

C. F. LAGANKE.
 VARIABLE SPACING MECHANISM FOR COMBINED TYPE WRITING AND CALCULATING MACHINES.
 APPLICATION FILED FEB. 12, 1908.

929,675.

Patented Aug. 3, 1909.

5 SHEETS—SHEET 1.

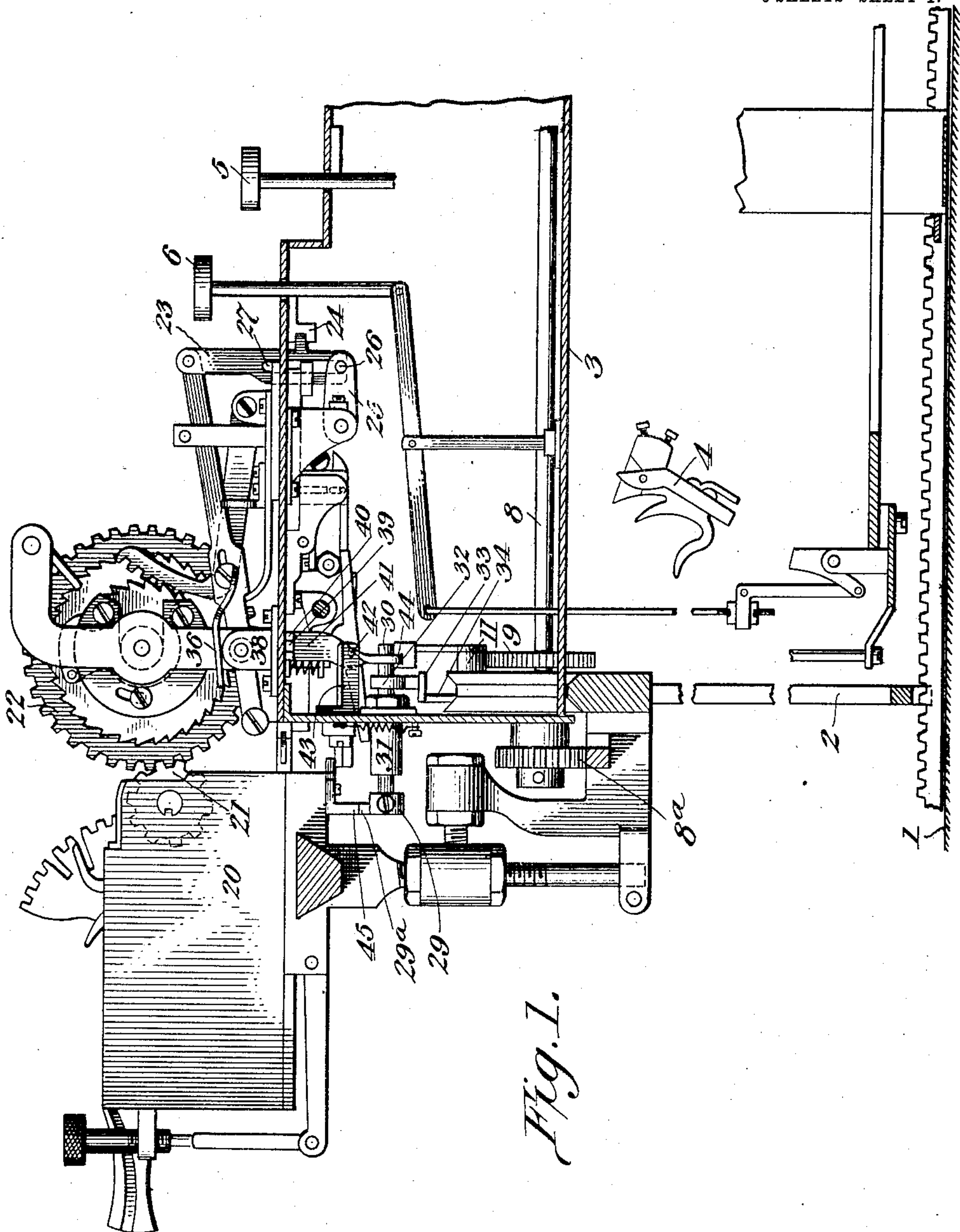


Fig. 1.

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 D. A. Colne

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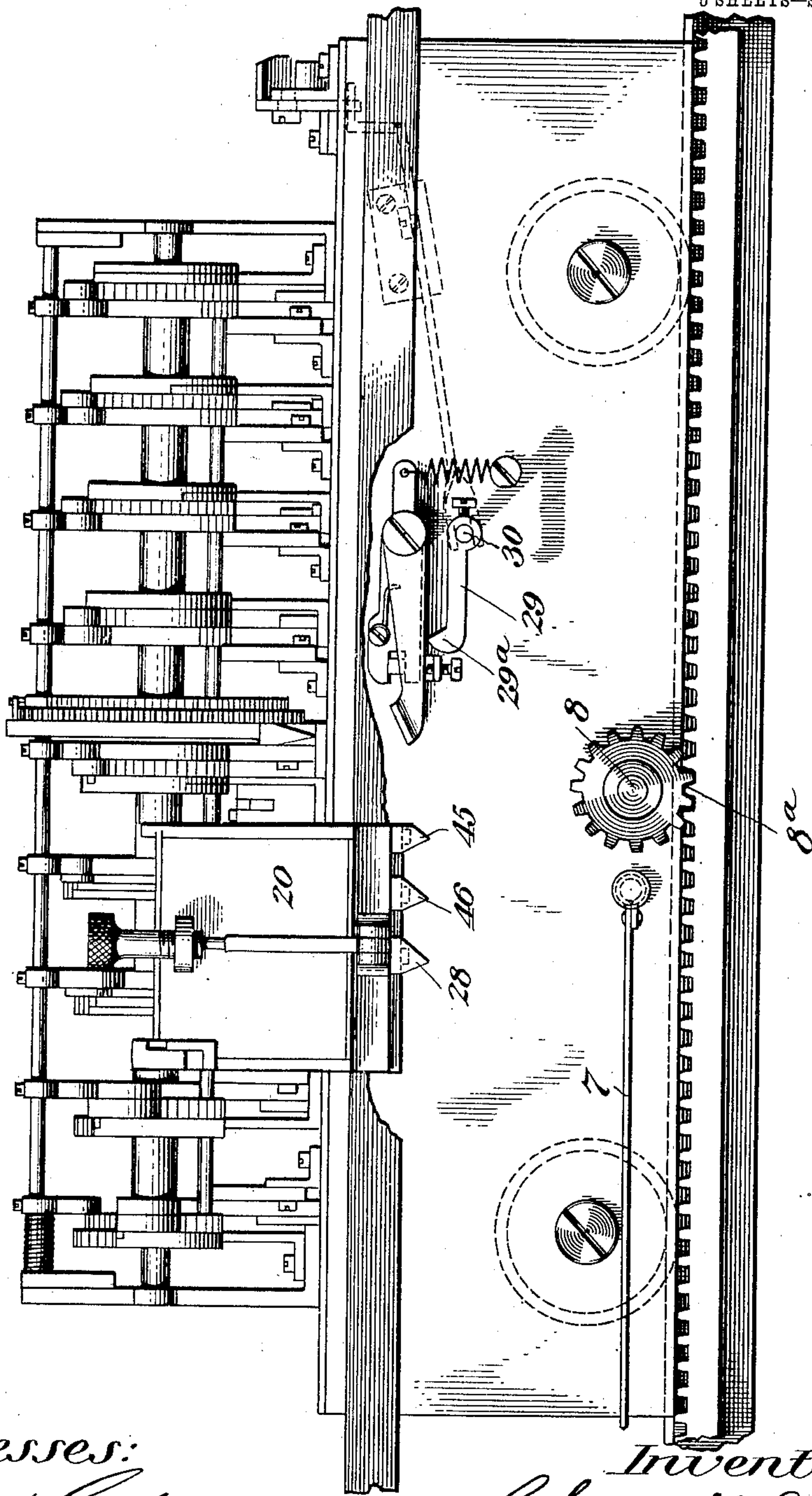
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5 SHEETS—SHEET 2.

