction as to tilt the shield 71 to cause the latter to bear down upon pawl 62 and thereby permitting pawl 61 to fall by gravity into engagement with the teeth of ratchet 59. As the pawls are continuously actuated the spindle 36 will be moved longitudinally to carry the friction wheel 7 toward the axis of the driving disk 6 to thereby reduce the speed of the back drawing rolls and the evener roll as already described. Should a sliver run below normal then shield 71 will be tilted in the direction indicated in Fig. 9

so as to release pawl 62 and allow it to drop into operative engagement with its ratchet 60. This will result in the feeding of spindle 36 in an opposite direction or so as to move friction wheel 7 toward the periphery of the driving disk 6 thereby increasing the speed of the back drawing rolls and the evener roll.

Practical conditions in this art deal with variations of a few grains per yard of sliver and in order to effect the desired movement of friction wheel 7, which is confined within very narrow limits, the teeth of the ratchets should be of small pitch so that a minute movement of the friction wheel can be obtained and also to diminish the extent of travel and amount of duty imposed on the shield. If very coarse teeth were used, as is the case on railway heads, more tension would be required to mesh the pawls, and a longer range of movement would be required for the shields.

The advantages heretofore referred to of the frictional engagement between lever 24 and rod 30 are present in the construction shown in Fig. 7 inasmuch as the slight movement of the detectors 19, transmitted to rod 30 through lever 24 will effect an immediate tilting of shield 71, the corresponding increase or decrease in the speed of the back drawing rolls and the evener roll being effected without the necessity of a complete movement of lever 24. As soon as normal conditions in the weight of the sliver are restored the shield 71 will assume such position as to hold both of the reciprocating pawls out of engagement with their respective ratchets.

In the type of sliver evening mechanism herein described an essential feature is the confining of the sliver on all sides, that is between the bottom and side walls of the grooves of the evener roll and the detectors. The latter bear directly upon the slivers and are yieldingly mounted in a plane transverse to the plane of fixed confinement from which it results that the detectors respond instantly to any variations in the weight of a sliver from a normal whether that variation is in a vertical or transverse direction. This movement is communicated through the system of levers described to the mechanism which controls the position of the ratchet actuating pawls, the feed of the ratchets to effect the shifting of friction wheel 7 continuing only so long as the sliver runs above or below a normal weight.

I wish to be understood by the words "evener roll" in the description and claims an element adapted to confine the sliver in the same manner stated and coöperating with the detector disks, and which may be either stationary or rotated.

What I claim and desire to secure by Letters Patent is:—

1. In a sliver evening device the combination of a lever adapted to be moved by the sliver when it varies from a normal weight, a rod having frictional engagement with said lever, stops to limit the extent of movement of said rod whereby the lever may continue its movement independently of said rod, and means controlled by said rod to effect a variation in the rate of feed of the sliver.

2. In a sliver evening device the combination of means for confining the sliver on all sides comprising a detector resting or bearing on said sliver and adapted to be moved thereby when the sliver varies from a normal weight, mechanism to vary the rate of feed of the sliver comprising ratchets and pawls therefor, means for continuously actuating said pawls, a lever adapted to be moved by said detector, a rod having a frictional engagement with said lever, stops to limit the extent of movement of said rod whereby the lever may continue its movement independently of said rod, and means connected to said rod and adapted by its movements to hold the pawls out of engagement with the respective ratchets or to permit one or the other of them to engage its ratchets to effect the desired variation in the rate of feed of the sliver.

3. In a sliver evening device the combination of a lever adapted to be moved by the sliver when it varies from a normal weight, said lever having a transversely placed longitudinally bored head, a rod passing through and frictionally engaging said head, mechanism to vary the rate of feed of the sliver comprising ratchets and pawls therefor, means for continuously actuating said pawls, and a shield for holding said pawls out of engagement with their respective ratchets under normal conditions, said shield being connected to said rod, whereby said shield may be moved to permit one or the other of said pawls to engage its ratchet to thereby effect the desired variation in the rate of feed of the sliver.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EDWIN C. SMITH.

Witnesses:
GEORGE H. PARKER,
ARTHUR G. HENRIKSON.