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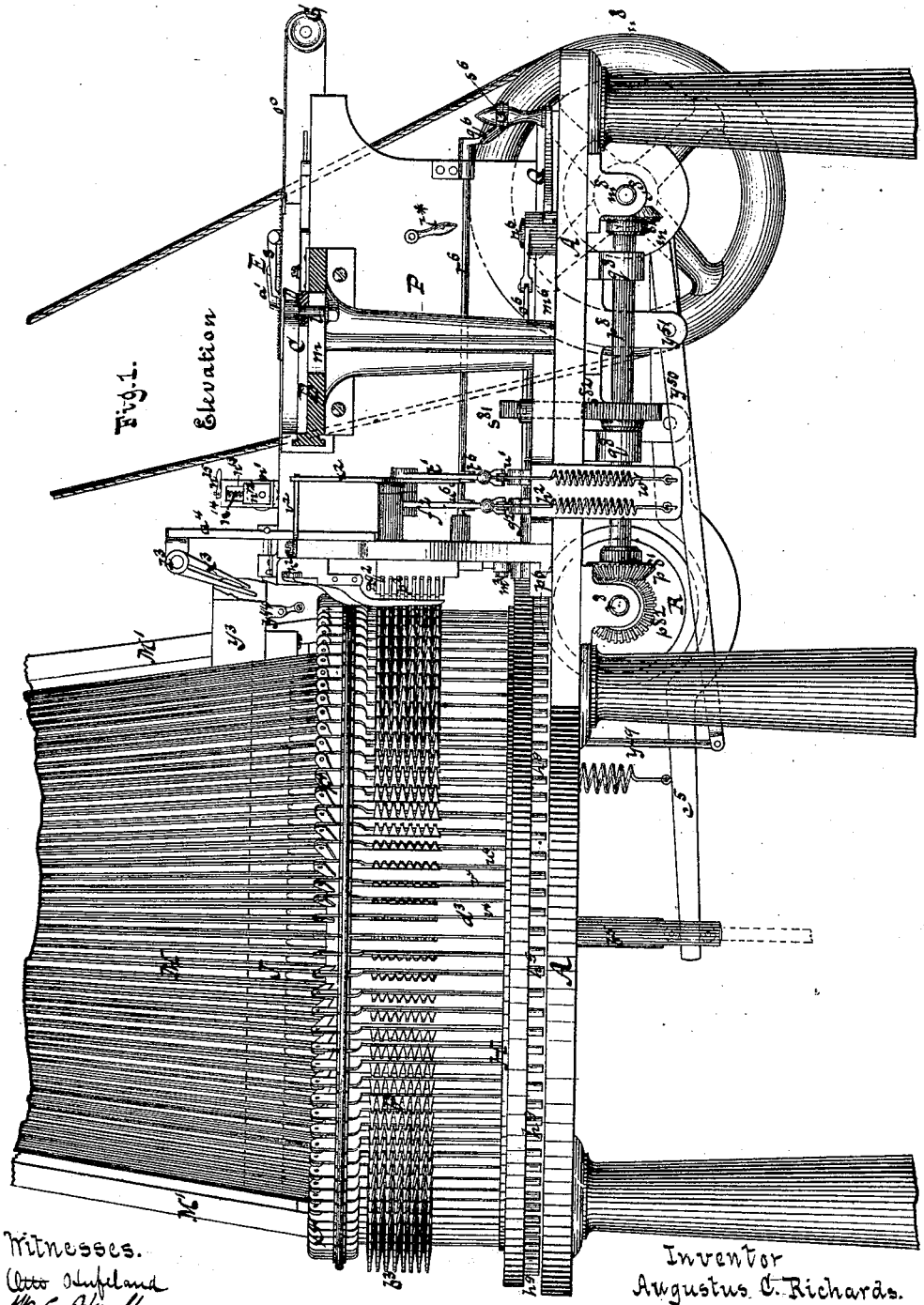
Type-Distributing Machine.

No. 212,503. Patented Feb. 18, 1879.