Fig. 2.



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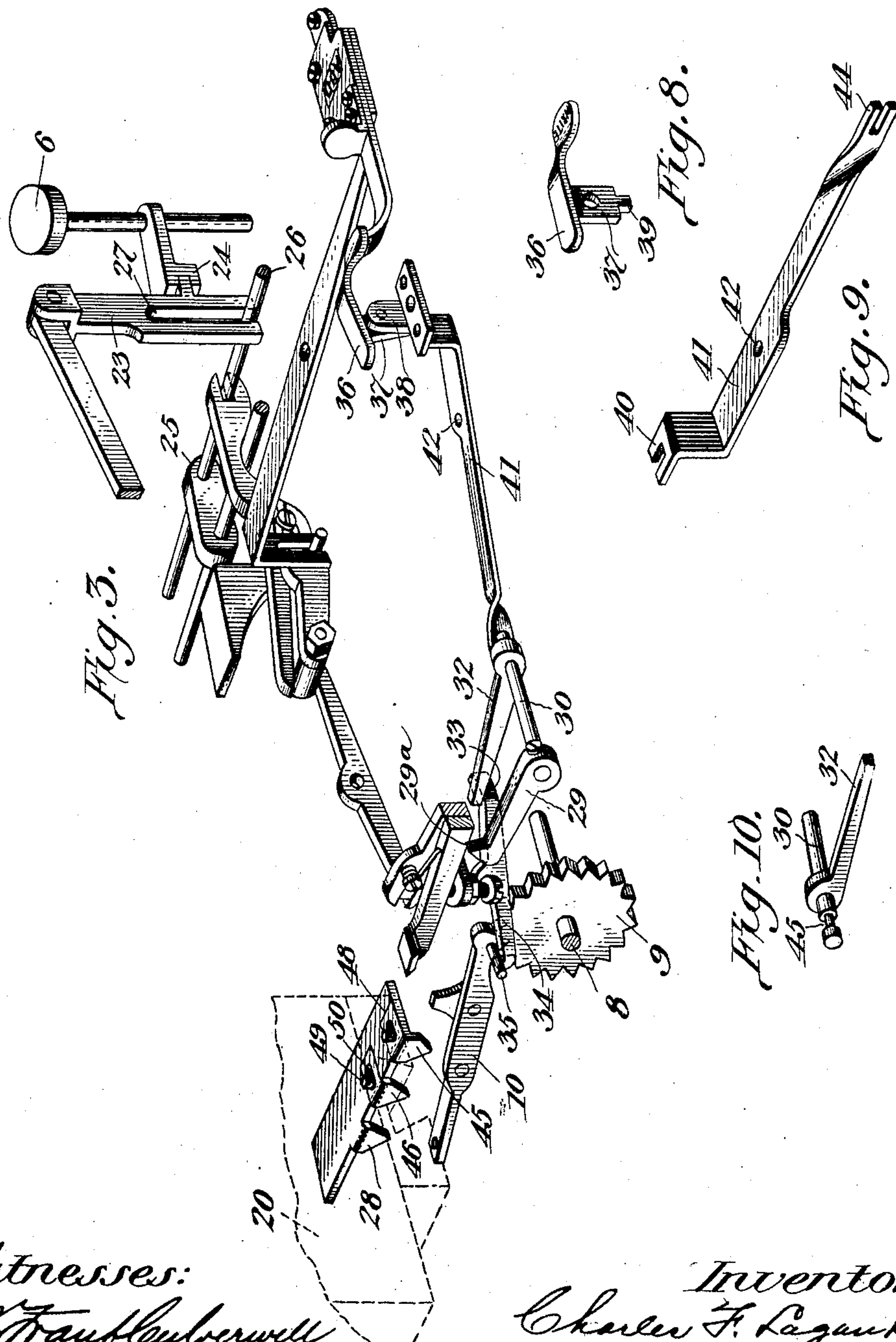
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