No. 887,281. PATENTED MAY 12, 1908.

E. C. SMITH.

SLIVER EVENING MECHANISM FOR DRAWING FRAMES.

APPLICATION FILED JAN. 5, 1907.

3 SHEETS—SHEET 1.

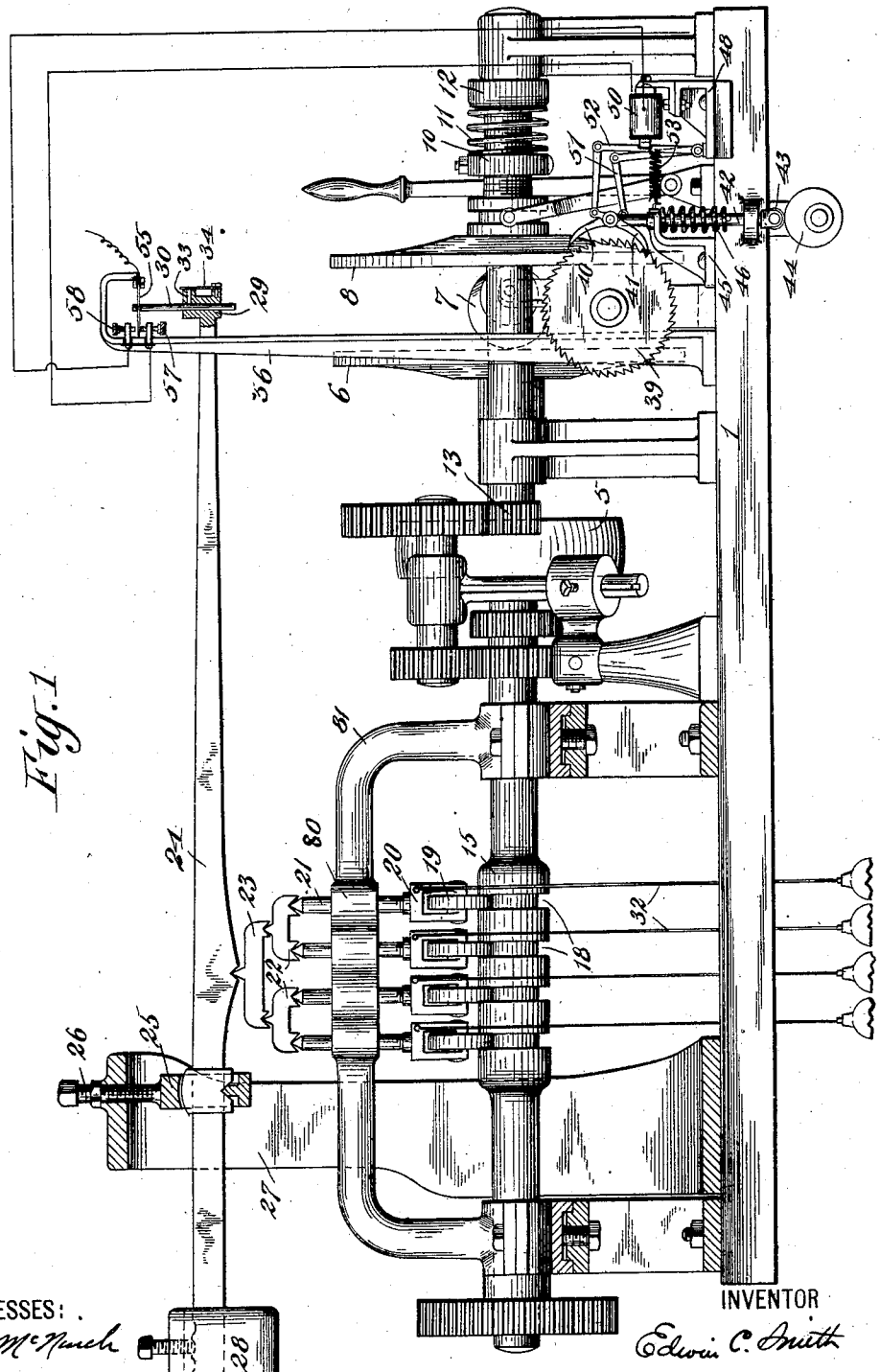


Fig. 1.

