

No. 879,368.

PATENTED FEB. 18, 1908.

R. CROMPTON.
WEFT REPLENISHING LOOM.

APPLICATION FILED MAY 1, 1905.

4 SHEETS—SHEET 1.

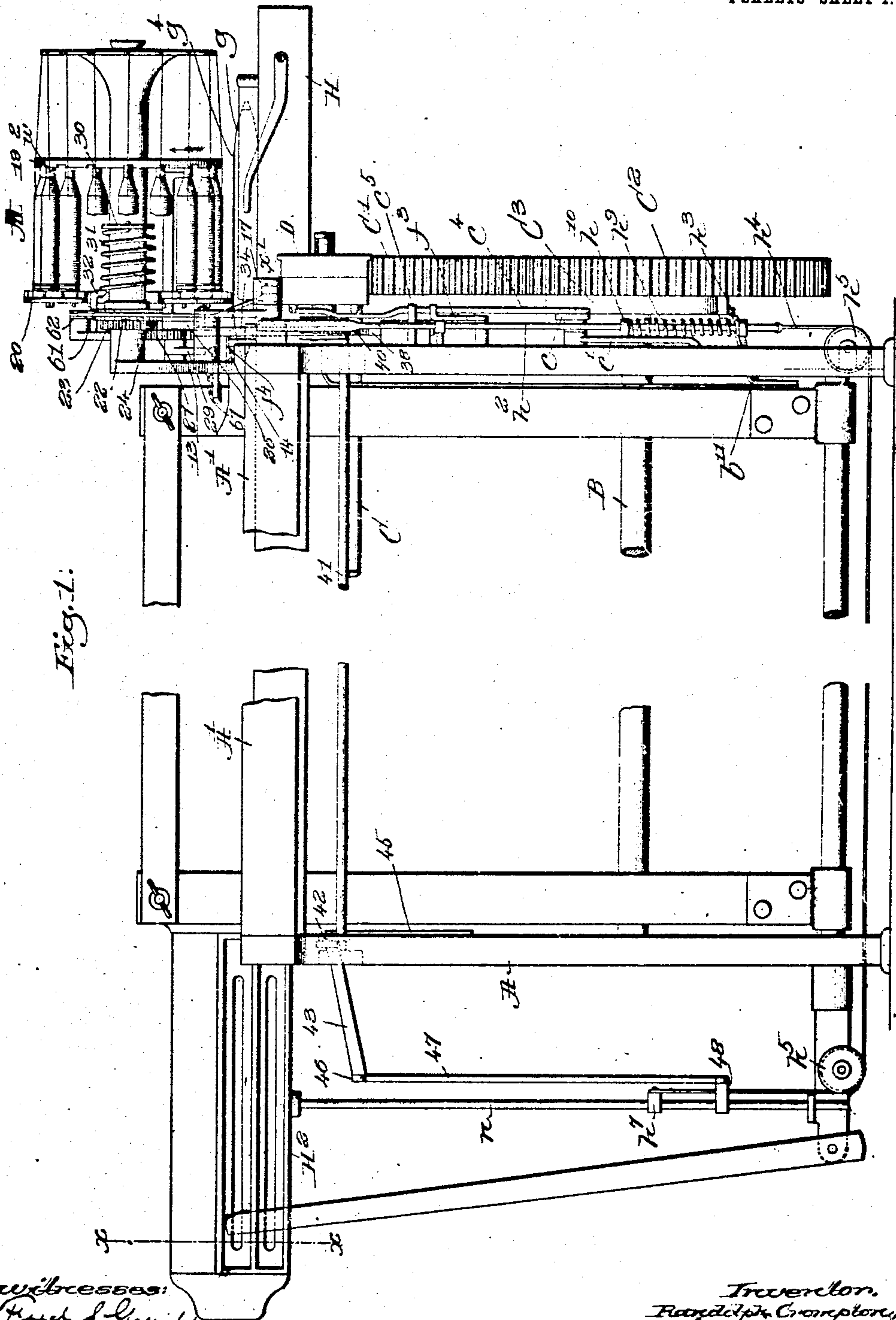


Fig. 1.

Witnesses:
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L. William Lutton.

Inventor.
Rudolph Crompton,
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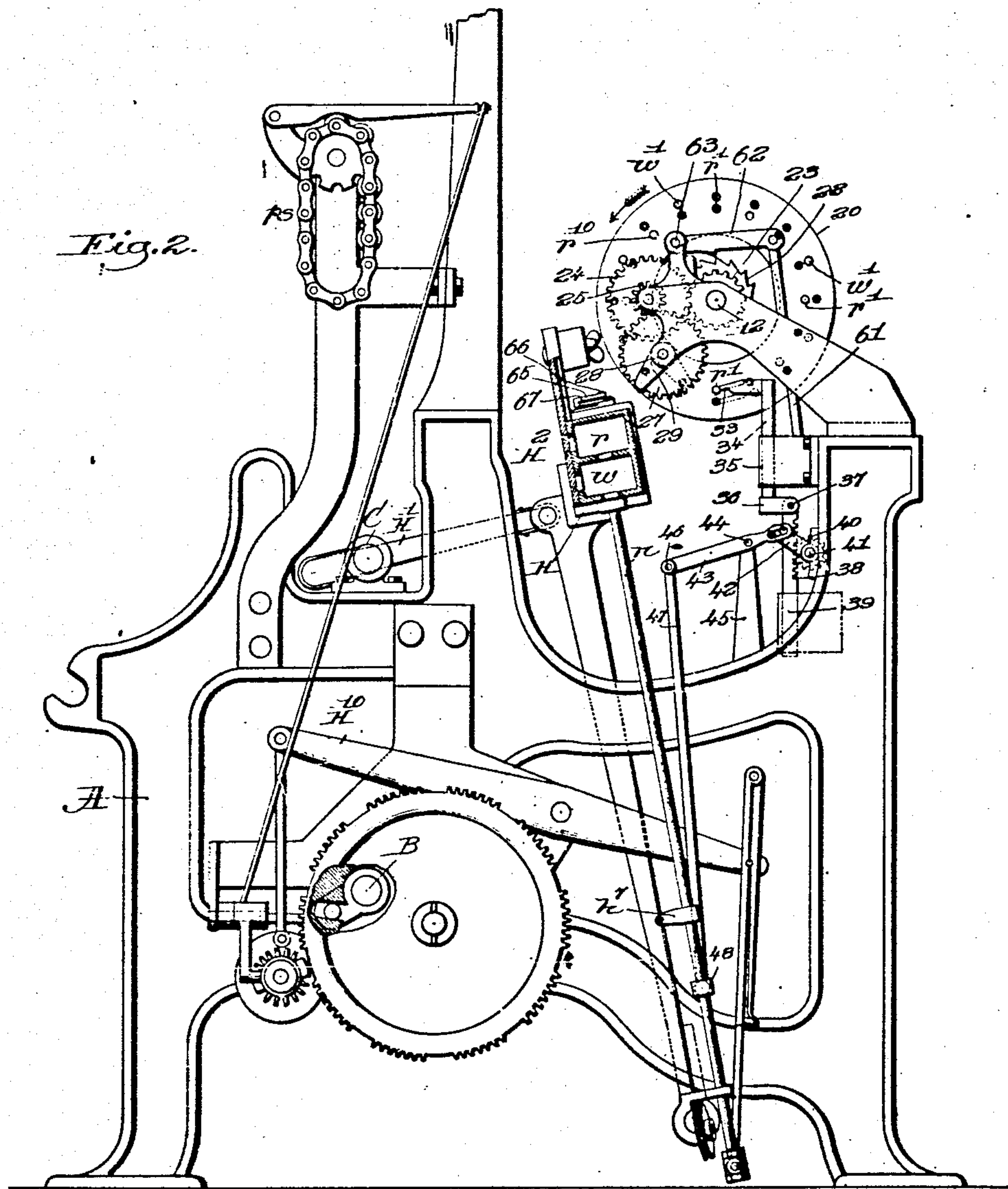
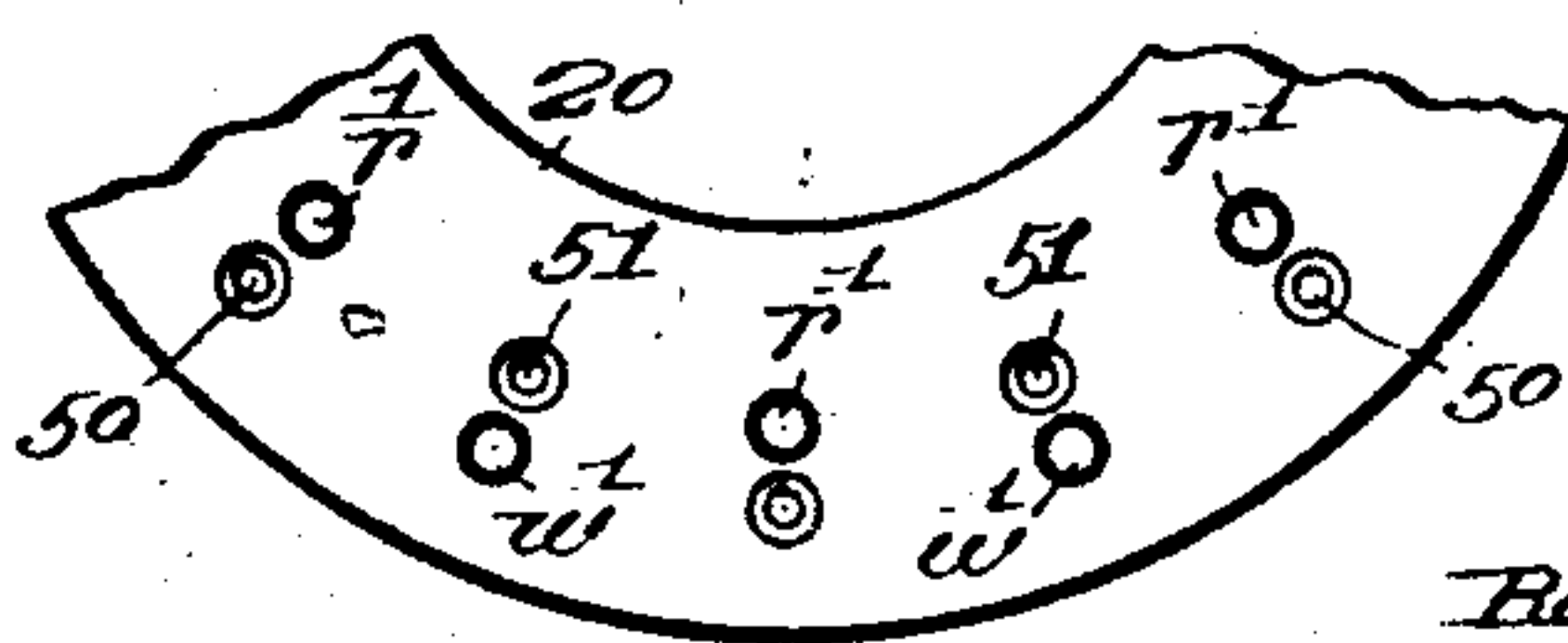