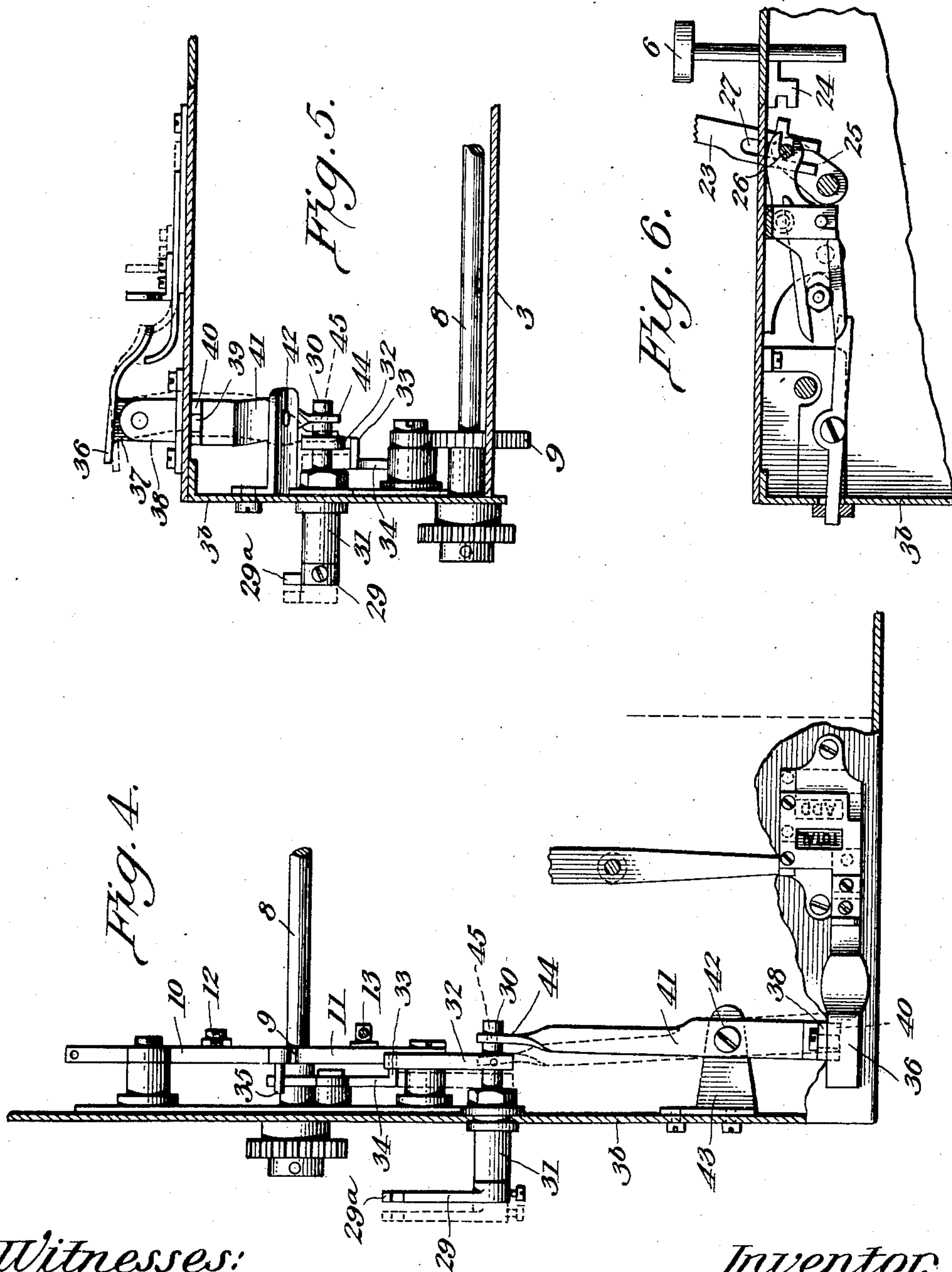
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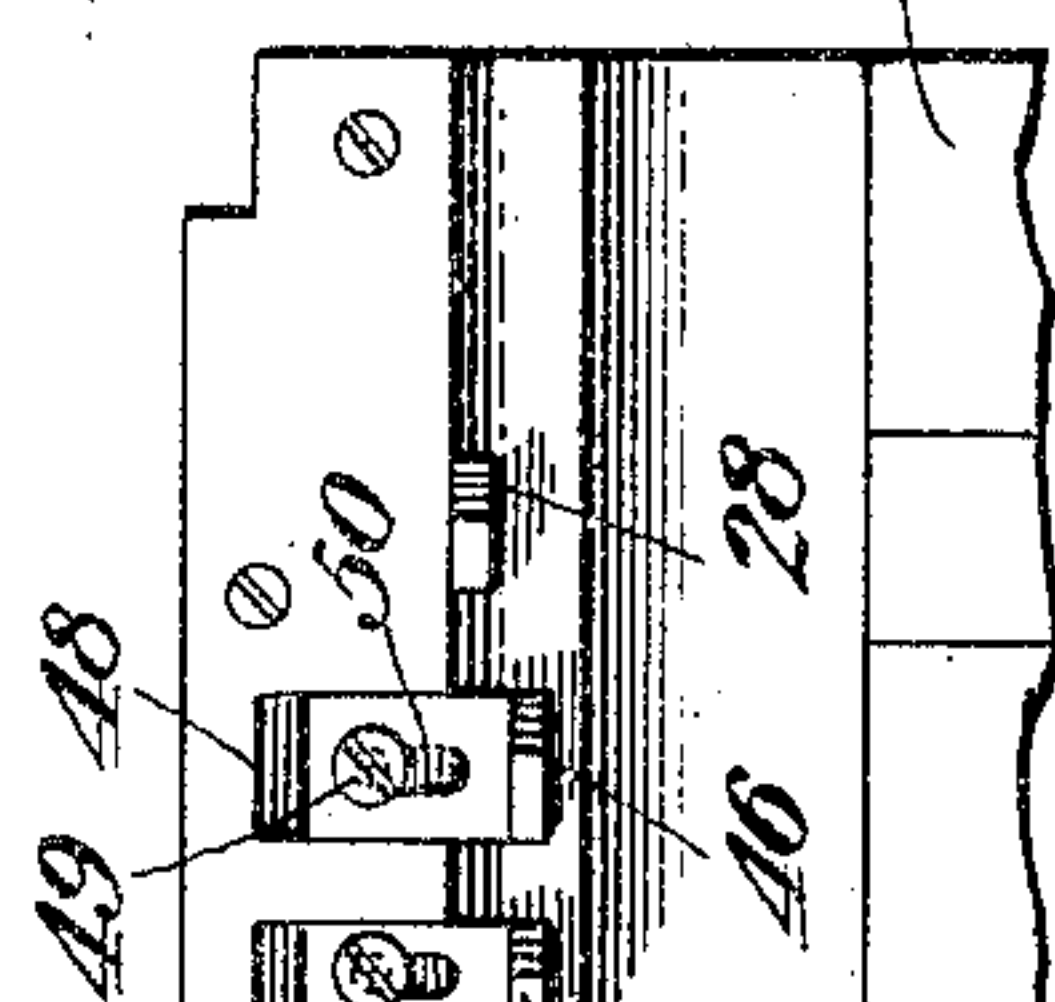
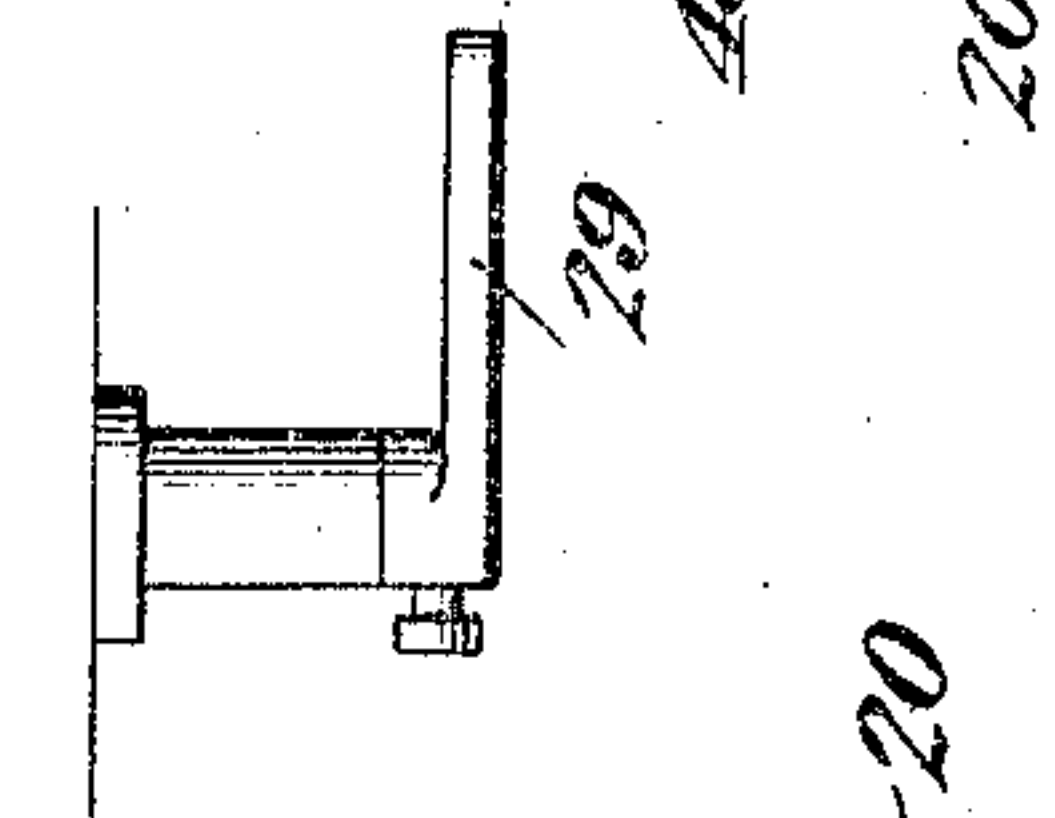