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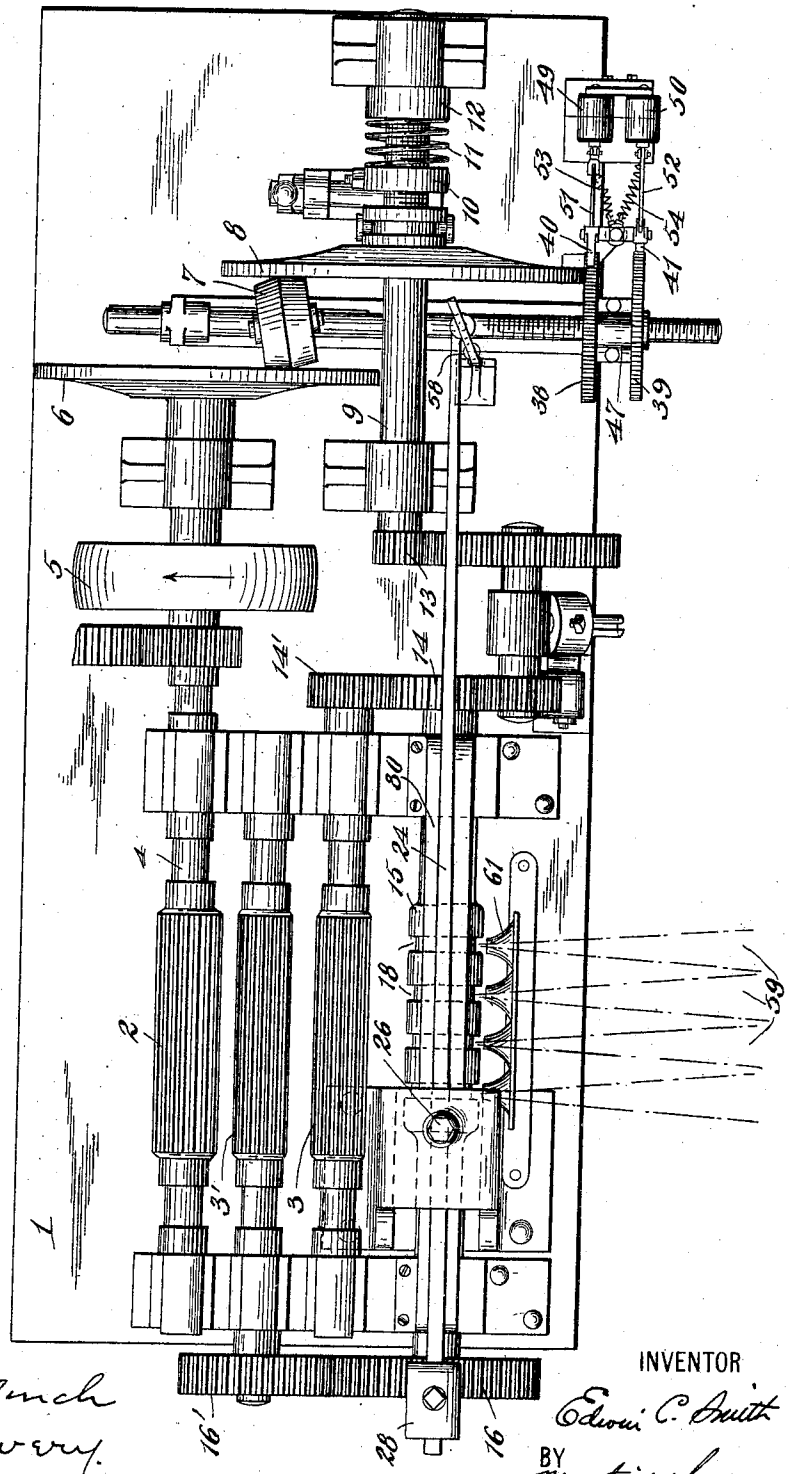
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3 SHEETS—SHEET 2.

Fig. 2.