Fig. 2a



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4 SHEETS—SHEET 3.

Fig. 3

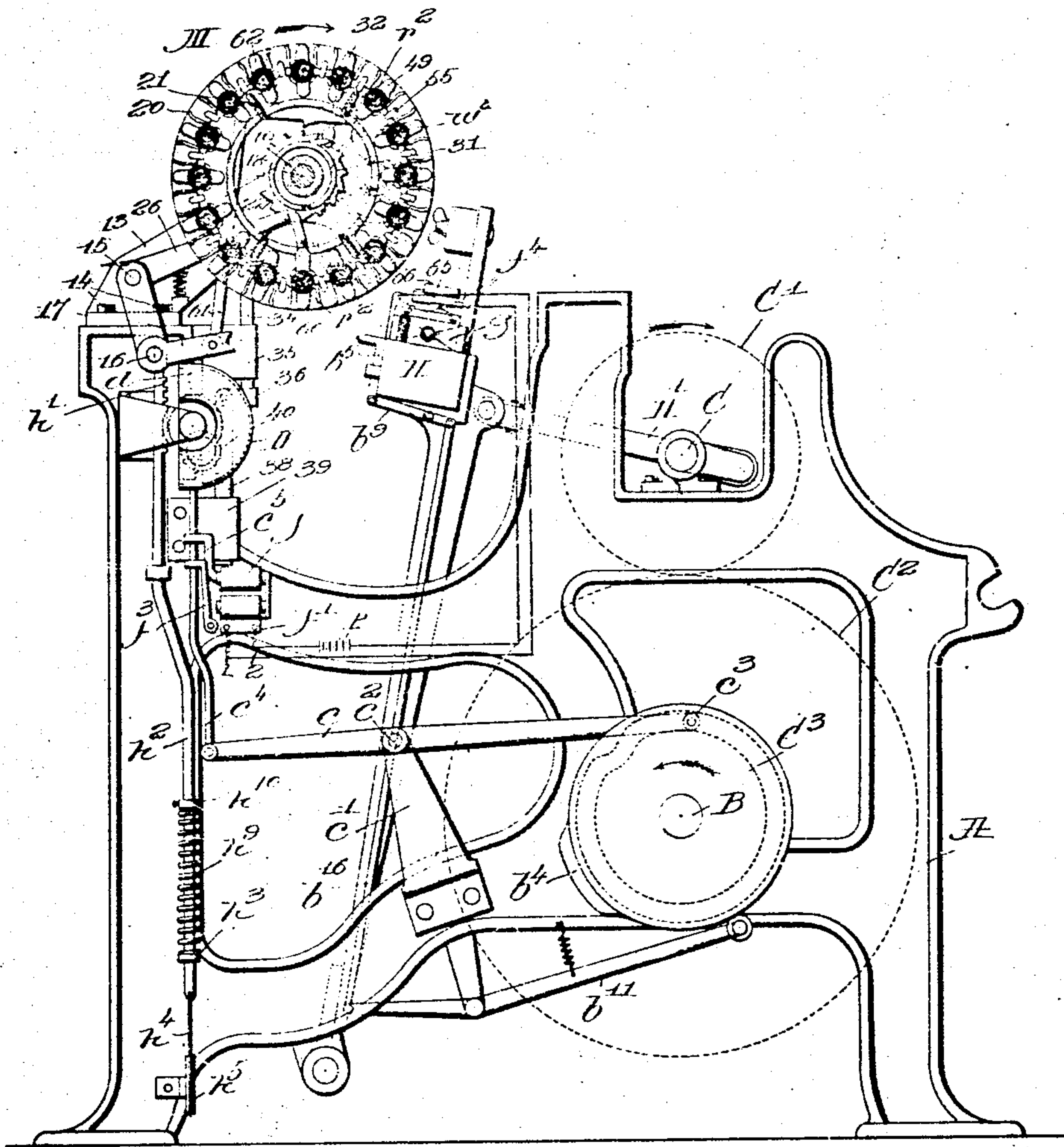
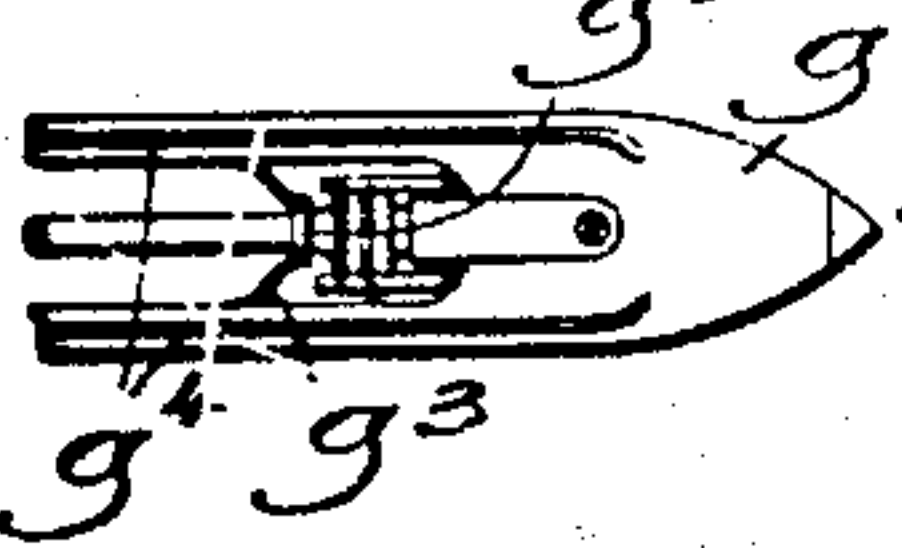


Fig. 3a



witnesses:
Fred. S. Grunke
S. William Lutton.

Fig. 3.