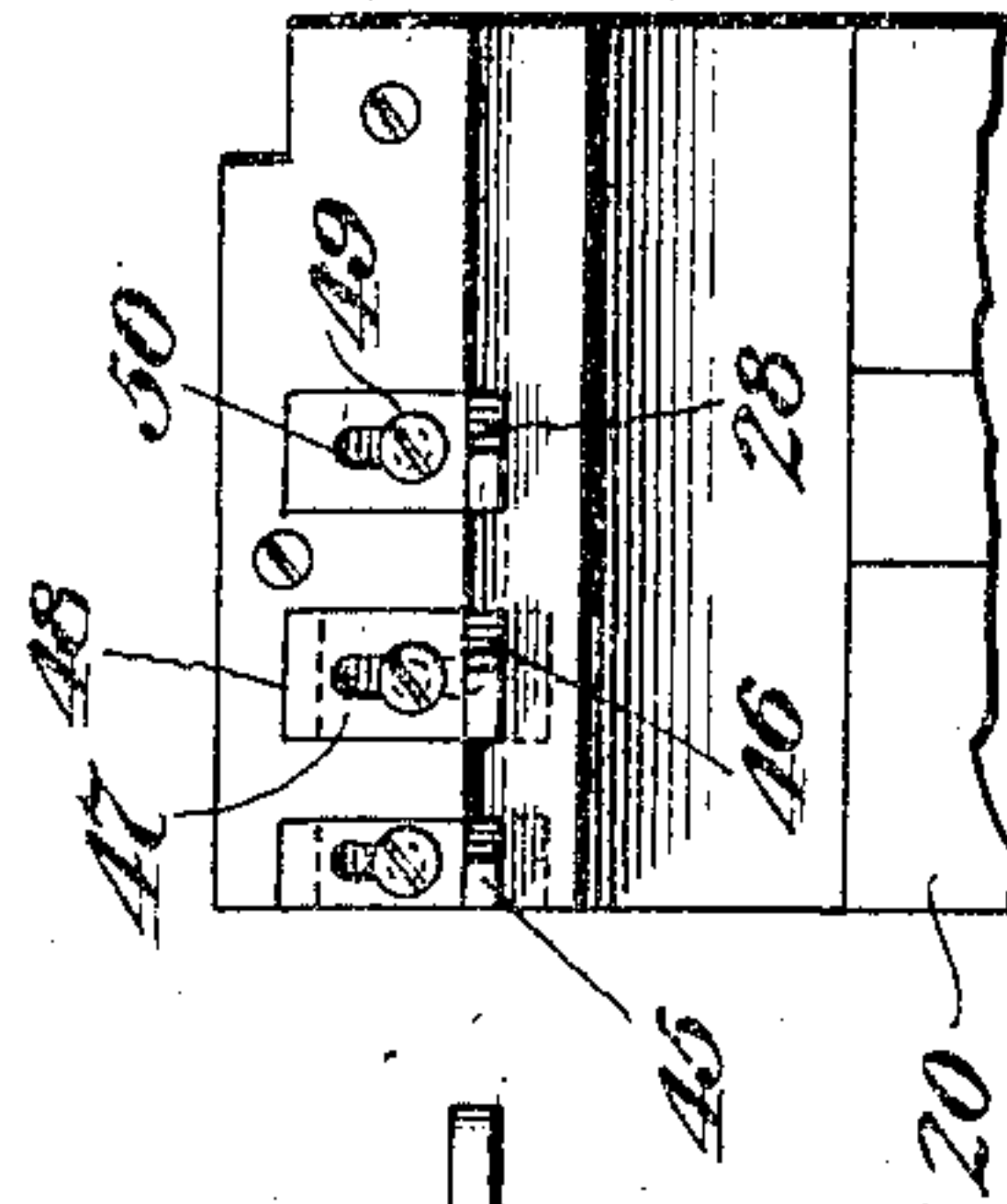
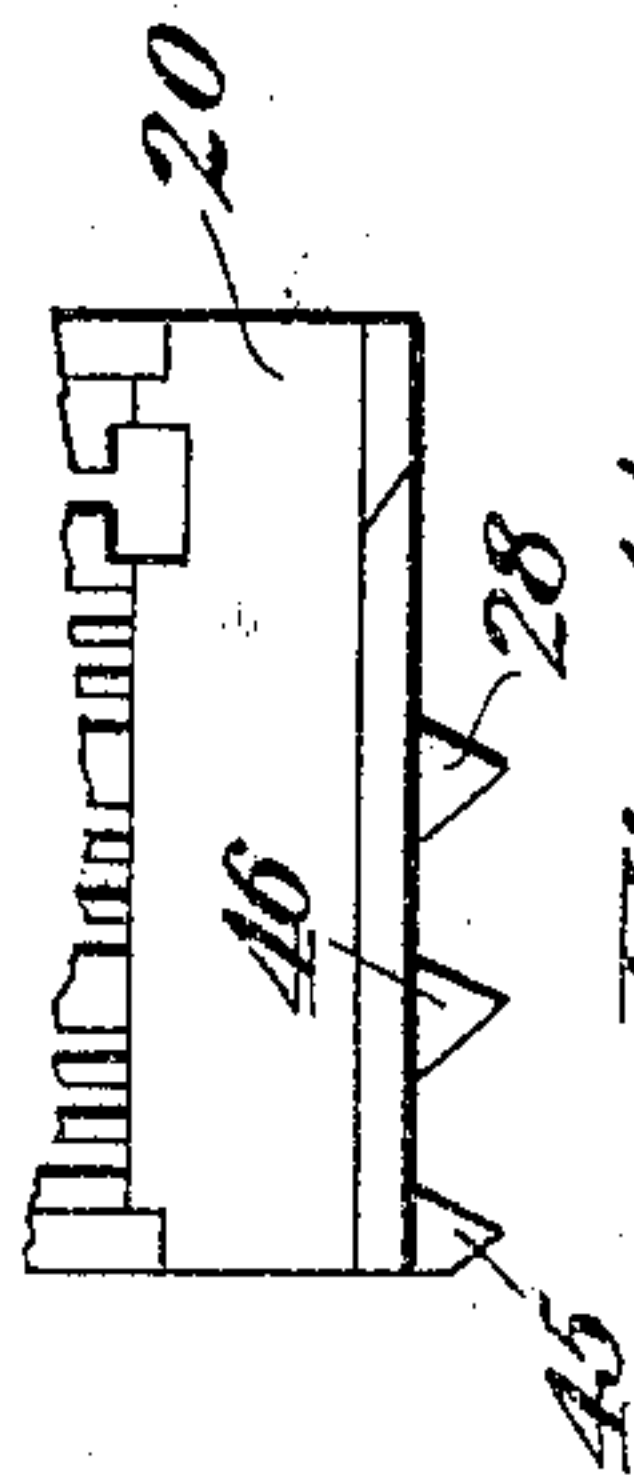
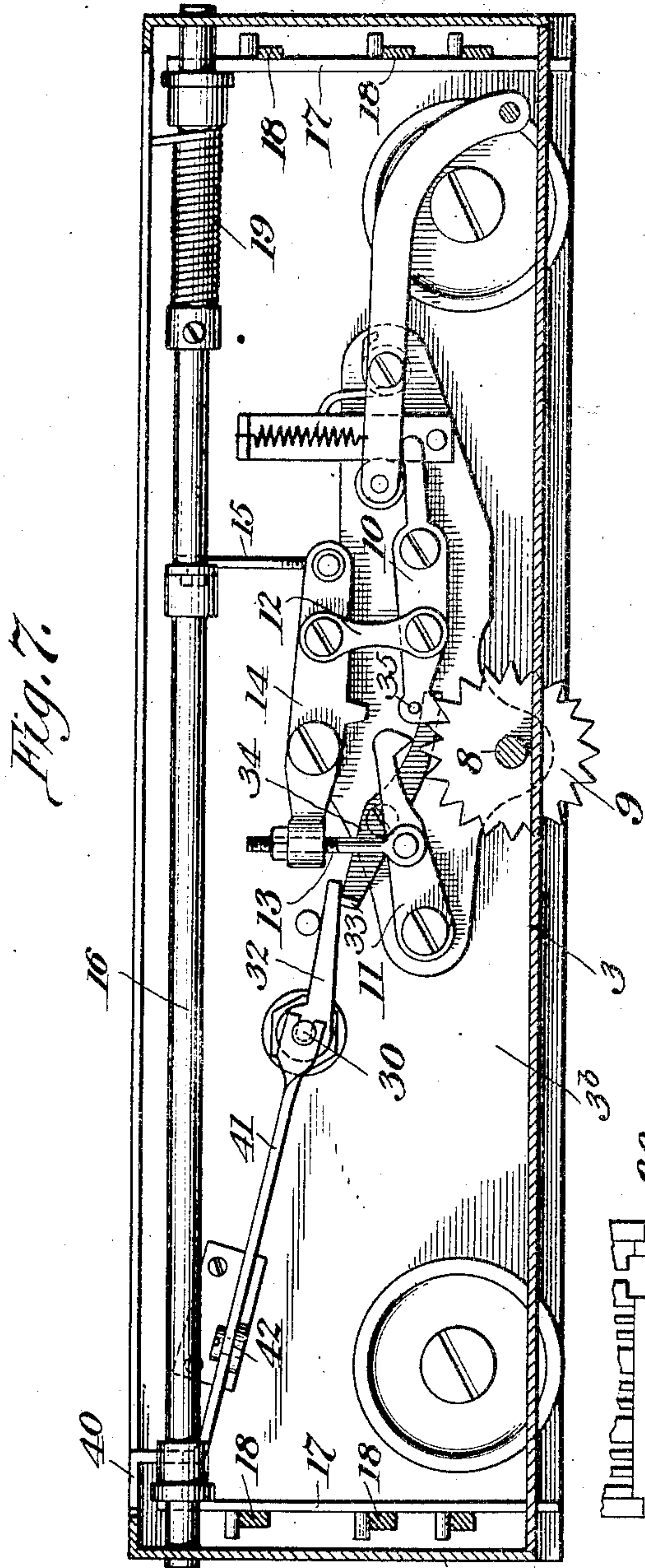
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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VARIABLE-SPACING MECHANISM FOR COMBINED TYPE-WRITING AND CALCULATING MACHINES.