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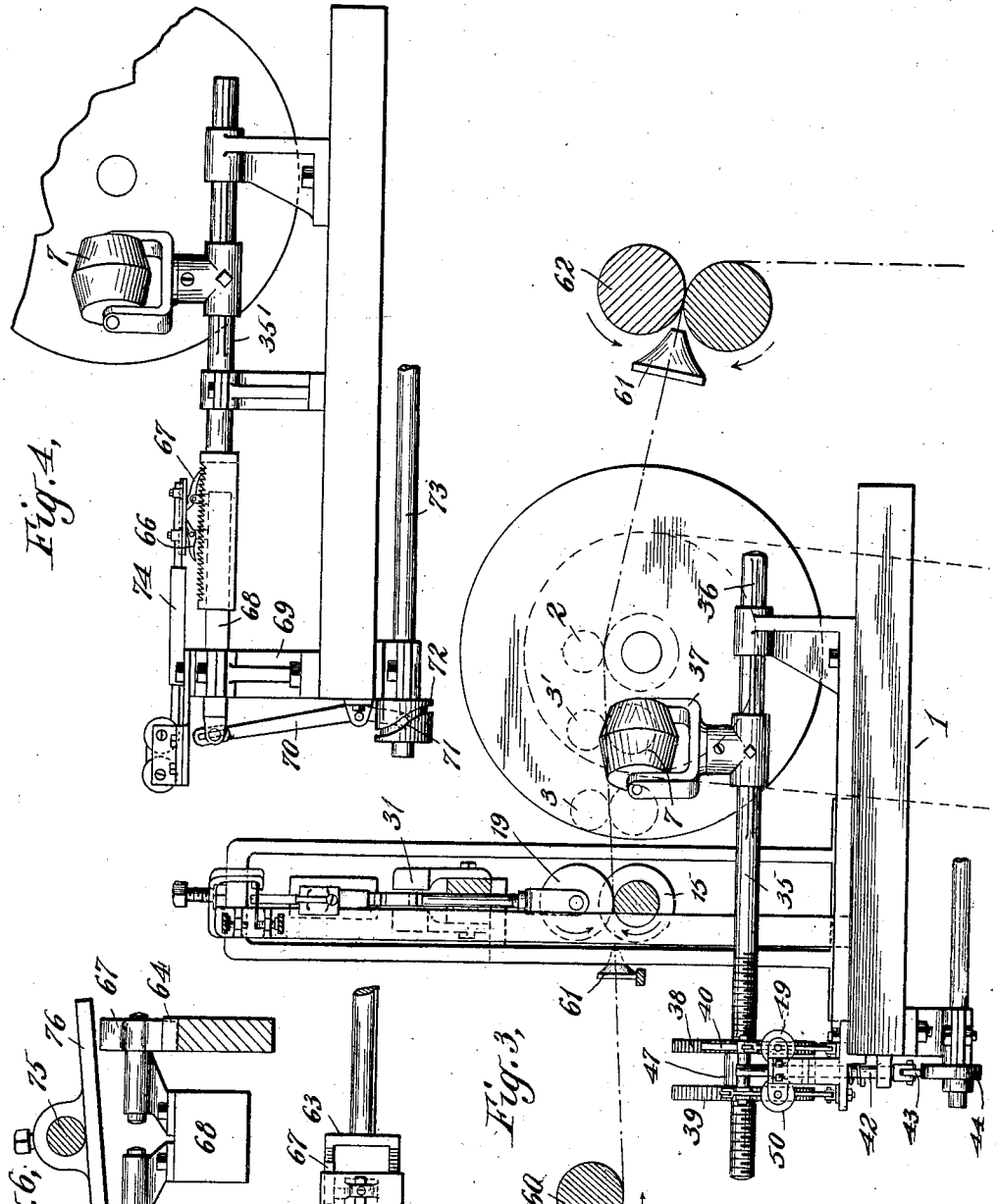
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## SLIVER-EVENING MECHANISM FOR DRAWING-FRAMES.

No. 887,281. Specification of Letters Patent. Patented May 12, 1908.

Application filed January 5, 1907. Serial No. 350,976.

*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.