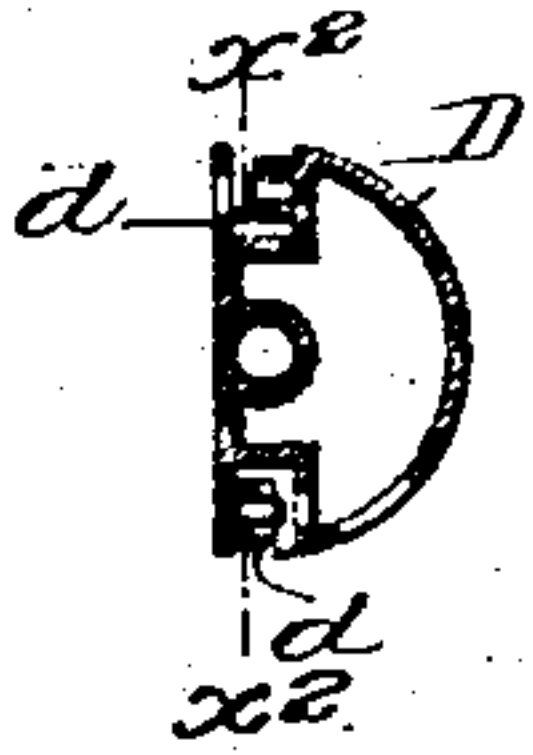
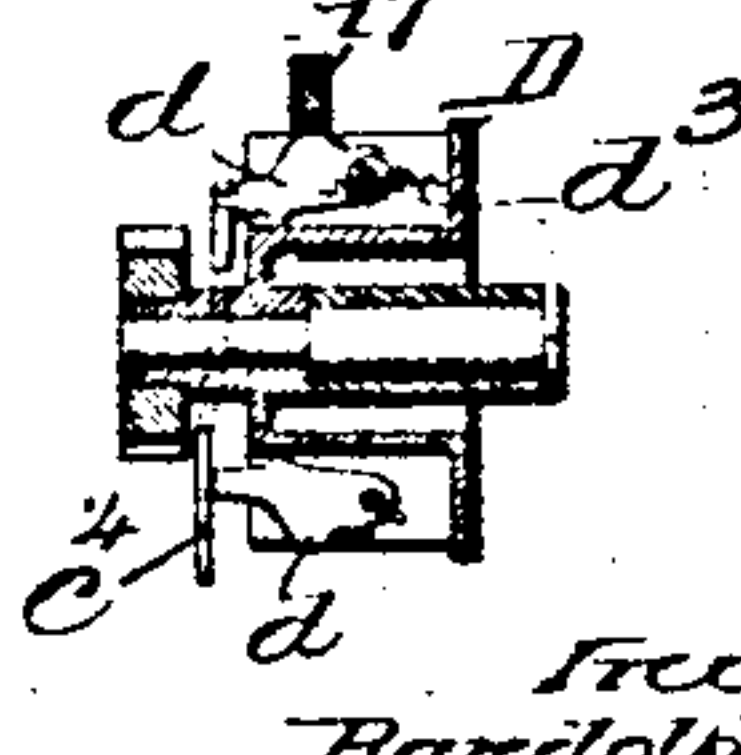


Fig. 39.



d. Frederick.
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4 SHEETS—SHEET 4.

Fig. 4.

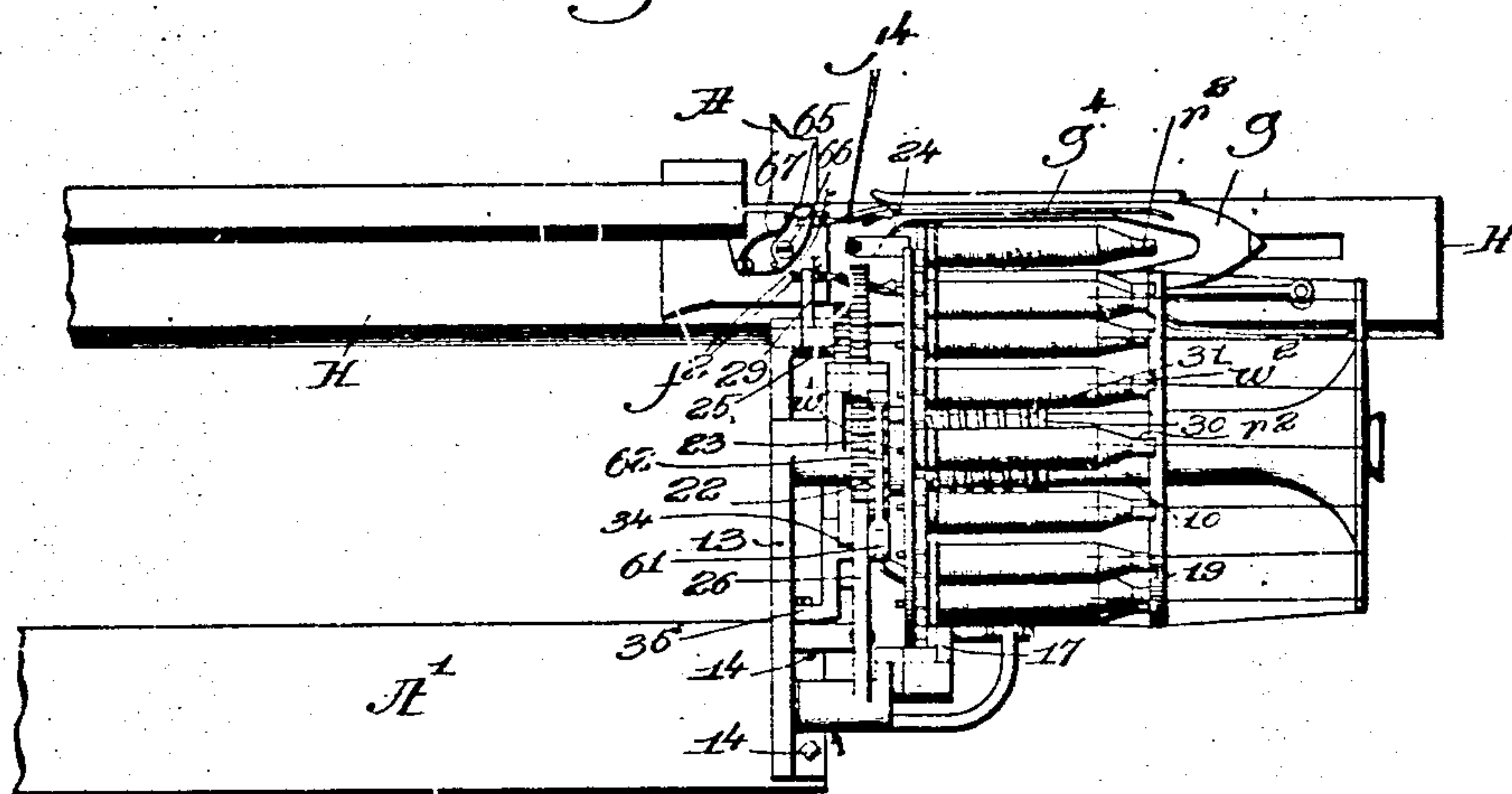


Fig. 5.