No. 929,675.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed February 12, 1908: Serial No. 415,470.

To all whom it may concern:

Be it known that I, CHARLES F. LAGANKE, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Variable-Spacing Mechanism for Combined Type-Writing and Calculating Machines, of which the following is a specification.

10 This invention relates primarily to variable automatic spacing mechanism for machines which include a spacing carriage, but is especially intended to effect variable automatic spacing of the carriage of a combined typewriting and calculating machine. Machines of the character specified, such for instance as the Elliott-Fisher billing machine of commerce, are employed for the recording and adding of a column of numbers, and the object of my present invention is to provide a variable mechanism whereby the carriage may be automatically spaced over both the comma and decimal points of the column to attain the greatest possible speed, or over the decimal point alone when it is desired to print the commas, or will be automatically spaced over none of these points so that both the commas and the decimal point may be printed. In the copending application of John A. Smith, No. 390,360, is disclosed a spacing mechanism including a trip and a trip arm, which elements are brought into interfering relation by the movement of the typewriter carriage to effect the automatic spacing of the carriage over a predetermined point, as for instance the decimal point of a column, and the trip arm is movable into and out of operative position to insure or avoid automatic spacing, as desired.

40 The several ends attained by the mechanism which I have devised have been attained by means of the mechanism disclosed in the copending application of W. L. Dench, No. 415,469, but the Dench mechanism comprehends a modification of the mechanism shown in the Smith application, above identified, for varying the position of the trip arm. In carrying out my invention, on the contrary, the desired ends are attained without modification of that part of the Smith mechanism which is mounted on the carriage, by adjustably mounting certain or all of the trips, the trip arm being moved into or out of its operative position precisely in the manner described in the Smith appli-

cation identified, and certain or all of the trips being shiftable into or out of position to be engaged by the trip arm when the latter occupies its "set" or operative position.

To the accomplishment of the objects so stated, the preferred embodiment of the invention resides in that construction and arrangement of parts to be hereinafter described, illustrated in the accompanying drawings, and succinctly defined in the appended claims.

In said drawings Figure 1 is a central vertical sectional view of a portion of an Elliott-Fisher billing machine equipped in accordance with my invention. Fig. 2 is a rear elevation of the same. Fig. 3 is a perspective view of the spacing mechanism and associated parts. Fig. 4 is a horizontal sectional view of a portion of the carriage casing, showing the spacing mechanism in plan, the effective or set position of the trip arm being indicated in dotted lines. Fig. 5 is a vertical transverse section through the rear portion of the carriage casing, showing in side elevation the mechanism illustrated in Fig. 4. Fig. 6 is a transverse sectional view through the middle portion of the carriage casing, showing the key connecting mechanism which is associated with the spacing mechanism. Fig. 7 is a longitudinal sectional view through the carriage casing designed more particularly to show the typewriter escapement and the relation of the spacing mechanism thereto. Fig. 8 is a detail view of the automatic space key. Fig. 9 is a detail view of the setting lever of the spacing mechanism. Fig. 10 is a detail view of the rear end of the decimal space rock shaft and the attached arm. Fig. 11 is a front elevation of the lower portion of the register. Fig. 12 is a bottom plan view of the front portion of the register and showing two positions of the trip arm, the operative and inoperative positions of said arm being indicated in full and dotted lines respectively. Fig. 13 is a view similar to Fig. 12, showing the comma trips adjusted to their inoperative positions. Fig. 14 is a bottom plan view of a slightly modified arrangement in which the trip arm always remains in its operative position and the trips are all adjustable.

Each part, wherever shown, is indicated by its proper reference character.

The Elliott-Fisher billing machine.—The Elliott-Fisher machine is a flat platen type-

writer equipped with adding mechanism operated from the typewriter keys, whereby a column of numbers recorded by the typewriter will be simultaneously added. The typewriter includes a flat platen 1 over which travels longitudinally for line spacing a machine frame 2 traveling on which transversely of the platen to effect letter spacing of the characters printed, is a carriage 3. Mounted on and movable with the carriage is suitable downwardly acting printing mechanism including type arms 4 operated through suitable connections by letter and numeral keys 5 and 6.

The carriage 3 is propelled to the right by carriage propelling mechanism including spring drums, not shown, connected to the carriage by flexible tapes 7, one of which is indicated in Fig. 2. The step-by-step movement of the carriage for letter spacing is controlled by carriage feeding mechanism operated from the typewriter keys in a manner well understood in the art and including a carriage feed spindle 8 geared to the frame 2, as indicated at 8^a, and controlled by an escapement which includes a ratchet wheel 9 fixed to the spindle 8 and cooperating with two dogs 10 and 11 connected by links 12 and 13 to a vibrator 14, which is in turn connected by a link 15 to an arm of a rock shaft 16 arranged to be rocked by slides 17, which are in turn operated by key yokes 18 mounted in the carriage of the typewriter and operated, as any given key reaches the downward limit of its movement, to effect the rocking of the shaft 16 and thus swing the vibrator 14, all as fully described and shown in Patent No. 765,861 to John A. Smith.

It will be noted that the dog 10 normally engages the escapement wheel 9 and thus holds the carriage against movement. Upon the depression of a key, the dogs are simultaneously moved in opposite directions, the dog 11 reaching its engaging position before the carriage is released and permitting only sufficient movement of the wheel 9 to insure the engagement of the dog 10 with the next succeeding tooth of the wheel when the dogs are again reversed by the action of a retracting spring 19 upon the release of the key. Therefore, as the key is depressed, there is no appreciable movement of the carriage, but upon the release of the key the dog 11 moves out of engagement with the wheel 9 thus permitting the latter to rotate the distance of one letter space or one tooth of the ratchet 9 before the carriage is arrested by the reengagement of the dog 10 with the ratchet.