In a companion application filed of even date herewith I have described a sliver evening mechanism for drawing frames in which variations in the weight of a sliver are utilized to set in operation means to automatically effect a variation in the rate of feed of the sliver. In that application and in the present application I have, for the purpose of illustration, 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 which 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 position of which determines the speed of rotation of the driven disk, is connected in such manner to detectors bearing upon the slivers that the whole duty of effecting the movements of said wheel is imposed upon the slivers. In my said application the friction wheel is mounted on a carriage which is positively moved in both directions by means of ratchets, provision being made in the form of a shield which holds the actuating pawls out of engagement with their respective ratchets when the slivers are running normal, and permits them to engage their ratchets when a sliver runs above or below normal, the essence of the invention residing in providing independent power actuated means to perform the actual work of shifting the friction wheel and requiring of the slivers 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 said detector arm having a substantial extent of movement and its co-related speed controlling element having a limited extent of movement, there being an inductive or yieldable connection between the two.

In the accompanying drawings 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, some of the parts being omitted; Fig. 4 a side view of a modified arrangement for effecting the shifting of the friction wheel; Fig. 5 a top view of the left hand portion of Fig. 4; Fig. 6 a detail elevation showing the ratchet actuating pawls and the tilting plate controlling the same of Fig. 4; and Fig. 7 a detail view.

Similar reference numerals indicate similar parts in the several views.

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 drawing rolls and 3 and 3′ the back drawing rolls said rolls having bearings in standards secured to the frame. The shaft 4 of the front drawing roll is driven by a belt passing around 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 on shaft 9, which shaft is longitudinally shiftable in its bearings. By means of a 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 13 which through the train of gears shown in Figs. 1 and 2 drives a gear 14 on the shaft of the evener roll 15. The gear 14 meshes with a gear 14′ on the shaft of the back drawing roll 3. On the shaft of the evener roll is keyed a gear 16 which meshes with a gear 16′ on the shaft of the drawing roll 3′. Through the trains of gears just described the back drawing rolls and the evener roll will be driven at a rate of speed determined by that of shaft 9. The parts above described are substantially the same as illustrated 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 mechanism 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 I accomplish in the present case through the following instrumentalities. The evener roll 15 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 larger saddle 23 which is in engagement with the under side of a lever 24. These 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 long arm is formed with a transversely placed longitudinally bored head 29 through which passes a rod 30.

The rods 21 which carry the detector disks are guided in their movements between plates 80 forming part of yoke 81 seated upon suitable standards. This yoke also carries upwardly extending cheek pieces 31 to prevent any lateral movement of the saddles 22 and 23.

In Fig. 1 I have shown weighted cords 32 attached to the yokes 20 to insure sufficient contact between the detector disks 19 and the slivers passing thereunder. In practice a weight of about seven pounds is used, although this may be varied as desired.

The rod 30 is held in frictional engagement with lever 24 by any suitable means. Thus in Fig. 1 I provide a pin 33 seated loosely in an opening in the head 29 and made to bear against rod 30 by a spring 34. The method of connecting lever 24 and rod 30 is a mere matter of detail the purpose being to provide a good frictional engagement which will be sufficient to secure the desired movements of said rod to permit of the adjustment of friction wheel 7 by the means presently to be described, 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 35 screw threaded for a portion of its length as clearly indicated in Fig. 3, and having a spline 36 by which rotation in its bearings is prevented. 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 35 I provide, as shown in Figs. 1, 2 and 3, two ratchet wheels 38 and 39 which may be formed integrally on a single hub or on independent hubs. In either case the hub or hubs is or are interiorly screw threaded to engage the threaded section of spindle 35. These ratchet wheels have their teeth inclined in opposite directions and are actuated respectively by pawls 40 and 41, said pawls being pivoted on a rod 42 carrying at its lower end a follower 43 which engages a continuously 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. The ratchets 38 and 39 are supported in a suitable standard 47.

Supported on a bracket 48 are two electromagnets 49 and 50. The armatures for said magnets are in the form of bell crank levers 51 and 52 which are pivotally mounted on bracket 48, and are connected through one arm with the pawls 40 and 41 respectively. Springs 53 and 54 attached to the bracket 45 and to the armature levers serve to retract the latter to their normal positions when the magnets 49 and 50 are deënergized, such normal positions maintaining pawls 40 and 41 out of engagement with their respective ratchets.

The rod 30 which is in frictional engagement with lever 24 is suspended from a terminal arm 55, suitable insulation being interposed between the two. The arm 55 is supported in an arm of a standard 56, said standard also carrying binding posts in which are adjustably mounted two circuit terminals 57 and 58, these terminals being included respectively in the circuits of magnets 49 and 50.

