(No Model.)

W. H. HONISS.

FEED MECHANISM.

No. 501,603. Patented July 18, 1893.

Fig. 1

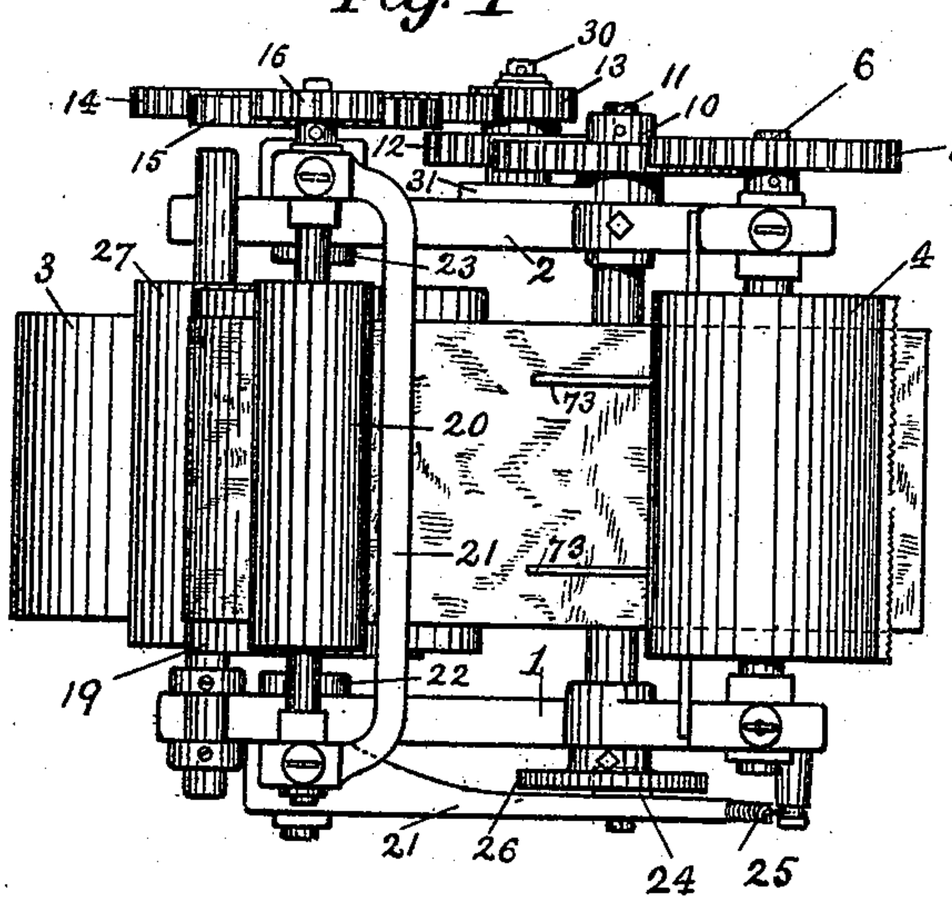


Fig. 3

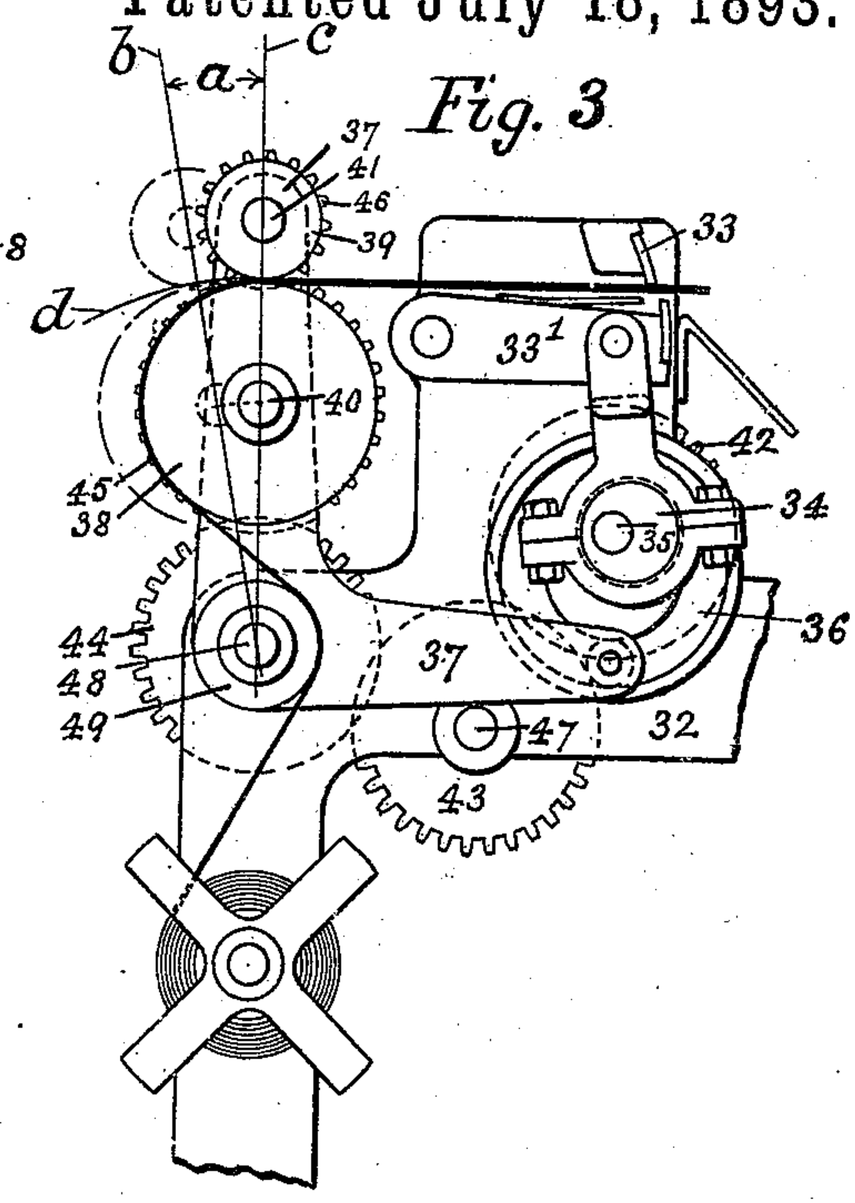