The adding mechanism.—The adding mechanism, which is combined with the typewriting machine, includes a totalizer, register, or computing device 20 adjustably mounted on the frame 2 and located in rear of the upper portion of the carriage 3. The

register 20 is of well known construction and includes a series of denominational members or number wheels 21 arranged in line and equipped with suitable carrying mechanism whereby the value accumulated upon any wheel will be transferred or carried to the wheel of next higher order. The register constitutes the relatively fixed unit of the adding mechanism, which latter also embraces a relatively movable unit in the form of actuating mechanism which travels with the typewriter carriage 3 and is presented by the movement of such carriage to successive number wheels. Thus upon the depression of any numeral key of the typewriter to print a digit in a given denominational position of the adding field or column, the number wheel of corresponding denomination will be moved a number of increments corresponding to the value of the printed digit, thereby accumulating the value of the digit in the register, simultaneously with the printing thereof.

The actuating mechanism embraces a master wheel 22 and suitable differential connections between the master wheel and the several numeral keys 6, the connections being so proportioned that each numeral key will move the master wheel a distance proportionate to the value of said key.

It is thought to be unnecessary to specifically describe either the register or its operating connections, but for a more complete disclosure of these mechanisms, attention is directed to Patents Nos. 825,469 and 829,971 to Laganke and Smith.

It may be noted in passing that the numeral keys 6 of the typewriter are separably connected to the actuating mechanism of the adder, the actuating mechanism including a series of links 23 having detachable connection 24 with the stems of the numeral keys and arranged to be swung into or out of connection with said keys by a yoke 25 which includes a bar 26 disposed within longitudinal slots 27 in the links. The keys are normally disconnected from the links but automatically connected thereto at the proper point in the travel of the typewriter carriage by what is known as automatic key connecting mechanism which is incidentally shown in the accompanying drawings, but is described and shown with more particularity in the application of John A. Smith already referred to.

The variable automatic spacing mechanism.—The Elliott-Fisher machine is largely used for the computation of money values. It therefore includes what is known as automatic decimal spacing mechanism arranged to cause the carriage to skip over the decimal point from the units to the tens position upon the release of a key after printing a digit in the units order of the column. One form of such mechanism is disclosed in Pat-

ent No. 320,879 to Laganke and Smith, but the form here shown involves the Smith escapement disclosed in the patent to Smith, No. 765,861, before mentioned, and is shown 5 and described in the application of John A. Smith, already referred to.

Depending from the casing of the register 20 is a decimal spacing strip, 28 in the form of a pointed tooth disposed in the path of a 10 trip arm 29 having a pointed tooth 29^a which, when the decimal space is reached by the carriage, engages and passes under the trip-28. The trip arm 29 is secured to the 15 outer end of a rock shaft 30, which is rotatable and longitudinally movable in a bearing sleeve 31 projecting through the back wall 3^b of the carriage casing, see Figs. 1, 3, 4, 5 and 7. Adjacent to the inner end of the rock shaft 30 is secured an arm 32 the free 20 end of which is disposed over the laterally disposed end or lug 33 of a dog retarding lever 34. The lever 34 is fulcrumed intermediate of its ends to the back wall of the carriage casing and is extended under the 25 pin 35 projecting laterally from the free end of the dog 10.

We have already seen that the letter space advance of the carriage is effected while the dog 10 is moving back to engage the next 30 succeeding tooth of the ratchet, and it will therefore be obvious that if this movement of the dog to its engaging position is momentarily retarded, the ratchet will be permitted to move the distance of two teeth 35 instead of one before it is engaged and the carriage arrested by the dog. The parts just described are designed to effect this momentary retardation of the dog 10 so that as the carriage moves from the units position 40 it will advance a double space or the distance of two normal letter space movements, so as to cause the printing point to pass directly from the units to the tens position and skip over the decimal space. It will be seen that 45 when the trip arm 29 engages the decimal spacing trip 28, said arm will be slightly depressed, thus rocking the shaft 30 and depressing the arm 32, which in turn depresses the left hand end of the lever 34 and causes 50 the right hand end of said lever to rise and thus, by engagement with the pin 35, to retard the movement of the dog 10 toward its engaging position, the retardation being obviously momentary because of the very 55 brief or momentary engagement of the trip 28 with the pointed tooth 29^a of the trip arm.

It is sometimes desirable to render the decimal spacing mechanism inoperative, particularly in writing ordinary matter across 60 that area which may be used as the adding field, for instance when the computing device is entirely out of use or when it is desired to write matter across the sheet above or below 65 a column of numbers which are to be or have

been added. In order to render the decimal spacing mechanism operative or inoperative, the shaft 30 is made longitudinally movable, as stated, in order to permit the same to be shifted back to bring the trip arm 70 29 into coöperative relation with the trip 28 or forward to present the trip arm out of coöperative relation with said trip, the two positions being indicated in Fig. 4, the operative position of the mechanism being shown 75 in dotted lines, and the trip arm being shown in full lines shifted to its inoperative position in which it will pass idly by the trip instead of engaging the same as the carriage advances. The position of the trip arm is 80 controlled by a key 36 in the form of a plate with a pivotally mounted shank 37 carried by a bracket 38 secured to the cover-plate of the carriage. The lower end of the shank 37 is provided with a tongue 39 which engages 85 the angular forked extremity 40 of a setting lever 41 fulcrumed intermediate of its ends, as indicated at 42, to a bracket 43 secured to the wall 3^b of the carriage. The opposite 90 end of the lever 41 is turned to vertical position, as shown in Fig. 9, and is provided with a fork 44 engaging a reduced portion 45, of the rock shaft 30. It will thus be seen that by tilting the space key 36 in one direction 95 the lever 41 will be swung to shift the shaft 30 longitudinally and thus present the trip arm 29 in operative position. Similarly, by tilting the key 36 in the opposite direction, the arm 29 will be withdrawn to its ineffective or inoperative position. Therefore, by 100 manipulating the key 36, the operator may determine whether or not the automatic spacing mechanism will operate when the tooth 30 of the arm 29 reaches the decimal spacing trip 28. 105

The multiple trip arrangement.—The mechanism for automatically spacing over the decimal point is fully disclosed in the Smith application, and it will be apparent that if, in addition to the decimal trip 28, other trips 110 of similar character are placed in alinement therewith and properly spaced therefrom, the carriage may be automatically spaced over the comma spaces of the column in a manner precisely similar to the described method of 115 spacing over the decimal point. Therefore, in addition to the trip 28, I provide the casing of the register with additional trips 45 and 46, which may be termed the comma trips, it being understood, however, that the 120 number of such trips is immaterial, and that the number here shown may be increased or diminished, as desired.