The method of operation of the machine above described is as follows. The slivers indicated at 59 passing in pairs from the rear tension roll 60 are directed by the stationary trumpets 61 to the grooves of the evener roll 15. They pass thence to the back drawing rolls 3 and 3′, front drawing rolls 2 and are then delivered to the condenser rolls 62. The several parts are adjusted primarily for a sliver of normal weight, that is the terminal arm 55 is maintained by lever 24 substantially midway between the terminals 57 and

58 thus maintaining the circuits of magnets 49 and 50 open, and the pawls 40 and 41 out of engagement with their respective ratchets. The terminals 57 and 58 are so adjusted that the slightest permissible variation in the weight of a sliver passing through the evener roll will cause the arm 55 to contact with one or the other of said terminals to close the circuit of the corresponding electro-magnet. Assuming that a sliver passing through one of the grooves of the evener roll increases in weight above the normal then the corresponding detector disk 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 the terminal arm 55 thus closing the circuit through magnet 50. When said magnet is energized its armature lever will be attracted and pawl 41 connected thereto moved into engagement with ratchet wheel 39. As said pawl is continuously actuated through cam 44 the ratchet wheel 39 will be fed as long as magnet 50 remains energized. The rotation of ratchet wheel 39 effects a longitudinal movement of spindle 35 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 moving the terminal arm 55 into contact with the lower terminal 57, closing the circuit of electro-magnet 49 and attracting its armature lever 51. This movement of armature lever 51 will cause pawl 40 to move into engagement with ratchet wheel 38 and when said wheel is fed a movement will be imparted to spindle 35 in a direction opposite to that above described or toward the periphery of the driving disk 6. This results in an increase in the speed of rotation of the 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 62 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 62 will be of substantially uniform weight for a given unit of length.

From the above description it will be seen that the only duty imposed upon the sliver is to effect a movement of lever 24 and of rod 30 and terminal arm 55 carried thereby so as to close the circuit of either one of the magnets 49 or 50, and that the actual work of feeding spindle 35 is performed by the independently power actuated pawls 40 and 41. The adjustable terminal contacts 57 and 58 limit the movements of rod 30 beyond that which is necessary to effect the desired closing of the circuits. 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 the slightest permissible variation in weight of a given sliver will move the terminal arm 55 to permit either one or the other of pawls 40 and 41 to act, the circuit of the corresponding electro-magnet remaining closed as long as arm 55 is in contact with one or the other of the terminals 57 and 58. As soon as the sliver returns to normal weight the arm 55 will be moved out of contact with either of the terminals 57 and 58 thus deënergizing the corresponding electro-magnet and permitting the revolving friction wheel 7 to remain in normal position as long as that condition of the sliver persists.

In Figs. 4, 5 and 6 I have shown a modified construction in which the friction wheel 7 is mounted upon a spindle 35′ said spindle having at its outer end a U-shaped extension 63 the respective upper sides of which are provided with ratchets 64 and 65 having teeth inclined in opposite directions. Adapted to be brought into engagement with these ratchets are pawls 66 and 67 pivoted on a bar 68 which is slidably mounted in a standard 69. To the outer end of bar 68 is secured a lever 70 fulcrumed on a stud carried by the bedplate 1. The lower end of lever 70 carries a follower 71 adapted to engage a cam 72 keyed on a shaft 73 by which the said cam is continuously rotated, thereby reciprocating bar 68 and the pawls carried thereby.

Supported in a bearing 74 secured to or forming part of the standard 69 is a rock shaft 75 to which is attached a shield 76 extending over and in proximity to the pawls 66 and 67. To the outer end of rock shaft 75 is fixed a lever 77 in the form of an armature for the electro-magnets 78 and 79. These magnets are in circuit respectively with the terminals 58 and 57 and the parts are so adjusted that when the slivers 59 are running normal said magnets will be deënergized thus maintaining the shield 76 in a substantially horizontal plane resting upon the tails of pawls 66 and 67 to maintain them out of engagement with their respective ratchets. Should a sliver run above normal weight the lever 24 will be raised to cause contact between the terminals 55 and 58 thereby energizing magnet 78 and attracting armature 77. The resulting rocking movement of shaft 75 will tilt the shield 76 as indicated in Fig. 6 to thereby release pawl 67 when it will drop by