Fig. 1. Elevation



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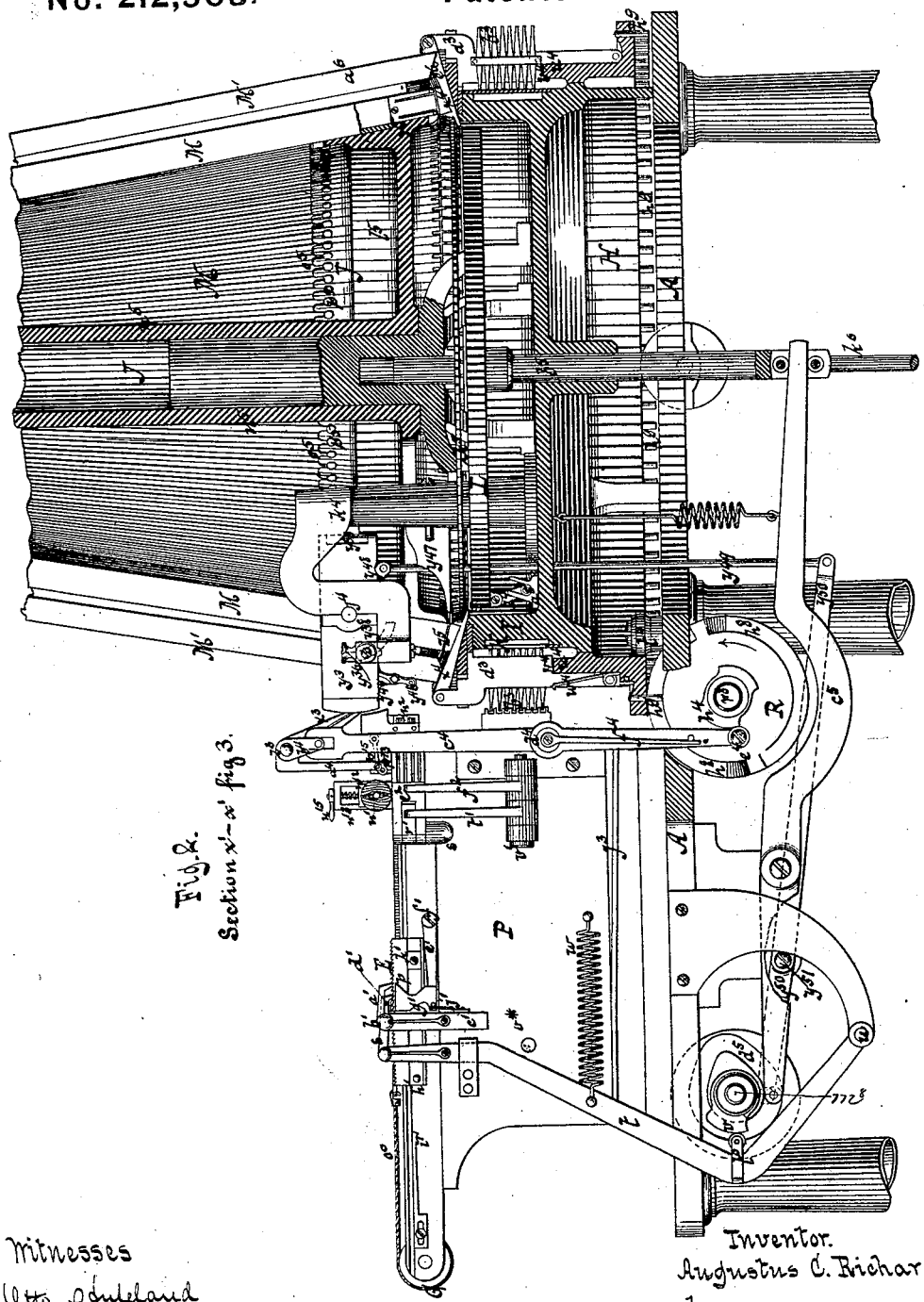

Fig. 2.
Section x'-x' fig 3.