A plurality of trips supported by the register and arranged in the path of a trip arm 125 which is capable of being moved into or out of operative position, is shown in the application of W. L. Dench, hereinbefore identified, but in accordance with my invention, the comma trips 45 and 46 are independently ad- 130

justable into and out of the operative plane of the trip arm, in order that, by the adjustment of said trips, the operator may predetermine the points at which the automatic spacing will be effected when the trip arm is located in operative position. Any suitable means for adjustably mounting the comma trips may be provided, but a simple and convenient arrangement is that shown in Fig. 11.

Each comma trip depends from a supporting plate 47 slidably mounted in a recess 48 in the under side of the register casing, or in a plate secured thereto, and is retained in its adjusted position by a headed screw 49 extended through a longitudinal slot 50 in the plate 47 and screwed into the bottom of the register, see Fig. 13. It will thus be seen that regardless of the position of the trips, the trip arm 29, if moved to its forward position, shown in dotted lines in Fig. 12, and in full lines in Fig. 4, will be located out of alignment with said trips as the carriage advances, and will effect no automatic spacing of said carriage. This will enable the operator to print both the commas and the decimal point, if he so desires. If, on the contrary, the trip arm is moved back to the full line position indicated in Figs. 12 and 13, then automatic spacing for both the commas and the decimal point will be effected, provided all of the trips are arranged in line, as shown in Fig. 12, this being the arrangement designed to facilitate the greatest possible speed in the manipulation of the machine by automatically spacing the carriage over the comma and decimal spaces. If, on the contrary, speed of operation is to be subordinated to the desire to print commas, instead of merely subdividing the groups of digits of a number by spaces, the screws 49 are loosened and the comma trips are moved back and secured in their inoperative positions, shown in Fig. 13, which will leave only the decimal trip in position to be engaged by the trip arm as the carriage advances and thus enabling the commas to be printed. Obviously, since the comma trips are independently adjustable, any one may be adjusted to operative or inoperative position, regardless of the position of the other or others, and if desired, the decimal trip may be adjustably mounted in a manner similar to the adjustable mounting of the comma trips.

Attention is directed to the fact that by mounting the comma trips adjustably, as described, it is possible to provide for no automatic spacing, automatic decimal spacing alone, or automatic spacing for both the commas and the decimal without modifying the automatic spacing mechanism disclosed in the Smith application, except to the extent of providing additional trips adjustably mounted. In fact, by mounting all of the trips adjustably, it is possible to secure these

three spacing conditions in a machine having no provision for shifting the trip arm laterally. In Fig. 14, for instance, I have shown the register equipped with three independently adjustable trips arranged to cooperate with a trip arm which remains at all times in its operative position, as disclosed in the co-pending application of John A. Smith, No. 221,857, it being observed that any or all of the trips can be adjusted into or out of operative relation with the trip arm, in order to provide for automatic spacing over any or all of the points to which the trips are appropriate, or over none of said points, as desired.

It is thought that from the foregoing, the construction and operation of my variable automatic spacing mechanism will be clearly understood, but I expressly reserve the right to effect such changes, modifications, and variations of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is:—

1. The combination with a carriage, carriage propelling mechanism, and carriage feeding mechanism controlling the step-by-step advance of the carriage, of automatic spacing mechanism including a plurality of spacing trips one of which is movable relative to another to present the same in or out of operative position, and a member co-operatively related to the trips and to the feeding mechanism.

2. The combination with a carriage, carriage propelling mechanism, and carriage feeding mechanism controlling the step-by-step advance of the carriage, of automatic spacing mechanism cooperating with the feeding mechanism and including a plurality of trips and a cooperating member brought into engagement by the movement of the carriage to effect an abnormal operation of the feeding mechanism, one or more of said trips being independently adjustable into and out of operative position.

3. In a typewriting machine, the combination with the carriage, carriage propelling mechanism, an escapement controlling the step-by-step advance of the carriage, and printing mechanism including keys co-operatively related to the escapement, of spacing mechanism co-operatively related to the escapement to automatically space the carriage over a predetermined point or predetermined points, said spacing mechanism including a plurality of trips relatively adjustable into and out of operative position, and a member adapted to cooperate with said trips when brought into engagement therewith by the movement of the carriage.

4. In a typewriting machine, the combination with the carriage, propelling mechanism therefor, an escapement controlling the letter space movement of the carriage, and printing mechanism including keys co-op-

eratively related to the escapement, of spacing mechanism brought into action by the carriage movement to exaggerate the spacing, said spacing mechanism including a plurality of trips and a cooperating member, and said trips being adjustable lengthwise of the carriage travel to predetermined positions and relatively adjustable into and out of operative position.

10 5. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, carriage propelling mechanism, an escapement, and printing mechanism having keys cooperatively related to the escapement, of a register, operating connections therefor, and spacing mechanism cooperatively related to the escapement and including a plurality of trips and a cooperating member, said trips being associated with the register and relatively adjustable.

25 6. In a combined typewriting and adding machine, the combination with a typewriter including the carriage, keys, printing mechanism, and an escapement controlling the step-by-step advance of the carriage and operated by the keys, of a register adjustable lengthwise of the carriage travel, and spacing mechanism cooperatively related to the escapement to cause an exaggeration of the normal operation thereof at one or more points in the travel of the carriage, said spacing

ing mechanism including a plurality of devices and a cooperating member brought into engagement by the movement of the carriage, said devices being adjustable lengthwise of the carriage travel to predetermined positions and one or more of said devices being independently adjustable into and out of operative position. 40

7. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys, and printing mechanism, an escapement controlling the step-by-step advance of the carriage and operated by the keys, a register adjustable lengthwise of the carriage travel to different column positions, operating connections for the register, and spacing mechanism cooperating with the escapement to cause the carriage to automatically space over decimal and comma points, said spacing mechanism including a plurality of devices mounted on and movable with the register, and a member presented successively to said devices by the movement of the carriage, certain or all of said devices being adjustable into and out of operative position. 55

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES F. LAGANKE.

Witnesses:

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