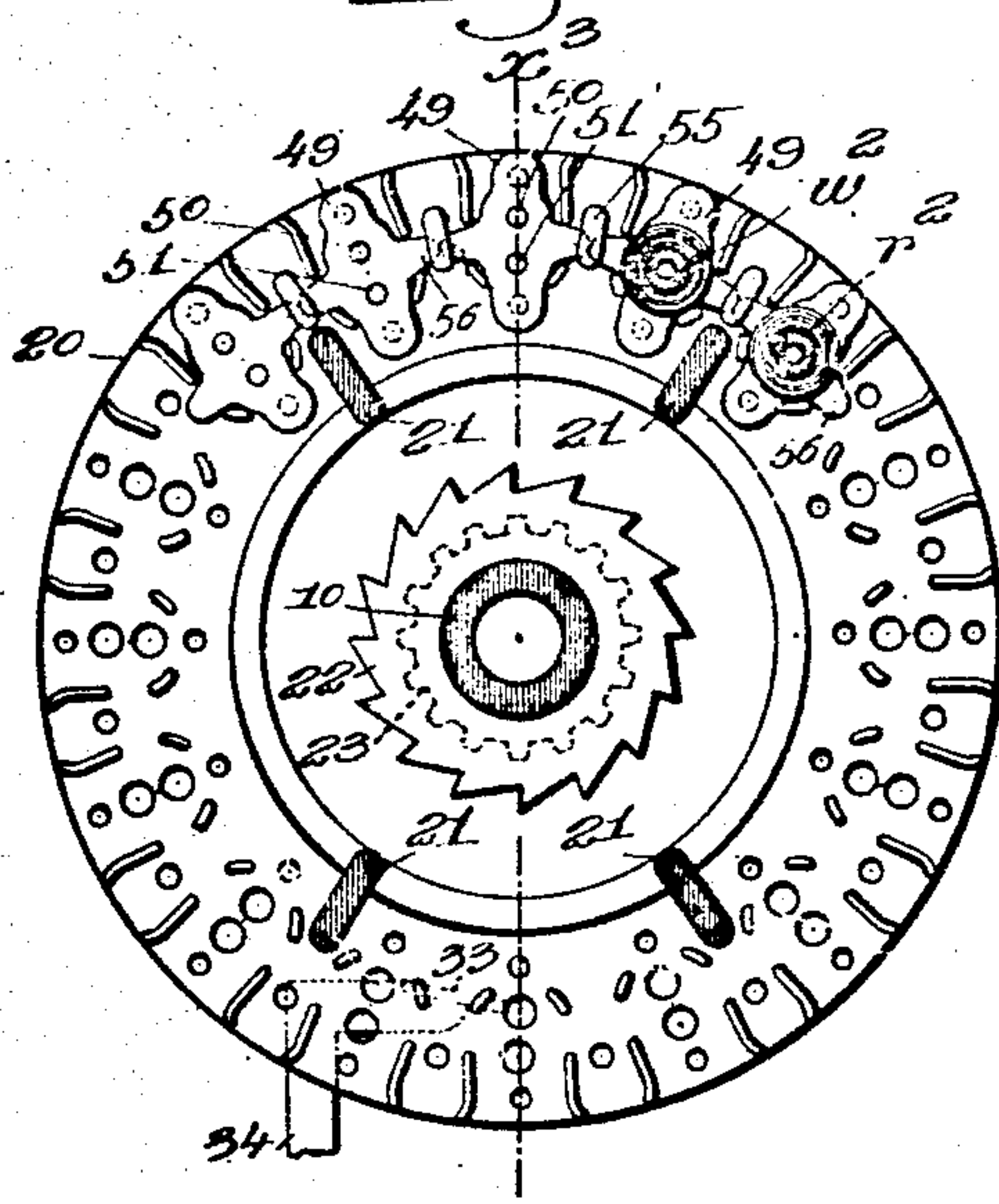
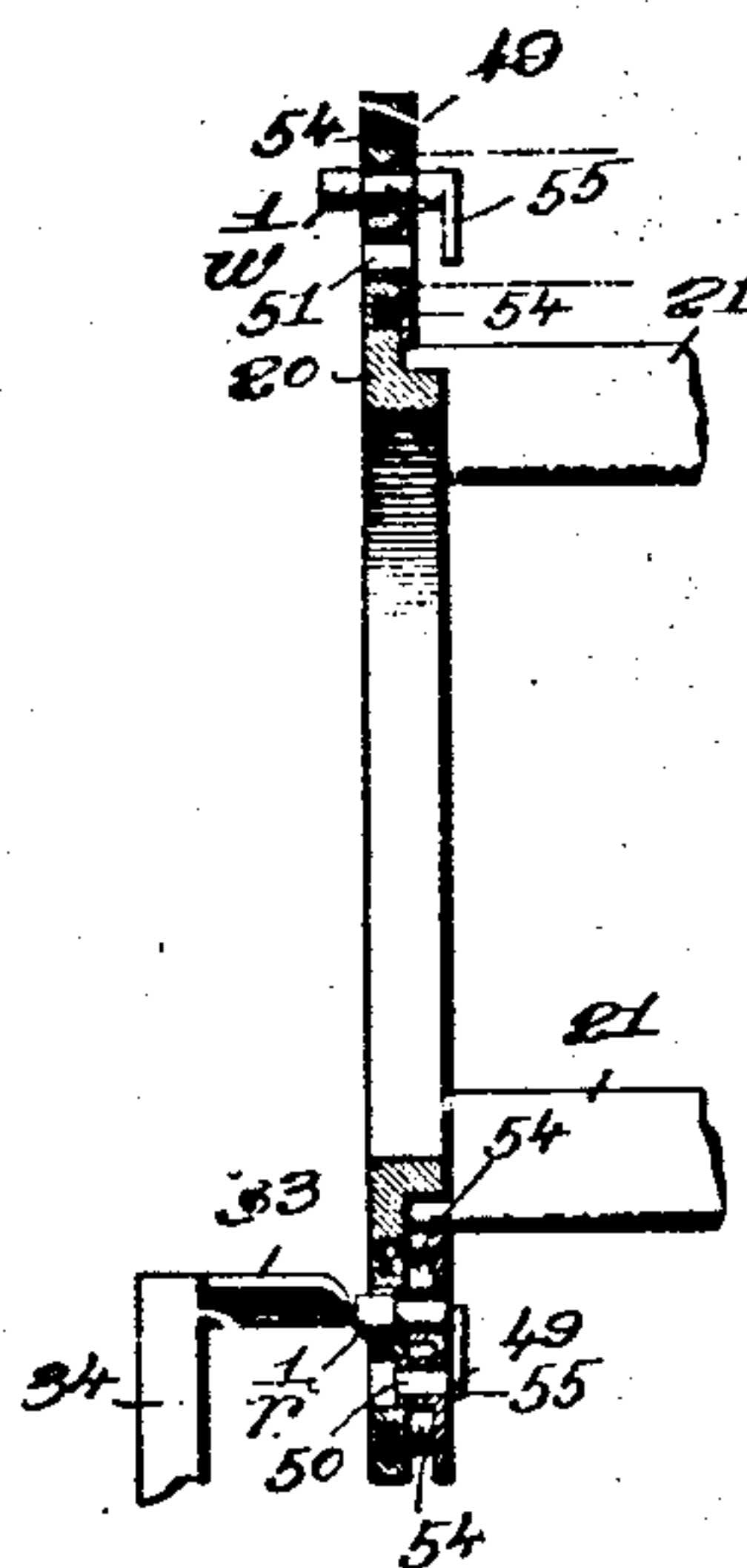


Fig. 6.



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UNITED STATES PATENT OFFICE.

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WEFT-REPLENISHING LOOM.

No. 879,368.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed May 1, 1905. Serial No. 258,150.

To all whom it may concern:

Be it known that I, RANDOLPH CROMPTON, a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Weft-Replenishing Looms, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawings representing like parts.

This invention relates to that class of loom employing shifting shuttle-boxes, each box containing a shuttle having filling differing in color or material from that in the other shuttles, and with which shuttle-boxes coact a filling-feeder having filling-carriers provided with filling corresponding with the filling used in the different shuttles controlled by the shuttle-boxes.

A patent of the United States, No. 600,053, dated March 1, 1898, shows a loom provided with a filling-feeder such as referred to, which through connections with the shuttle-boxes (said connection including gears) is moved in unison with said shuttle-boxes whereby a filling-carrier having a filling corresponding in color or character with the filling in whatever shuttle is acting, may be maintained in proper position to be put into the acting shuttle whenever the filling is fully exhausted from the filling-carrier then in the shuttle, or whenever the filling breaks. The filling-feeder referred to is oscillated for every change of position of the shuttle-boxes irrespective of the condition or amount of filling in the acting shuttle.

In looms for weaving check gingham, for which the loom herein referred to is more particularly adapted, it is necessary for the production of perfect cloth to obviate leaving a short shot of filling in the cloth as the same is especially noticeable when weaving in colors, and consequently to obviate short filling the indication for change of filling must be made just prior to exhaustion of filling in the acting shuttle.

Patent No. 692,933, dated February 11, 1902, shows a loom of the class referred to having provision for effecting a change of filling from the filling-feeder into the acting shuttle prior to complete exhaustion of the filling therein to thus enable the loom to produce perfect cloth, but in said Patent No. 692,933, the filling-feeder having groups of

filling-carriers is moved in unison with the shuttle-boxes as provided for in United States Patent No. 600,053. In my studies to improve and simplify this class of loom and increase its speed I have provided a filling-feeder that is unconnected with the shuttle-boxes and consequently stands normally at rest during the weaving of the cloth so long as the filling is not exhausted.

The filling-feeder in my improved loom is to be moved prior to practical exhaustion of the filling in the acting shuttle, at which time the filling-feeder is moved to bring it in co-acting relation to the particular shuttle having filling corresponding with the filling in the shuttle which is to be replenished or in other words the filling-feeder is moved only after a detector has indicated that the filling in an active shuttle is practically exhausted, the movement of the filling-feeder being then for a greater or less distance to place a filling-carrier having filling of the desired color or character in position to be transferred into the active shuttle at the next forward beat of the lay after the shuttle, which has caused the indication, has been returned to the filling-feeder end of the lay. Furthermore, it is of great advantage to retain the feeder normally stationary for the reason that it may be readily supplied with filling-carriers, which would be a very difficult task were the carriers moved in unison with the shuttle-boxes; and also in my invention by simply changing the stops to be described in their position in one or the other holes of the bases any number of filling-carriers, of either color, may be readily applied to the feeder, which will ordinarily contain from sixteen to twenty-four filling-carriers, and one or more carriers of one color might be placed in the feeder and all the other carriers be of a different color; or in other words the weaver may supply the same with filling-carriers to correspond with the particular pattern being woven. As, for instance, if the pattern being woven calls for a much greater quantity of filling of one color from that of another color the skilled operative can supply the filling-feeder with filling of the required colors in an approximating ratio, and in so doing not only greatly increase the capacity of the loom but also increase the output thereof.