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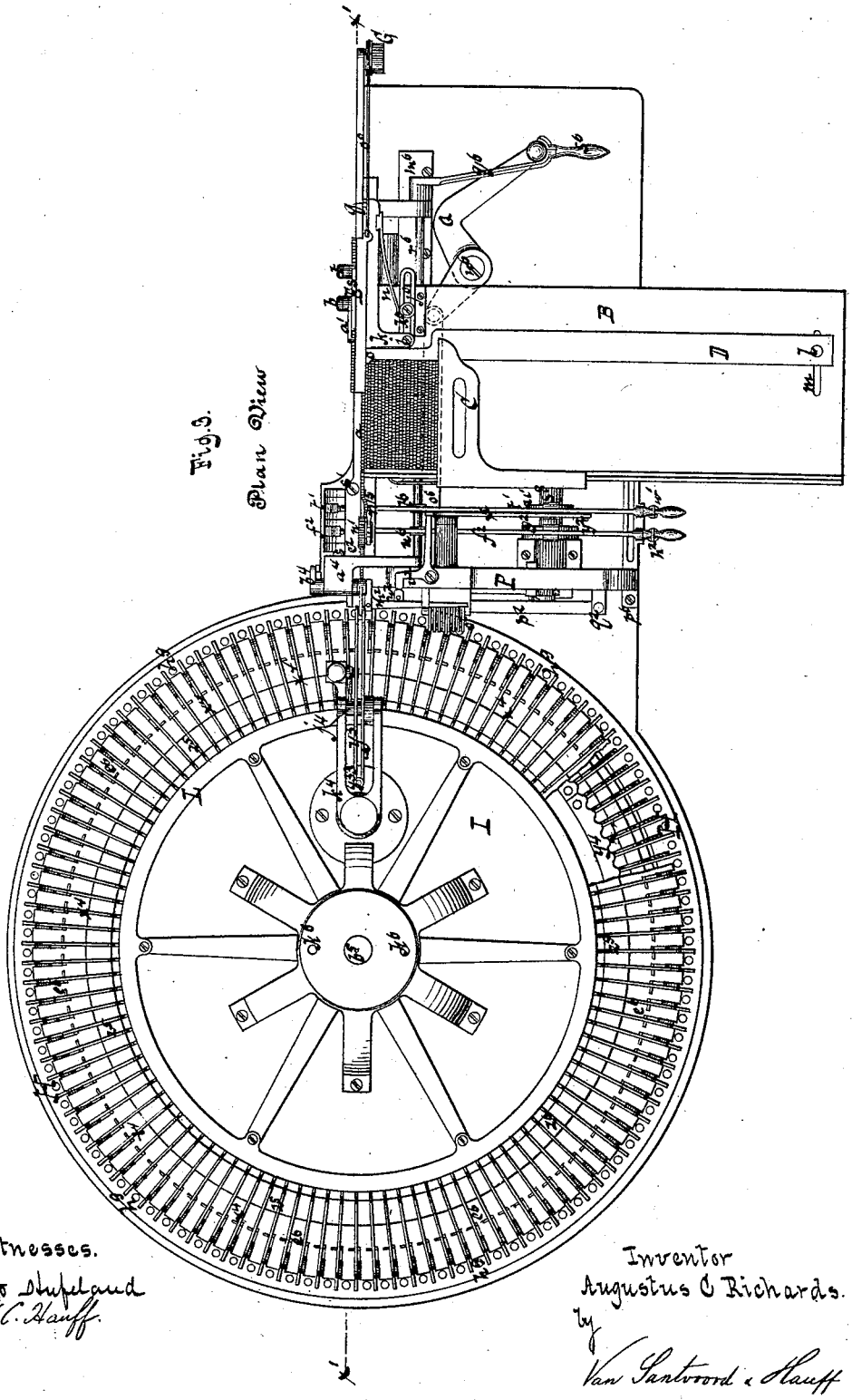
Fig. 3. Plan View