Fig. 2

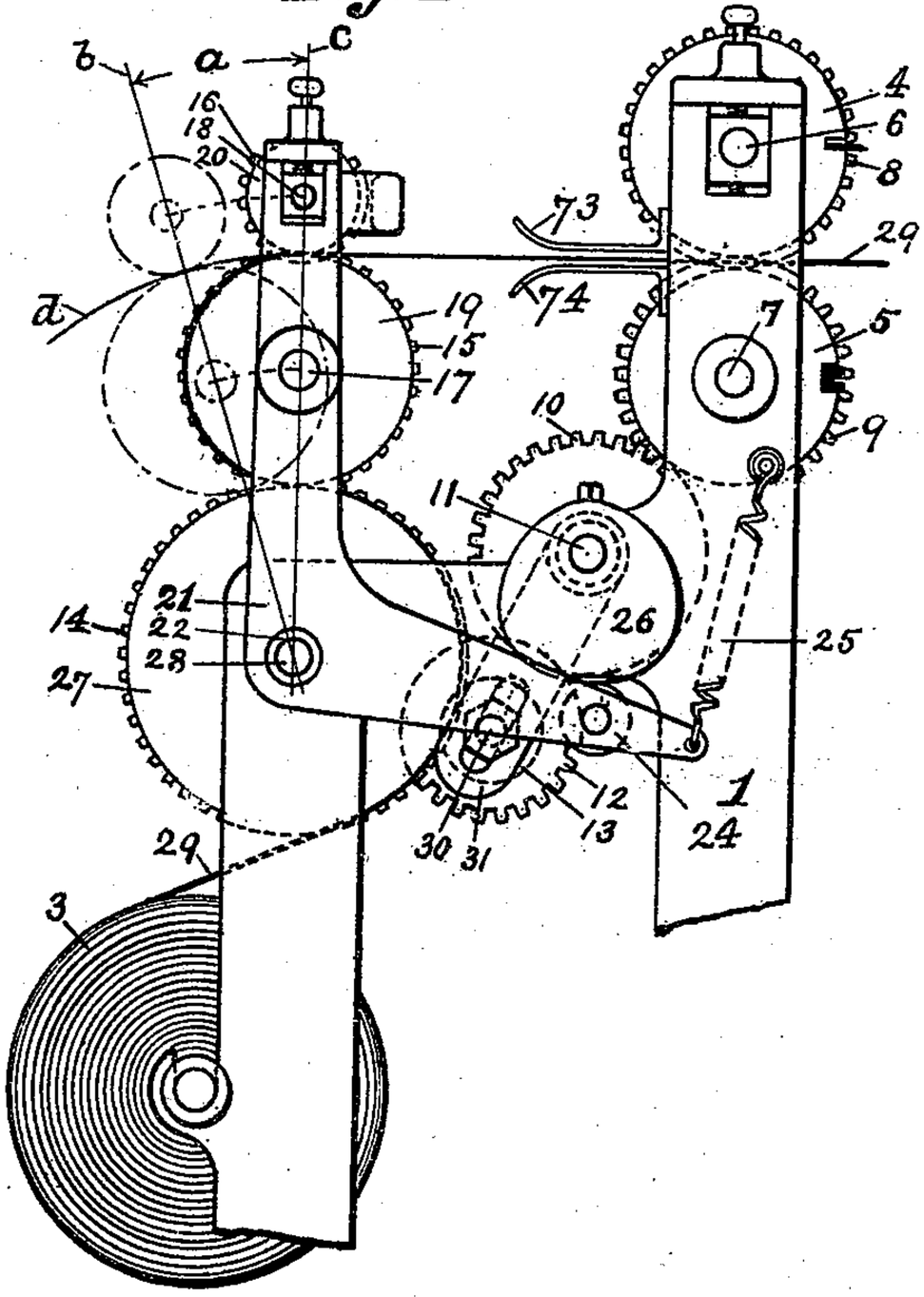
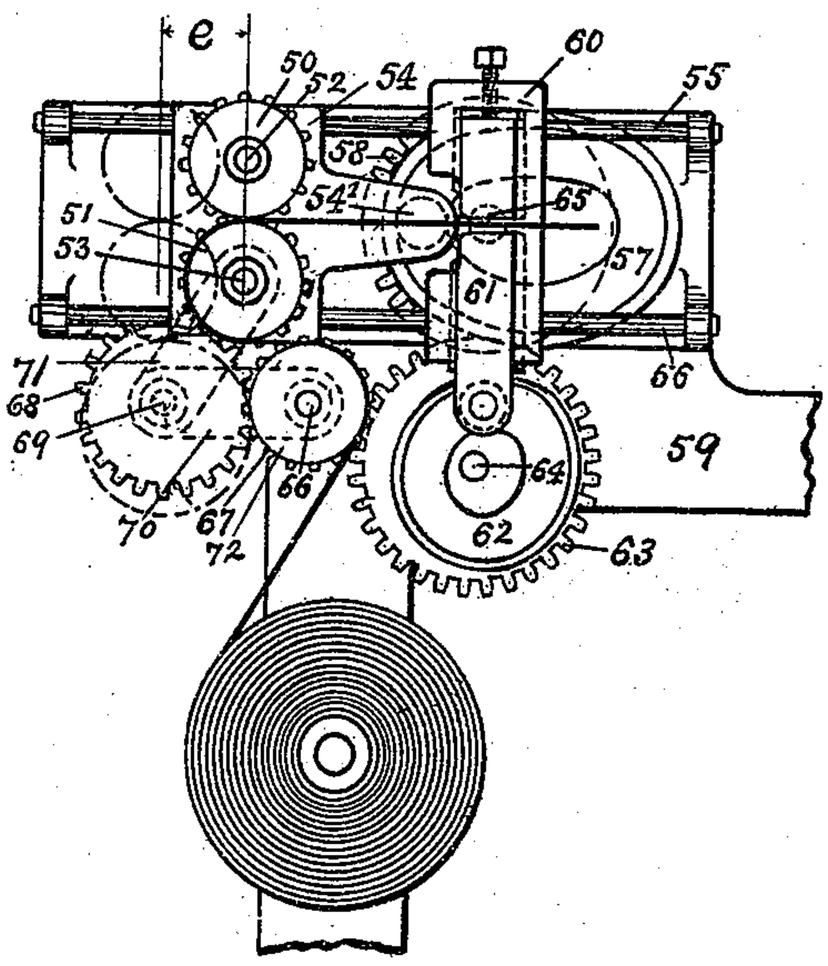