Figure 1 in front elevation, broken out

centrally, shows a sufficient portion of a loom embodying my present improvements to enable my invention to be understood; Fig. 2 is a left hand end view of the loom with the picker-stick omitted, the shuttle-boxes being in section on the line x , Fig. 1, said figure also showing a shuttle-box actuating mechanism and a pattern surface; Fig. 2^a, on a larger scale, shows a part of the inner end of the feeder with a stop applied in some of the holes; Fig. 3 is a right hand elevation, the filling-feeder being in section; Fig. 3^a, a detail showing in top view part of a shuttle; Fig. 3^b, a section of the indicator D on the line x' , Fig. 1; Fig. 3^c, a section on the line x'' , Fig. 3^b; Fig. 4 is a partial plan view showing the filling-feeder and part of the lay with its single shuttle-box, a shuttle being contained therein; Fig. 5 is an enlarged detail of the filling-feeder; and Fig. 6 is a section on the line x'' , Fig. 5.

The loom frame A, the breast beam A', the cam-shaft B, the crank-shaft C, the gears C' and C'' between said shafts, the lay H having the usual reed, the lay connecting rods H', said lay having, as shown at its right hand end, viewing Figs. 3 and 4, a stationary shuttle-box, and at its left hand end shifting shuttle-boxes H'' represented as having but two cells and carried by a shuttle-box n , the transferrer 26 are and may be all substantially as described by like letters in United States Patent No. 600,053, dated March 1, 1898, and it will be understood that in practice the shuttle-box rod and shuttle-boxes are shifted by a lever H'' moved at the desired time by usual shuttle-box actuating mechanism which may be such as shown in said Patent No. 600,053, or by any other usual form of mechanism commonly employed for moving a shuttle-box lever to control the position of the different cells of the shuttle-box and place each cell at the proper time at the level of the race of the lay as called for by the shuttle-box pattern-surface ps which may be of any usual construction.

Patent No. 600,053, shows a shifting shuttle-box having three cells, whereas, in the manner in which I have herein chosen to illustrate my invention the shuttle-box is represented as having two cells capable of handling two shuttles having filling differing in color or material. The invention to be herein described is not, however, limited to the number of cells in the shuttle-box so long as there is more than one cell, and it will be understood by those skilled in the art of weaving that the shuttle-box lever used will be moved in usual manner and by usual devices commonly employed to move a shuttle-box of whatever number of cells, such mechanism as that used on the well known Crompton loom for weaving ginghams.

The cam-shaft, see Fig. 3, the cam C³ con-

nected herewith and provided with a cam-groove shown by dotted lines, the roller c^3 , the lever c pivoted at c^2 on a stand c' , the actuator or rod c^4 , the guide-arm c^5 , the indicator D having several recesses in each of which is pivoted a dog or lifter d having each a connected spring d^3 , the shuttles g open from their top to their bottom sides for the passage therethrough of a filling-carrier w^2 , r^2 , best shown in Figs. 3^a and 4, and having a metallic conductor g^5 thereon adapted to be acted upon by detectors g^3 shown as springs carried by the shuttle and acting against said conductor prior to complete exhaustion of the filling, the metallic strips g^4 applied to said shuttle, the spring-fingers f^4 to contact with said strips as the shuttle enters the single shuttle-box; the bracket f' , the electro-magnet f , the armature f^3 having a hole to embrace loosely the actuator or rod c^4 , the wires 1 and 2 connecting the usual binding posts of the electro-magnet, and the terminals f^2 to which the fingers f^4 are attached, the battery P, the gear connected with the hub of the indicator D, the rod h^2 having the rack h' engaging said gear, the collar h^{10} , the spring h^9 surrounding said rod between said collar and the guide h^3 , the cord h^4 , and sheaves h^5 over which said cord is extended, said cord at the left hand end of the loom, as herein shown, being connected with a collar h^7 carried by the shuttle-box rod n , the cam b^4 , the lever b^{11} actuated thereby and connected by rod b^{10} and lever b^9 with the bunter b^5 , which is thus made vertically movable at the front of the lay, are and may be all as indicated by like letters in United States Patent No. 692,933, dated February 11, 1902, with the exception that herein the indicator D is shown as semi-circular instead of circular and has but two dogs or lifters d , for the reason that, as stated, the present drawing embodying my invention shows a shifting shuttle-box with but two cells. It will, however, be understood that the indicator will, in practice, have a dog or lifter d for each cell of the shifting shuttle-box, whatever the number of cells, and also that the indicator will be moved by the rod h^2 , and the dogs or lifters d will be moved by the rod or actuator c^4 controlled by the electro-magnet prior to complete exhaustion of the filling in the acting shuttle, all as and for the purposes set forth in the last named patent.

The indicator by its connection with the shuttle-box rod is moved in unison with the shuttle-boxes, the dogs or lifters will be actuated in the time and for the purposes set forth in Patent No. 692, 933, and the change of position of the bunter to place it in position to meet the raised dagger as the lay is moved forward after the filling-feeder to be described has been unlocked and moved and stopped by the arresting device to be described, said bunter meeting said dagger and

causing the transferrer to effect a change of the filling in the active shuttle as stated in the last named patent.

While the mechanism shown in Patent No. 692,933, is well adapted for actuating the transferrer 26, common to both said patents, to take a filling-carrier from the filling-feeder therein shown and put it into the active shuttle in which the filling is nearly exhausted, instead of the filling-carrier then in said shuttle, discharging said substantially exhausted filling-carrier through the bottom of the shuttle, I desire to state that this invention is not limited to the particular detecting mechanism shown, and instead I may, without departing from my invention, employ any usual detecting mechanism, either electric or mechanical, adapted to indicate prior to complete exhaustion that the filling in the active shuttle needs to be replaced, or that said active shuttle needs to be provided with another filling-carrier in time to insure the production of perfect cloth.

The hub 10 of the novel filling-feeder M is loosely mounted on a stud 12 extended from a stand 13 secured on the loom side by bolts 14. The transferrer 26 is mounted on a second stud 15 of said stand, and to the arm of said transferrer I have pivoted at 16 a dagger 17 under the control of the indicator D, which latter lifts the dagger, as provided for in United States Patent No. 692,933, when the dagger is to be struck by the bunter l^5 connected with the lay as the latter is moving toward the breast-beam at that beat at which the transferrer 26 is to be actuated, as provided for in the last named patent, to transfer a filling-carrier from the filling-feeder or creel into the active shuttle then in the single shuttle-box of the lay, the latter being in its forward position. The outer end of the disk 19 of the filling-feeder is connected with the inner ring-shaped end 20 thereof by bars 21, and the inner side of the outer disk is grooved, in usual manner, for the reception of the delivery ends of the usual filling-carriers sustaining masses of filling, and there is extended from the outer end of the feeder, or creel, the usual circular flange to which is attached the end of the filling connected with the filling masses. The inner end of the hub of the filling-feeder has an attached ratchet-toothed gear 22, and alongside thereof is fixed a pinion 23. The hub of the feeder has an attached collar 30 with which is connected one end of a feeder moving device 31 shown as a coiled spring, the opposite end of said spring being attached to a stud 32 fixed on the stand 13.

The device 31 acts normally to turn the filling-feeder about the stud 12 in the direction of the arrows preparatory to actuating the transferrer 26 to replenish the active shuttle, said feeder being arrested with the

filling-carrier to be transferred from the filling-feeder into the active shuttle by a novel arresting device herein shown as a finger 33 extending laterally from a rod or shank 34 free to be slid in a guide 35 extended inwardly from the breast beam. The lower end of the shank 34 is provided with a fixed collar or arm 36 with which is jointed at 37 a depending toothed leg 38, the lower end of which slides in a guide-block 39.

The leg of the arresting device is shown as located at the end of the loom where the filling-feeder is mounted, and the teeth of the leg are engaged by a pinion 40 on a shaft 41 extended under the breast-beam to the shuttle-box side of the loom where said shaft is provided with an arm 42 having, as shown, a pin that enters a slot in the end of a lever 43 pivoted at 44 on a stand 45 sustained at the loom side. This lever, bent laterally, see Fig. 1, has jointed to it at 46 a rod 47, the lower end of which is in turn secured loosely to a block 48 secured to the shuttle-box rod n .