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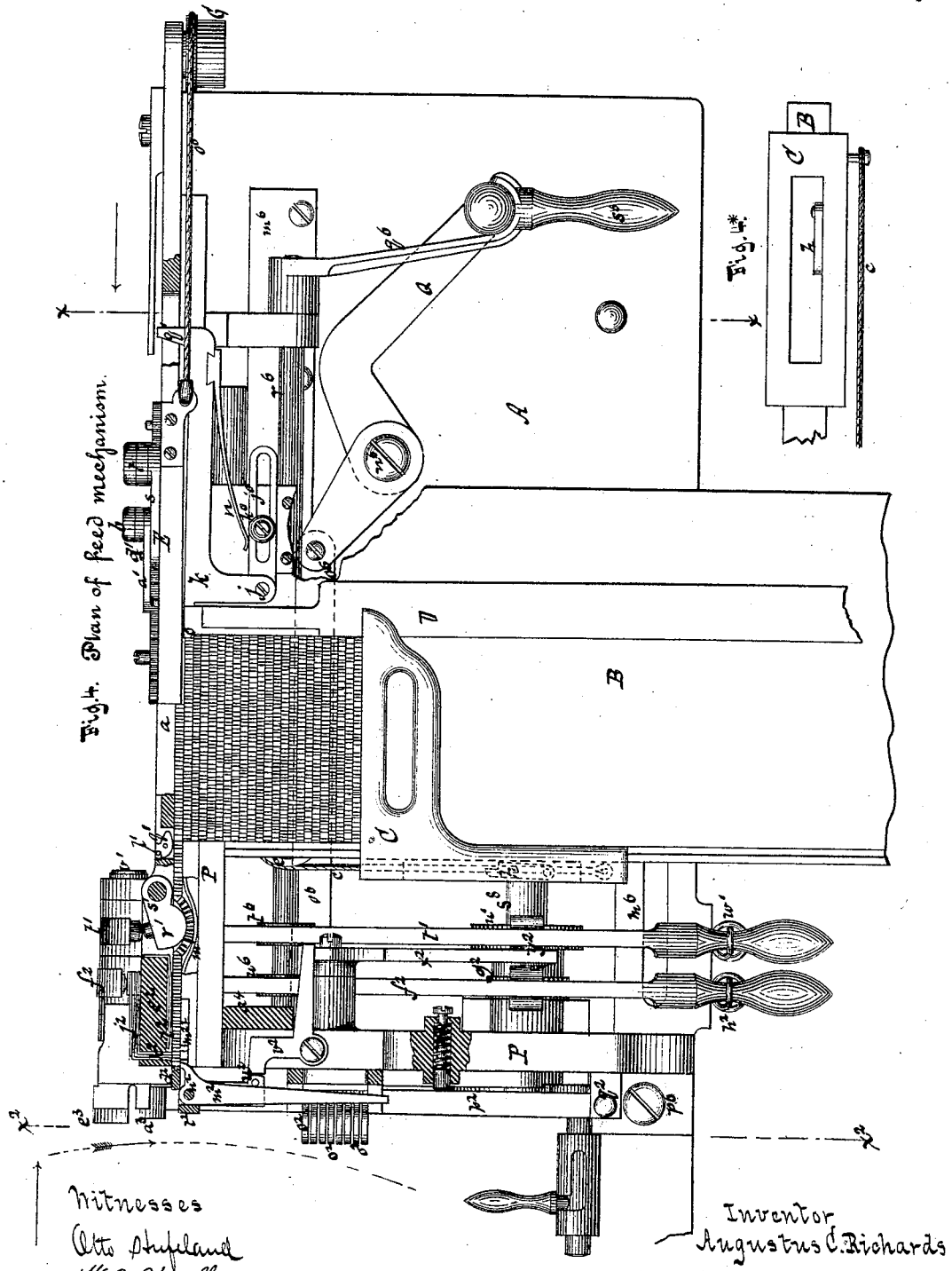

Fig. 4. Plan of feed mechanism.

Fig. 4*.

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Type-Distributing Machine.

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Fig. 5.

Section x–x fig 4.