Fig. 4



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UNITED STATES PATENT OFFICE.

WILLIAM H. HONISS, OF HARTFORD, CONNECTICUT, ASSIGNOR OF ONE-HALF TO WILLIAM A. LORENZ, OF SAME PLACE.

FEED MECHANISM.

SPECIFICATION forming part of Letters Patent No. 501,603, dated July 18, 1893.

Application filed January 27, 1892. Serial No. 419,418. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. HONISS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Feed Mechanisms, of which the following description and claims constitute the specification and which are illustrated by the accompanying sheet of drawings.

This invention relates to that class of machinery in which it is desirable to feed a web, sheet, wire, or filament at an intermittent or irregular rate of speed, in order that any desired operation, such as printing, embossing, cutting, or folding may be performed thereon, without arresting or varying the surface speed of the roll or rolls from which the material is being drawn, and it consists in mounting the feeding rolls on a bed or slide which is capable of movement in a backward and forward direction relative to the general direction of the feed, and in being so connected with the gearing and mechanism by which the feeding rolls are operated, that the backward and forward movement of the bed or slide shall cause any desired retarding or accelerating effect to the material being fed, at the part where it is operated upon.

Figures 1 and 2 of the drawings are a plan and a side view respectively of my improvement adapted to the feeding and cutting off of varying lengths of material from a web by a rotating knife, the variations in length being obtained by the substitution of suitable change gears between the cutting and feeding rolls, and the rate of travel of the altered lengths being adapted to that of the knife at the moment of cutting off, while maintaining a regular surface speed of the roll from which the material is taken. Fig. 3 is a side view of a modification of my improvement, adapted to the cutting off of wire or of narrow material. Fig. 4 is a side view of another modification of my improvement, in which the feeding rolls are carried on a slide which moves backward and forward in a straight line.

The modifications shown in Figs. 3 and 4 are shown in side views only, as they will be readily understood without the use of additional views.

The numerals 1 and 2 indicate portions of the main frames which support my improved devices, and also support the roll of material 3 to be operated upon. The rotary cutting rolls 4 and 5 are secured to the shafts 6 and 7 which are driven by the gears 8 and 9 respectively. The gear 9 meshes with the gear 10 which is secured to the cam shaft 11, and transmits motion through the gears 12, 13, and 14 to the feeding roll gears 15 and 16 on the shafts 17 and 18 respectively. The shafts 6 and 18 are preferably mounted in boxes which are pressed down by springs in the usual manner. The shafts 17 and 18 are carried by the frame 21, which oscillates on the bushings 22 and 23 attached to the main frames 1 and 2 respectively. The frame 21 carries the roller or pin 24, which is held by the spring 25 against the periphery of the cam 26 on the shaft 11. As shown in Fig. 2 the cam 26 is so formed as to cause the frame 21 to oscillate to the extent indicated by the angle *a* between the lines *b* and *c*, which represent the centers through the feeding rolls at their extreme positions. The roll 27 is fixed to the shaft 28 and should be of a diameter equal to that of the pitch circle of the gear 14, when it is desirable that the web 29 shall be unwound from the roll 3 at a perfectly regular rate of speed, in order to avoid a jerky and irregular rotation of that roll. The cutting rolls 4 and 5 are of a less diameter than that of the pitch circles of their gears, and allow the web to move freely between them, excepting at the moment of cutting off. The intermediate and change gears 12 and 13 are fixed to each other and revolve on a stud 30 attached to the swinging yoke 31, and the length of sheet to be cut off at each revolution of the cutting rolls may be altered by removing one or both of the gears 12 and 13 and substituting therefor other gears which have a suitable number of teeth to give the desired feed at each revolution of the cutting rolls. When the length of sheet fed through is equal to the pitch line circumference of the gear 8 or 9 it is obvious that the web will travel at the same rate of speed as the knife, but when