The arresting device 33, it will be seen, is raised and lowered in unison with the shuttle-boxes, it occupying its elevated position, see Fig. 2, when the cell r of the shuttle-box, which may be supposed to contain the shuttle-supplying say a red filling, said device occupying its lowered position, as shown by dotted lines, when the cell w , that may be considered as receiving the shuttle containing white filling, occupies a position at the level of the race of the lay.

The pivot 44 of the lever is so located that the extent of movement of the arresting device is much less than that of the shuttle-boxes, and so that the finger 33 will occupy a definite position with relation to certain stops, to be described, carried by the filling-feeder according to which cell of the shuttle-box is at the level of the race of the lay, and this finger remains in each of its positions so long as one or the other of the cells of the shuttle-box occupies a position at the level of the race of the lay. The filling-feeder, as herein described, must contain filling-carriers provided with filling differing in color or in character, as say red and white, and as I have illustrated my invention I apply the filling-carriers having filling differing in color or material, as will now be described.

Referring to Figs. 5 and 6, where the inner ring-shaped end 20 of the filling-feeder is shown enlarged, it will be noticed that said ring is provided with a series of stops comprising a base 49 provided with two holes 50 and 51 in one of which I place either of the two projections w' or r' , maintained, as herein provided for in their operative position or extended beyond the inner end of the feeder by the filling-carriers w^2 , r^2 . The projections w' are applied to the holes 50 while the

projections r' are applied to the innermost holes 51, and but one stop will be put in one of the two holes of each base.

The inner side of the ring 20 is provided with a series of cavities in which are placed springs 54, there being two such springs interposed between the ring 20 and the ears of the base, as shown in Fig. 6 and by dotted lines in Fig. 5, said springs acting normally to move the stops inwardly as indicated at the bottom of Fig. 6, where a stop is shown in its inoperative position. At the inner side of the ring 20 I have mounted a series of shoulders 55 having overhanging lips against which may contact the ears 56 of the base 49 under the action of the springs 54.

The projections w' , r' , are alike. I may employ a set of stops in which the projections w' occupy a position in holes 50 most distant from the longitudinal axis of the filling-feeder to indicate, for instance white filling, and the stops having the projections r' in the holes 51 occupy a position nearer the longitudinal axis of the filling-feeder, to indicate, for instance red filling. These two series of stops are fully shown in Fig. 2^a and partially in Fig. 2, and it will be understood that there will be as many circular rows of stops as there are cells in the shifting shuttle-box, and that the projections w' , r' , will when the loom is started be applied preferably alternately in the holes 50 and 51, i. e. a projection w' in one hole in one base and a projection r' in the other hole of the next base, so that all the projections corresponding with a particular color of filling will occupy alternate holes of one circular series of holes, and other projections of stops indicating another color of filling will occupy alternate holes of another circular series of holes.

As the filling-feeder is being supplied with filling-carriers I may insert first a carrier having white filling and then a carrier having red filling, and the head end of each carrier as it is applied to the filling-feeder will act against the base of a stop and will project from the inner end of the filling-feeder the projection carried by said base, thus putting said stops in their operative positions, and said stops will remain in their operative positions so long as they are held projected by a filling-carrier in the filling-feeder. Whenever a filling-carrier is ejected from the filling-feeder it releases a stop so that the springs 54 thereof retract the stop and move it to the right, see the underside of Fig. 6, thus placing the stop in its inoperative position. These stops, when the filling-feeder is turned after unlocking the same, strike the arrester 33, described, which is moved in unison with the shuttle-boxes, and when the cell r of the shuttle-box is at the level of the race of the lay the arrester 33 stands in the path of movement of a pro-

jection r' , and a red filling will be placed in position under the transferrer, and viewing Fig. 2 when the shuttle-box is raised to place the cell w opposite the race of the lay, the arrester will be lower and put in the path of movement of the projection w' , and a filling-carrier having a white filling corresponding with the filling in the shuttle which is contained in the shuttle-box cell w will be put in position under the transferrer.

The dagger 17, see Fig. 3, has jointed to it at 60 a link 61 in turn jointed to a pawl 62, pivoted at 63 on the stand 13, or on some other fixed part of the loom. The tooth of this pawl engages the teeth of the ratchet toothed wheel 22, and holds the filling-feeder locked or stationary during the shifting of the shuttle-boxes in the process of weaving, as called for by the shuttle-box pattern-surface or chain, so long as the active shuttles, of whatever number, being thrown across the lay from one to the other box are supplied with filling. I may use any usual picking mechanism common to looms for actuating the shuttles.

The feeder locking device is moved or raised to release the ratchet toothed-wheel and permit the device 31 to move the filling-feeder in the direction of the arrow only after the movement of the indicator D, as provided for in said Patent No. 692,933, said indicator being made operative only after the detector, of whatever form, has indicated that the filling in an active shuttle is nearly or substantially exhausted. Whenever the locking device is moved to unlock the filling-feeder the device 31 will act to turn said feeder in the direction of the arrow until a projection r' or w' of one of the series of stops meets the arresting device 33, it then occupying a position calling for either a red or a white filling, so that said arresting device receives against it one or another of said projections according to the position of the arresting device determined by which cell of the shuttle-box is at the level of the race of the lay.

The filling-feeder will be moved by the device 31 for a greater or less distance according to the number of stops maintained in operative position by filling-carriers, the movement being for a less distance when the filling-feeder has its full supply of filling-carriers and all the stops are in their operative positions, than when a number of filling-carriers have been taken from the filling-feeder and permitted the stops to be moved into their inoperative positions. After the filling-feeder has been turned until a stop has met and been arrested by said arresting device 33 and the transferrer has been moved to effect a change of filling, the filling-feeder for the best results should be returned to its normal position to rewind the spring 31 prior to again releasing the filling-feeder to

bring the called for filling-carrier of whatever color in position to be moved by the transferrer in to the active shuttle. To effect this restoration of the filling-feeder to its normal position, I have shown restoring mechanism herein illustrated as a gear 24 in mesh with the pinion 23, carried by the filling-feeder, said gear 24 having a connected pinion 25 that is engaged by a gear 27 having its pivot at 28 and provided with an arm or projection 29.

Viewing Figs. 2 and 3, it will be seen that the filling-feeder occupies its normal position with the spring 31 wound up, and with the point of the arm 29 of the restoring mechanism directed backwardly toward the lay.

Now let it be assumed that the detector acts because the filling in the shuttle in the cell *r* is nearly or substantially exhausted. This exhaustion will result in the movement of the rod *c'*, as provided for in Patent No. 692,933, to raise that one of the lifters *d* of the indicator D then over it, that depending on the position of the indicator which is moved in unison with the shuttle-boxes, and the lifter *d* will raise the dagger from the position, Fig. 3, and put the same in the path of the bunter, and at the same time the locking device will be moved to release the filling-feeder and let the spring 31 turn the same in the direction of the arrow, Fig. 2, which it will do unless a stop corresponding with the color of the filling called for is not at such time already practically in contact with the arrester 33, which is the case in Fig. 2 in which condition the filling-feeder will not be moved by the spring 31.

The filling-feeder is released by raising the dagger while the lay is on its back-stroke after the necessity of change of filling has been indicated by the detector and while the acting shuttle was in the single shuttle-box, and while said feeder is released the shuttle containing the nearly exhausted filling is thrown back into its own cell of the shifting shuttle-box. As the shuttle, having the filling which is to be changed, again returns to the single shuttle-box as provided for in the last mentioned patent, the lay in its forward movement, the dagger being lifted and the filling-feeder being unlocked and one of the stops, as *r'*, being in contact with the arrester, the bunter will meet the dagger and move the transferrer, causing the latter to transfer a filling-carrier from the feeder into the shuttle, and at the same time the dagger will depress the dog or lifter then under it, as provided for in Patent No. 692,933, and as the lay starts back the tooth of the pawl again engages the ratchet-wheel and locks the filling-feeder. Now suppose that a filling-carrier having red filling has been inserted in the shuttle carried in the cell *r* of the shuttle-box, and consequently the projection *r'*, which was effective as above

described and shown in Fig. 2, has been retracted by the springs 54, the filling-feeder cannot move because it is held by the locking device. Now suppose that instead of a projection *r'* occupying a position practically in contact with the arrester 33, as in Fig. 2, when the filling-feeder was unlocked, said stop occupied the position indicated by *r''*, then when the dagger is raised the locking device is moved to release the filling-feeder, the spring 31 will immediately act and turn the filling-feeder in the direction of the arrow until the stop marked *r''* meets the arrester. During this movement of the filling-feeder the restoring mechanism described will be moved and will turn the arm 29 forwardly for a greater or less distance, that depending upon the extent of movement given to the filling-feeder by the spring, the extent of such movement varying due to the position of the projection in the inner circle of holes of the bases of the stops.