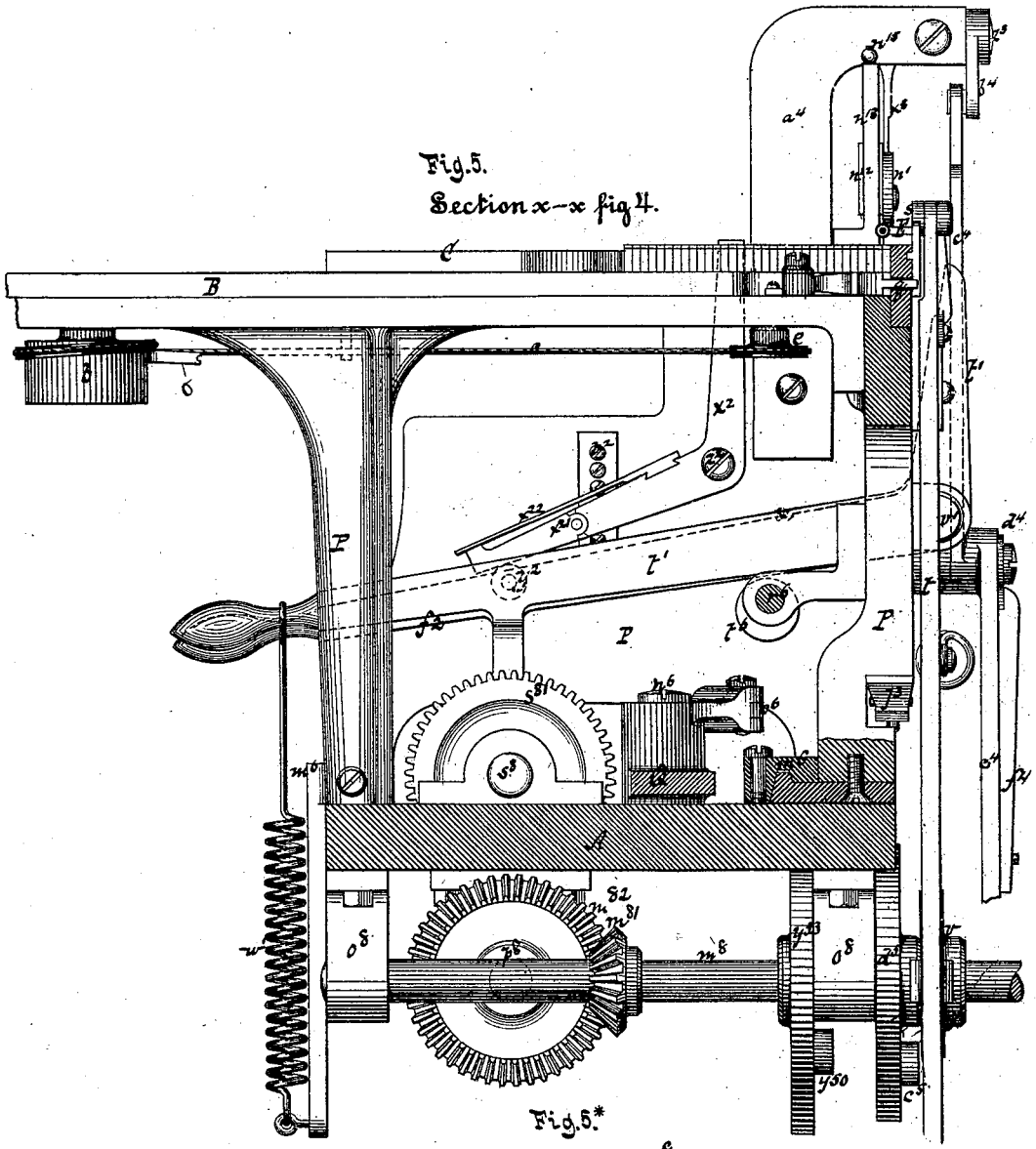
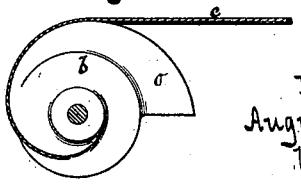