gravity into operative engagement with its ratchet 64. As the pawls are continuously actuated the bar 35′ will be moved in such direction as to carry the friction wheel 7 toward the axis of the driving disk 6 thereby decreasing the speed of the back drawing rolls and evener roll as already described. Should a sliver run below normal then the contact of terminals 55 and 57 will close the circuit of magnet 79 thereby tilting the shield 76 so as to release pawl 66 and permitting it to engage its ratchet 65 to effect a feeding movement of bar 35′ in a direction the reverse of that above described, or toward the periphery of the driving disk 6. The movement of friction wheel 7 in that direction will increase the speed of the back drawing rolls and evener roll in the manner already described with reference to Figs. 1, 2 and 3.

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.

Both embodiments of the invention herein illustrated make provision for controlling circuits to set in operation the mechanism which effects the desired variation in feed of the sliver, said circuits including a switch which is governed by the rising and falling movements of the detector.

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

1. In a sliver evening device the combination of mechanism to vary the rate of feed of the sliver, controlling circuits for setting said mechanism in operation, a switch included in said circuits, and means actuated upon the variation of the sliver from a normal weight to effect the opening and closing of said switch.

2. In a sliver evening device the combination of a detector resting or bearing on the sliver and adapted to be moved by the sliver when it varies from a normal weight, mechanism to vary the rate of feed of the sliver, controlling circuits for setting said mechanism in operation, a switch included in said circuits, and means actuated by the detector to effect the opening and closing of said switch.

3. In a sliver evening device the combination of means for confining a sliver on all sides comprising a detector bearing upon and adapted to be moved by the sliver when it varies from a normal weight, mechanism to vary the rate of feed of the sliver, controlling circuits for setting said mechanism in operation, a switch included in said circuits, and means actuated by the detector to effect the opening and closing of said switch.

4. In a sliver evening device the combination of a roll having a groove therein, a detector consisting of a rotatable disk seated within said groove and mounted so as to yield upon a variation of the sliver from a normal weight, mechanism to vary the rate of feed of the sliver, controlling circuits for setting said mechanism in operation, a switch included in said circuits, and means actuated by the detector to effect the opening and closing of said switch.

5. In a sliver evening device the combination of 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, controlling circuits for setting said mechanism in operation, a switch included in said circuits, a lever with which the switch-arm is in frictional engagement, and means actuated by the detector to effect the movement of said lever for the purpose described.

6. In a sliver evening device the combination of mechanism to vary the rate of feed of the sliver comprising ratchets and pawls therefor, means for continuously actuating said pawls and for normally holding them out of engagement with their respective ratchets, electromagnets the armature of which govern the positions of said pawls, controlling circuits for said magnets, a switch included in said circuits, and means actuated by the variation of the sliver from a normal weight to effect the opening and closing of said switch.

7. In a sliver evening device the combination of mechanism to vary the rate of feed of the sliver comprising ratchets and pawls therefor, means for continuously actuating said pawls and for normally holding them out of engagement with their respective ratchets, electromagnets having their armatures connected to said pawls, controlling circuits for said magnets, a switch included in said circuits, and means actuated by the variation of the sliver from a normal weight to effect the opening and closing of said switch.

8. 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 and for holding them out of engagement with their respective ratchets, electromagnets having their armatures connected to said pawls, controlling circuits for said magnets, a switch included in said circuits, and means actuated by the detector to effect the opening and closing of said switch.

9. In a drawing frame the combination of drawing rolls, means to rotate said rolls comprising a variable speed motion having a shiftable member, ratchets adapted to effect the movement of said member, actuating pawls for said ratchets, means for holding said pawls out of engagement with their respective ratchets during normal conditions, electromagnets having their armatures connected to said pawls, controlling circuits for said magnets, a switch included in said circuits, a detector bearing upon and adapted to be moved by the sliver when it varies from a normal weight, and means actuated by the detector to effect the opening and closing of said switch.

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

EDWIN C. SMITH.

Witnesses:
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ARTHUR G. HENRIKSON.