The lay, Fig. 4, is provided with a dog 65 mounted on a stud-screw 66, and acted upon by a spring 67. As the lay is moved forward to actuate the dagger the dog passes the arm 29 in whatever position it is put by the turning of the filling-feeder under the action of the spring 31, but when the lay returns on its back stroke the end of the dog acted upon by said spring meets the right hand side of the arm 29 and turns the same and the train of gearing described, causing the gear 24 in engagement with the pinion 23 to turn the filling-feeder backwardly and wind up the spring 31 restoring the filling-feeder to its normal position.

From the foregoing description, and as provided for in Patent No. 692,933, it will be understood that should a shuttle become practically exhausted on reaching the single box side of the loom, the described electric circuit will be completed to place the rod *c'* in position to raise a lifter *d*, as explained, on the back stroke of the lay, and said lifter will raise the dagger and unlock the filling-feeder and the latter will be moved by spring 31 until a stop representing the color being called for meets the arrester. The practically exhausted shuttle will be picked to the drop-box side of the lay, and as the lay is next moved forward the bunter is put in its inoperative position and consequently the dagger is not struck and the transferrer remains at rest. At the next forward beat of the lay the shuttle which is to receive fresh filling having been picked onto the single shuttle-box, the bunter having been, in the meantime, put into its operative position will strike said dagger and effect a change of filling. Should, however, the drop-boxes be moved after throwing the practically exhausted shuttle into a cell of the shifting shuttle-box, so that another shuttle-box brings its shuttle into play, it becomes neces-

sary to suspend the action of the filling-changing mechanism through the indicator D until such time as the practically exhausted shuttle is returned to the single box or changing side of the lay, as provided for in Patent No. 692,933, said indicator D and its lifters, and generally coacting parts, constituting what is designated as "held-up indication" or means for suspending the action of the filling-changing mechanism until the subsequent arrival of a shuttle in which the filling has been practically exhausted at the filling-changing side of the loom. The loom will be provided with a filling-fork of usual construction to stop the loom in case the filling breaks in the operation of weaving.

I have shown in Fig. 2 the pattern-surface *p s* for controlling the movement of the lever employed for actuating the shuttle-box rod, and it will be understood that the arrester derives its movement, as herein shown, through the shuttle-box rod, but the prime mover of the arrester is the pattern-surface, and this invention is not limited to moving the arrester through the particular mechanism herein employed, the shuttle-box rod forming a part thereof, but instead I consider the pattern-surface as the device which controls the arrester, and the movement of the arrester may be effected by any form of devices deriving its movement from the pattern-surface.

I have shown the filling-feeder which is unconnected with the shuttle-boxes as being moved after the operation of detecting for the practical exhaustion of filling, and while it is essential to change the carriers prior to practical exhaustion in weaving check gingham and like cross strip fabrics, yet it is unnecessary to save the pick, or in other words a short pick does not damage the goods being woven, and is not objectionable in weaving blankets or any goods of a similar character which are heavily napped, but in this class of work it is of great advantage to keep the loom running continuously as practiced in the well known Northrop loom employed for weaving print cloths, such as shown in United States Patent No. 529,940, dated November 27, 1894.

In blankets and napped work the filling from numerous filling-carriers of the same color is used in succession for weaving the body of the fabric, as for instance white filling where the body is to be white; whereas for the production at intervals of a narrow stripe, say from red filling, for a border requiring but a few picks of the red filling it would require but a few carriers containing say the red color used in the stripe.

It is of great advantage to fill the magazine with as few carriers as possible having the filling of the color used for weaving the stripe, as by so doing a much larger portion of the space of the carrier may receive filling

of the color called for by the body of the goods. In looms for weaving this class of work while I prefer to indicate for a change of position of the feeder through the shuttle in the shuttle-box, yet I consider that my invention would not be departed from, if instead, the indication for starting the transferrer and releasing the feeder should be effected by the actuation of the filling-fork as provided for in United States Patent No. 600,053, instead of from a filling-detector.

The filling-feeder described in Patent No. 600,053, is provided with filling in groups, and if a red and a white filling were required, each group would comprise two carriers, one containing white and the other red filling, and whenever the white filling in a shuttle was exhausted and another carrier containing white filling was to be supplied to the shuttle, the filling-feeder would be moved forwardly to place the filling-carrier of the next group, it having white filling, in position to be met by the transferrer, and in this way it will be noticed that the white filling for the body of the blanket would use up rapidly, and the red filling for striping but very slowly.

In the filling-feeder devised by me and unconnected with the shuttle-boxes the filling-carriers are not inserted in groups as provided for in Patent No. 600,053, but on the contrary the weaver puts into the feeder filling-carriers having say white filling in proportion to filling-carriers having say red filling for making a cross stripe for a border in the ratio of the use of shots of white filling as compared with red filling, and it will be obvious that it will be possible to weave practically continuously or without stopping the loom except when the filling breaks, a fabric in which the main body is of one color and an occasional stripe of another color is inserted for a border.

I believe that I am the first to provide a filling-changing loom with a filling-feeder which is normally held stationary and disconnected from the shuttle-boxes during the operation of the shuttle-boxes for laying filling differing in color or material so long as the filling is not exhausted, and I desire to claim this feature broadly. So also this invention is not restricted to the particular shape of the stops or arresting means as the same may be varied within the scope of the description in various ways without departing from my invention.

The extent of movement imparted to the feeder in restoring the same to its normal position with the spring rewound varies, and it will be understood that this invention is not limited to the precise construction shown for the restoring mechanism.

Believing that I am the first to employ a normally stationary filling-feeder unconnected with the shuttle-boxes and moved

independently of the shuttle-boxes to place a filling-carrier of the color called for by the pattern in the cloth being woven, I desire to state that while I prefer to restore automatically the filling-feeder to its normal position after each change of filling yet my invention would not be departed from should the filling-feeder be turned backwardly at times by hand, as it may be, thus rewinding the spring.

10 Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a filling-changing loom, a series of shifting or drop shuttle-boxes, combined
15 with an unconnected filling-feeder containing filling-carriers, means to restrain the movement of said filling-feeder while the shifting shuttle-boxes are operated and their shuttles are being actuated to lay filling
20 in the shed, and means for supplying filling to said shuttles.

2. In a filling-changing loom, shifting or drop shuttle-boxes, a normally stationary filling-feeder containing filling-carriers, and
25 filling-changing means to effect a change of filling in an active shuttle controlled by said shuttle-boxes.

3. In a loom, shifting shuttle-boxes, a normally stationary filling-feeder provided
30 with filling-carriers, transferring mechanism to transfer a carrier from said feeder into a shuttle prior to substantial exhaustion of the filling therein, and devices for suspending the operation of said transferring mechanism
35 until a subsequent arrival of the nearly exhausted shuttle into the shuttle-box adjacent said filling-feeder.

4. In a loom, shifting or drop shuttle-boxes, a filling-feeder unconnected with said
40 drop shuttle-boxes and occupying normally a stationary position, filling-changing mechanism including a transferer, a dagger connected to the latter, an indicator carrying a series of lifters, and connections between
45 said indicator and drop shuttle-boxes to move the former in unison with the latter, an actuator, and means to move the same prior to complete exhaustion of the filling in an active shuttle to raise said lifter to place
50 the dagger in position to be actuated.

5. In a loom, a filling-feeder to sustain a series of filling-carriers, transferring mechanism, means to lock and release the filling-feeder, a spring acting normally to move
55 said feeder in one direction when released, and an arresting device to arrest the filling-feeder with a filling-carrier in the path of movement of the arm of the transferring mechanism.

6. In a loom, a filling-feeder to sustain a series of filling-carriers, transferring mechanism, shifting shuttle-boxes disconnected from said filling-feeder, means to lock and release the filling-feeder, a device acting
65 normally to move said feeder in one direction

when released, and an arresting device operatively connected with the shifting shuttle-boxes to arrest the filling-feeder with a filling-carrier of the desired color or character called for by the shifting shuttle-boxes in
70 the path of movement of the acting end of the transferring arm of the transferring mechanism.

7. In a loom, having a lay provided with shifting shuttle-boxes, a filling-feeder unconnected with the shuttle-boxes and provided with filling-carriers, means independent of the lay for moving said feeder prior to complete exhaustion of the filling in the active shuttle, transferring mechanism,
75 means to arrest the feeder in position for the transferring arm of the transferring mechanism to act on a filling-carrier having filling corresponding with that in the active shuttle controlled by the shuttle-boxes, and
80 means to actuate said transferring mechanism to effect a change of filling in said active shuttle.