Fig. 5.*



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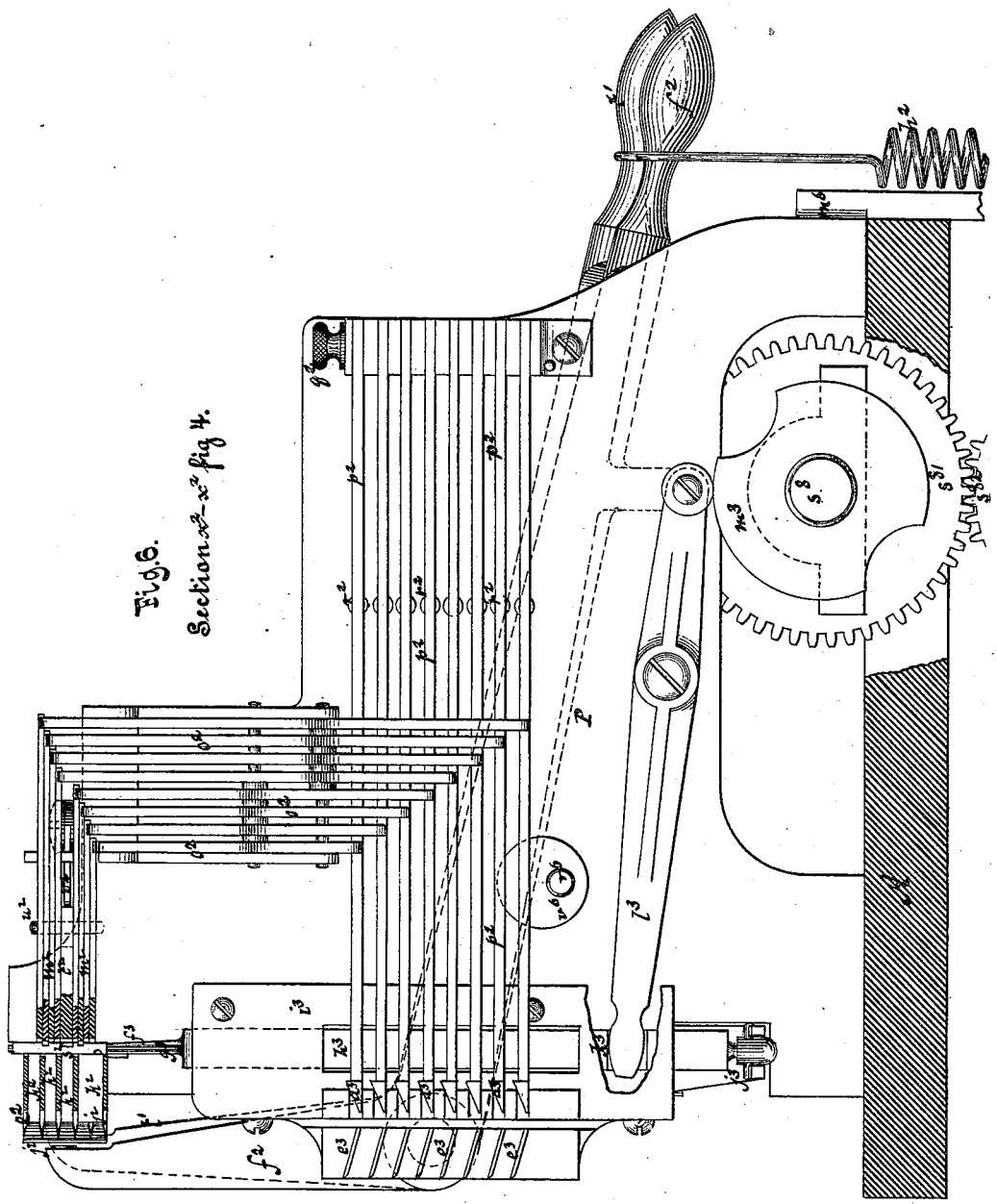

Fig. 6.
Section x²-x² fig 4.