a longer or shorter sheet is fed it is desirable to retard or accelerate the travel of the web at the moment of severance, so that it will equal the travel of the knife at that moment. To accomplish this for different lengths of sheets it is only necessary to alter the form of the cam 26, or to substitute therefor a cam having the proper form. In practice it is desirable to keep with each change gear a cam formed to impart the desired motion to the sheet fed by that gear.

Fig. 3 is a side view of a modification of this invention, adapted to feed wire or narrow webs of material, in which the rolls, being narrow, may be supported on one side of a single frame 32. This frame carries a shear 33 with a lower part 33′ driven by an eccentric 34 fixed on the shaft 35. On this shaft is also fixed a cam 36 which imparts the desired oscillating motion to the frame 37 which carries the rolls 38 and 39 fixed to the shafts 40 and 41 respectively. Motion is communicated in any of the usual ways to the gear 42 fixed on the shaft 35 and is transmitted to the feeding rolls 38 and 39 by means of the gears 43 44 45 and 46 fixed to the shafts 47 48 40 and 41 respectively. The roll 49 may be of a diameter smaller than that of the pitch circle of the gear 44 when it is not necessary or desirable that the material shall be drawn from the roll at a regular rate of speed.

In Fig. 4 the feeding rolls 50 and 51 are integral with their gears, and turn on the studs 52 and 53 respectively, fixed to the slide 54, which is reciprocated on the guide rods 55 56 by the face cam 57, fixed to the gear 58 and turning on the stud 65. The frame 59 supports the ends of the rods 55 and 56, and these rods support an embossing frame 60 having dies thereon, the lower one 61 being operated by a cam 62. The gear 63 is fixed to the cam 62, and they turn on a stud 64. The studs 64 65 and 66 are fixed in the frame 59. Motion is communicated to the gear 63 in any of the usual ways, and is transmitted to the gear 58 and also by means of the gears 67 and 68 to the feeding rolls 50 and 51. The gear 68 turns on a stud 69, which is fixed in one end of the link 70, the opposite end of which is pivoted loosely on the stud 66. A similar link 71 is loosely pivoted on the studs 53 and 69, the function of these links being to keep the gear 68 operatively connected with the gears 51 and 67 at all times during the forward and backward movements of the slide 54. On the stud 66 is the roll 72 which is represented as being of the same diameter as the pitch circle of the gear 67 in order that the material being fed shall draw from its roll at a uniform rate of speed. The slide 54 engages with a cam 57 by means of a projecting pin 54′ and is moved by that cam to the extent represented by *e*.

Referring to Fig. 2, as the feeding rolls 19 and 20 are moved backward from the position *c* to the dot-and-dash position *b*, the advance portion of the web is retarded to an amount equal to the length of that part of the arc *d* which is included in the angle *a*, plus the length of the arc describing that portion of the pitch circumference of the gear 14 which is included in the same angle *a*. The latter addition to the retarding effect is due to the circumstance that the gear 15 in moving back from the position *c* to that of *b*, and being in contact with the gear 14, is caused to roll backward to the extent represented by the arc described by the point of contact of the gears 15 and 14. In returning to the position *c* the rolls will accelerate the speed of the web 29 to an extent equal to the previous retardation, so that the amount or length of web fed forward during a complete revolution of the cutting rolls 4 and 5 will be the same as though the feeding rolls had remained in one position as *c* during that revolution.