8. In a loom, a filling-feeder having a plurality of stops located at different distances from its longitudinal axis and maintained in their operative positions by filling
85 carriers in said feeder.

9. In a loom, a filling-feeder having a plurality of stops located at different distances from its longitudinal axis, said means being acted upon by filling-carriers in said feeder to maintain said stops in their operative position, combined with means for
90 arresting said stops to stop the feeder in desired position.

10. In a loom, a filling-feeder having a plurality of stops combined with means acting normally to retain said stops in their inoperative position.
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11. In a loom, a filling-feeder having a plurality of series of stops arranged at different distances from the center of rotation of said feeder, means to lock and unlock said feeder, a feeder moving device to move said
110 feeder in one direction when unlocked, transferring mechanism, means to operate the same prior to complete exhaustion of the filling in the active shuttle to transfer filling from said feeder into said shuttle prior to
115 complete exhaustion of the filling in said shuttle, and means for moving said feeder backwardly into its normal position.

12. In a filling-changing loom, shifting or drop-shuttle-boxes, a normally stationary
120 filling-feeder containing filling-carriers, means to release said feeder prior to complete exhaustion of the filling in an active shuttle, means to arrest said feeder, and filling-changing means to effect the transfer of filling from
125 said feeder into said active shuttle.

13. In a filling-changing loom, shifting or drop shuttle-boxes, a filling-feeder containing filling-carriers, means to lock said filling-feeder and restrain the motion of the same
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during the changing of the shuttles through shifting of the drop shuttle-boxes, means to unlock said feeder prior to complete exhaustion of the filling in an active shuttle, means to arrest said feeder, and filling-changing means to effect a change of filling in said active shuttle prior to complete exhaustion of the same.

14. In a filling-changing loom, shifting or drop shuttle-boxes, a normally stationary filling-feeder containing filling-carriers, means to release said feeder prior to complete exhaustion of the filling in an active shuttle, filling-feeder arresting means, a device to turn said unlocked feeder until stopped by said arresting means, and filling-changing means to effect a change of filling in said active shuttle prior to complete exhaustion of the filling therein.

15. In a loom, shifting shuttle-boxes, a filling-feeder to sustain a series of filling-carriers, transferring mechanism, means to lock and release the filling-feeder, a device acting normally to move said feeder in one direction when released, and an arresting device connected to and moved in unison with said shifting shuttle-boxes, and adapted to arrest the filling-feeder with the filling-carrier in the path of movement of the arm of the transferring mechanism.

16. In a loom, filling transferring mechanism, a filling-feeder to contain filling masses differing in color and arranged therein at will more of one than of the other color, means to move said feeder preparatory to a transfer of filling, and means under the control of a pattern-surface to arrest the feeder in position to insure the transference therefrom of filling of the color called for.

17. In a loom, a filling-feeder to contain filling masses differing in color, means to indicate a change of filling, a feeder arrester moved in unison with the shuttle-boxes while the feeder is at rest, a device to move the feeder to be stopped by said arrester with filling of the color called for in position to be transferred, and transferring mechanism to transfer filling of the required color to the active shuttle.

18. In a loom, a filling-feeder to contain filling masses differing in color, means to indicate a change of filling, means controlled independently of the usual shuttle-boxes to hold said feeder stationary, means to move the feeder to bring filling of the desired color into position to be transferred, and transferring mechanism to transfer said filling into the active shuttle to be resupplied with filling.

19. In a filling replenishing mechanism for looms, a filling-feeder, a device to hold the same stationary, means to release said device, an arresting device, means to turn said feeder until checked by said arresting device, and means to restore said filling-feeder into its normal position.

20. In a filling-changing loom having movable shuttle-boxes and filling transferring mechanism, a filling-feeder arrester, means to move the same prior to a change of filling and place the feeder in one or another position according to the color or character of filling called for, a filling feeder unconnected with the shuttle-boxes adapted to sustain filling-carriers differing in color or character, and means to move said filling-feeder from a normal position of rest until stopped by said arrester with filling of the color or character called for between the transferring arm of said transferring mechanism and the shuttle to be supplied with filling, and means to actuate said transferring mechanism to effect a change of filling.

21. In a loom, a lay, shifting shuttle-boxes controlling shuttles having filling differing in color or character, a filling-feeder arrester the position of which is changed as a shuttle having one or the other color is active, a filling-feeder unconnected with the shuttle-boxes and normally at rest, a filling transferring device, means prior to a change of filling to move said filling-feeder from its position of rest until stopped by said arrester, and means to move said transferring device to transfer filling of the desired color into the active shuttle.

22. In a loom, the combination of a lay, a filling-feeder containing a plurality of filling-carriers containing filling differing in color or character and normally at rest during the action of the shuttle-boxes, a detecting device arranged adjacent to said filling-feeder, and means intermediate said detecting device and said shifting shuttle-boxes to defer a change of filling to a subsequent pick.

23. A lay, filling-feeder arresting means, shifting shuttle-boxes at one end of the lay, a filling-feeder adjacent the opposite end of the lay and provided with devices adapted to be put into operative position by filling-carriers containing filling differing in color or character, each device being put into operative position only by a carrier having a filling corresponding in color or character with said device.

24. In a loom, the combination with transferring mechanism, of a lay, a shuttle-box, a filling-feeder adjacent thereto, a detecting device, and independent means to arrest said feeder between the time of action of said detector and said transferring mechanism.

25. In a filling-changing loom, a filling-feeder provided at its inner ends with two circular series of stops adapted to be maintained in their operative positions by presence of filling-carriers in said feeder.

26. In a loom, a filling-feeder having filling-receiving spaces and a series of stops adapted to occupy each one or another position at the end of each space according as filling of one or another color or character is

to be put in one or another space of said carrier.

27. In a loom, a filling-feeder having filling-receiving spaces and a series of stops adapted to occupy each one or another position at the end of each space, according as filling of one or another color or character is to be put in one or another space of said carrier, an arrester, means to place the same in one or another position according to the color or character of filling to be supplied to an active shuttle, detecting mechanism to indicate that a change of filling should be made, filling-transferring mechanism, means under the control of said detecting mechanism to effect the movement of the filling-feeder, so that one or another of its stops indicative of filling of one or another color or character meets said arrester, and means to actuate said transferring mechanism to effect a transfer of filling.

28. In a loom having shifting shuttle-boxes, a normally stationary filling-feeder containing filling differing in color or character, filling-transferring mechanism, an arrester, means to place said arrester in one or another position according to the color or character of filling required, and detecting mechanism to cause the feeder to present a filling of the color or character called for by the active shuttle to be replenished in the path of movement of the transferring arm of the transferring mechanism, and means to move said transferring arm to effect a change of filling in the active shuttle.

29. In a loom, a lay, shifting shuttle-boxes at one end thereof, and a filling-feeder adjacent to the opposite end thereof and normally at rest and arranged to receive filling-carriers having filling differing in color or character, and means arranged therein so that the filling-carriers may be placed in said feeder in any desired position.

30. In a loom, a lay, shifting shuttle-boxes at one end thereof, a filling-feeder adjacent the opposite end of the lay having filling-receiving spaces and provided with stops or devices to indicate the color or char-

acter of filling placed in each of said spaces of said feeder, said feeder being normally at rest, an arrester intermediate said shifting shuttle-boxes and said filling-feeder and adapted to co-act with said stops or devices, a releasing device, a device arranged to detect the practical exhaustion of filling in any of the active shuttles, and a variable winding mechanism for said filling-feeder.

31. A lay, shifting shuttle-boxes at one end and a filling-feeder adjacent to the plain end of said lay, said feeder having devices arranged to correspond with the different color and character of filling in said feeder, and an arrester moved into one or another position as an active shuttle containing filling of one or another color or character is operated at the race of the lay, and mechanism to keep said filling feeder normally at rest in readiness to be turned any part of a whole revolution until one or the other devices carried by said feeder contacts with said arrester.

32. In a loom of the class described, a filling-feeder normally at rest and containing filling differing in color or character, combined with a feeder arrester, and means to place the same in position to arrest said feeder in the position to present into transferring position a filling of the color or character called for in the pattern being woven.

33. In a loom of the class described, a filling-feeder normally at rest and containing filling differing in color or character, combined with a feeder arrester, means to place the same in position to arrest said feeder in the position to present into transferring position a filling of the color or character called for in the pattern being woven; means to release said feeder, and means to move said feeder after it is released.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

RANDOLPH CROMPTON.

Witnesses:

GEO. W. GREGORY,
MARGARET A. DUNN.