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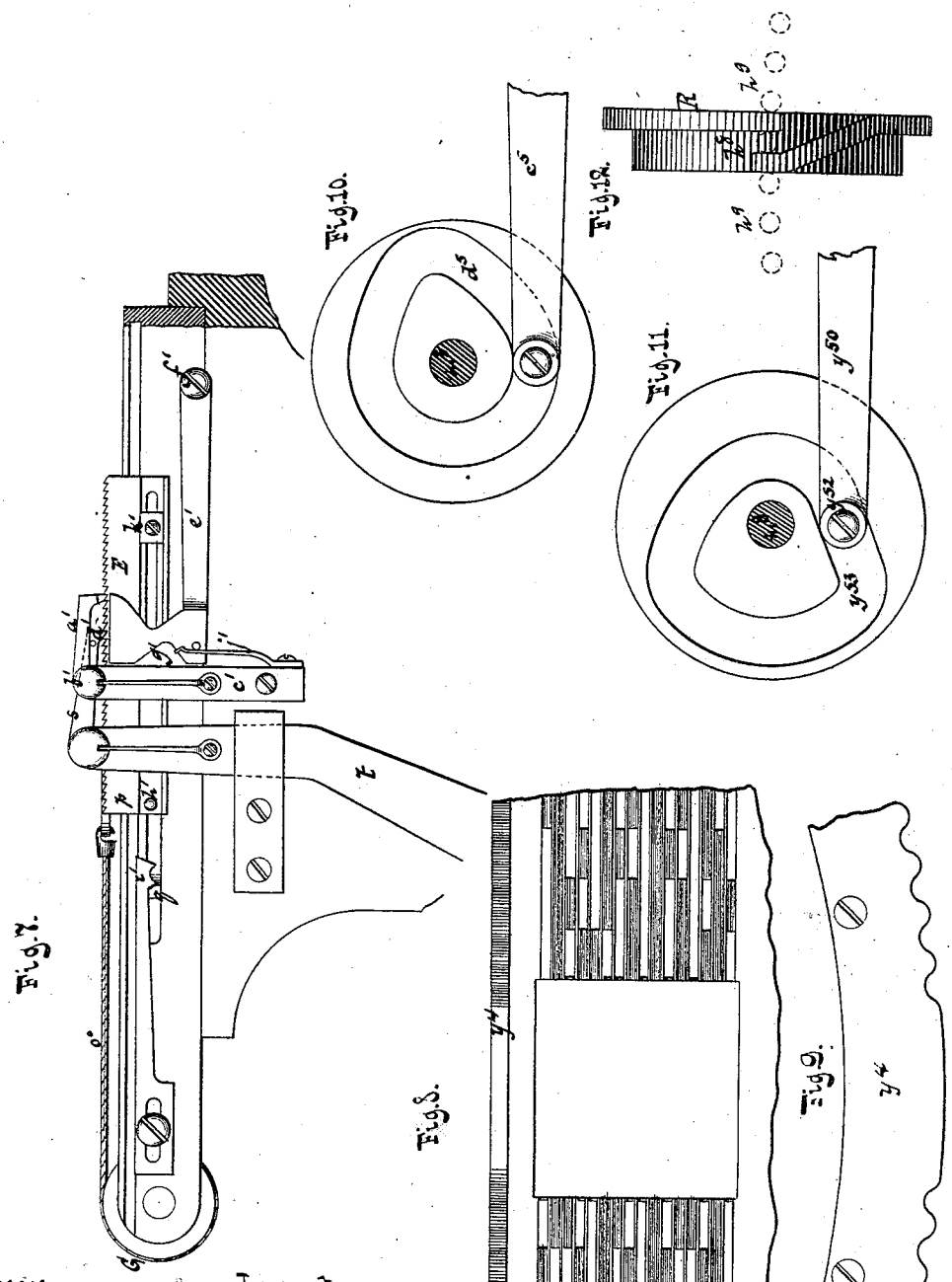

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Type-Distributing Machine.

No. 212,503. Patented Feb. 18, 1879.

Fig. 13.