In the arrangement shown in Fig. 3 it is necessary to stop the wire or web of material while the shear is closed, and to feed the proper length through while the shear is open. Also in the arrangement shown in Fig. 4 it is necessary to entirely arrest the motion of the web at the time it is engaged by the embossing device. Either of the modifications shown may be adapted to so arrest the motion of the advance portion of the web or wire during a considerable part of the time which elapses before the next recurring operation of the dies or knife, employing only the small remaining part of that time for feeding the proper length of the material forward.

A feature of the arrangement shown in Fig. 4 is that the amount of acceleration or of retardation communicated to the web or wire during any given period is equal to exactly twice the amount that the slide 54 is moved forward or backward during that period. This is due to the circumstance that the geared roll 51 moves in a straight line while retaining its operative connection with the gear 67, and that the rotative effect on the geared roll 51 of that straight line motion while so connected, communicates an accelerating or retarding effect to the web equal and in addition to that effect produced by the motion of the slide only.

In order to secure a constant rate of speed to that portion of the web which is being drawn into the machine it is necessary, as above stated, to have the diameters of the rolls 27 and 72 equal to the pitch or effective diameters of their gears 14 and 67 respectively, if those rolls are concentric with those gears. But any diameter of roll may be employed, or any fixed guiding surface substituted for the rolls 27 or 72 and the same results secured if those portions of the rolls or surfaces are so located that the web leads to the succeeding roll in substantially the same plane as indicated in Figs. 2 and 4.

It is obvious that wrapping connectors, such as belts or chains may be substituted for the toothed connectors herein shown, also that the mechanisms of Figs. 1, 2 and 4 may re-

ceive the web or sheet from another machine which delivers it at a uniform rate, instead of drawing it from a roll of the material as herein shown.

The desired motion of the frame 21, or slide 54, may be imparted by an eccentric or crank by means of any of the known link connections for modifying the motion as may be desired.

For greater clearness and to avoid circumlocution I designate the gears 13, 43, and 63, the "sources of motion" of the mechanisms of which they form a part, as they are the immediate sources from whence motion is transmitted to my devices.

The gears 14 44 or 67 in Figs. 2, 3 and 4 respectively, may be advanced by any step by step motion, such as the ordinary ratchet and pawl feed, at each stroke of the machine, instead of being driven by a uniform rotary motion as herein shown, without departing from the substance of this invention.

I claim as my invention—

1. A feed mechanism, consisting of geared feeding rolls carried on a bed or frame which has a reciprocating movement relative to the source of motion from whence those rolls are rotated, and a connecting gear 14 arranged and operating to maintain operative connection between those rolls and that source of motion during the reciprocation of the bed or frame and operating to increase the accelerating and retarding effect upon the material, beyond the effect that would be due merely to the reciprocation of the bed or frame, all substantially as described.

2. A feed mechanism consisting of feeding rolls carried on a bed or frame which is capable of movement in a direction transverse to the axial lines of the feeding rolls, and a cam arranged and operating to move that bed or frame in that transverse direction, whereby the rate of progression of the material being fed is intermittently arrested at that part which has passed the feeding rolls while maintaining a constant rate of progression at that part which is passing to the feeding rolls, all substantially as described.

3. A feed mechanism consisting of feeding rolls carried on a bed or frame, change gears by means of which the amount of material to be fed may be altered, and a cam or its equivalent operating to move that bed or frame whereby the rate of progression of the material being fed is intermittently arrested, substantially as described.

4. A feed mechanism for a printing or cutting machine, consisting of feeding rolls operatively connected with that machine and carried on a bed or frame capable of a reciprocating motion in the same general direction as that of the material being fed, and a cam arranged and operating to move that bed or frame at a suitable rate and time, whereby the material being fed is arrested while being operated upon by the printing or cutting mechanism, and whereby a suitable length of material is fed forward between the recurring operations of the printing or cutting devices, substantially as described.

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