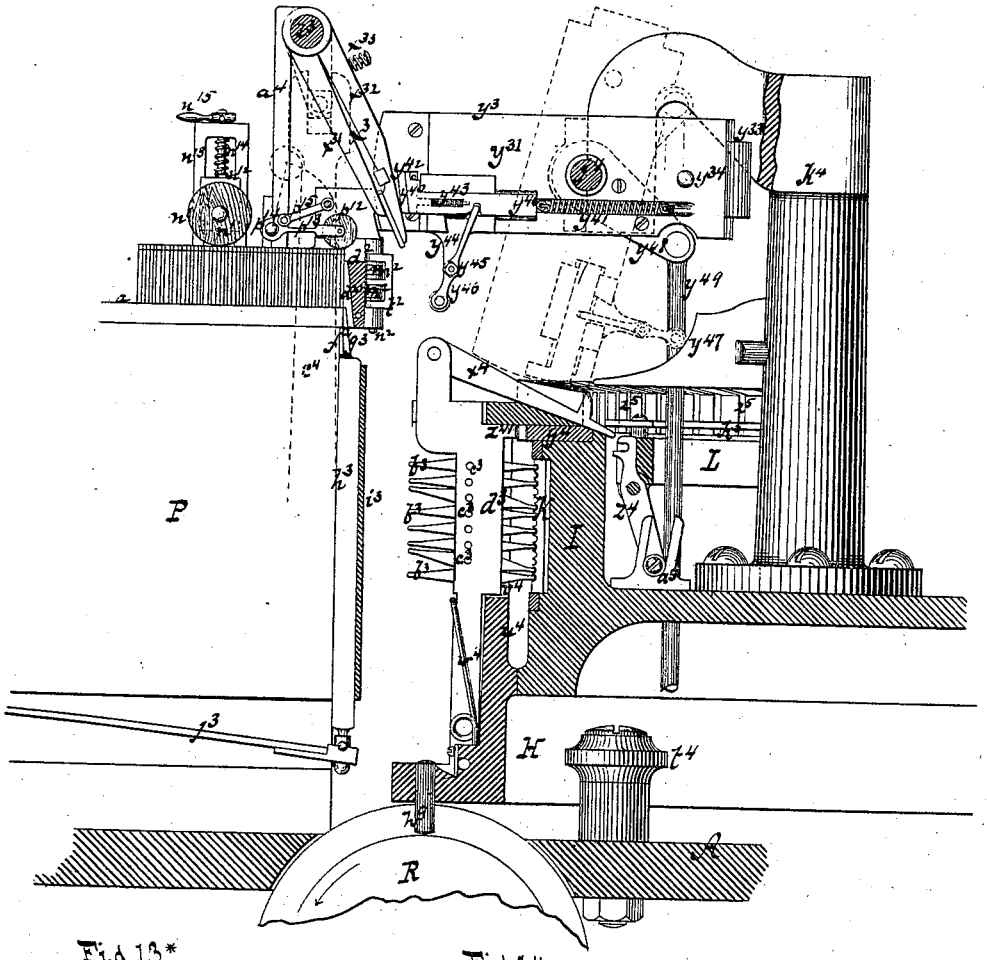


Fig. 13.*

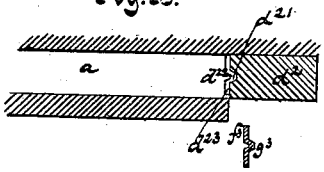


Fig. 14.

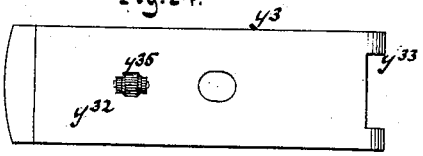


Fig. 14.*

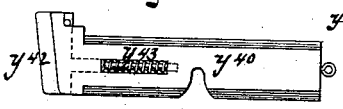


Fig. 14.**

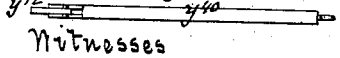


Fig. 15.

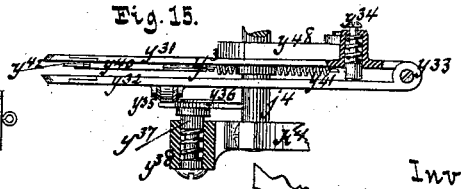
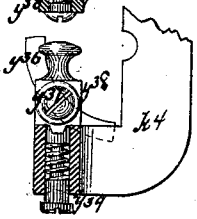


Fig. 16.



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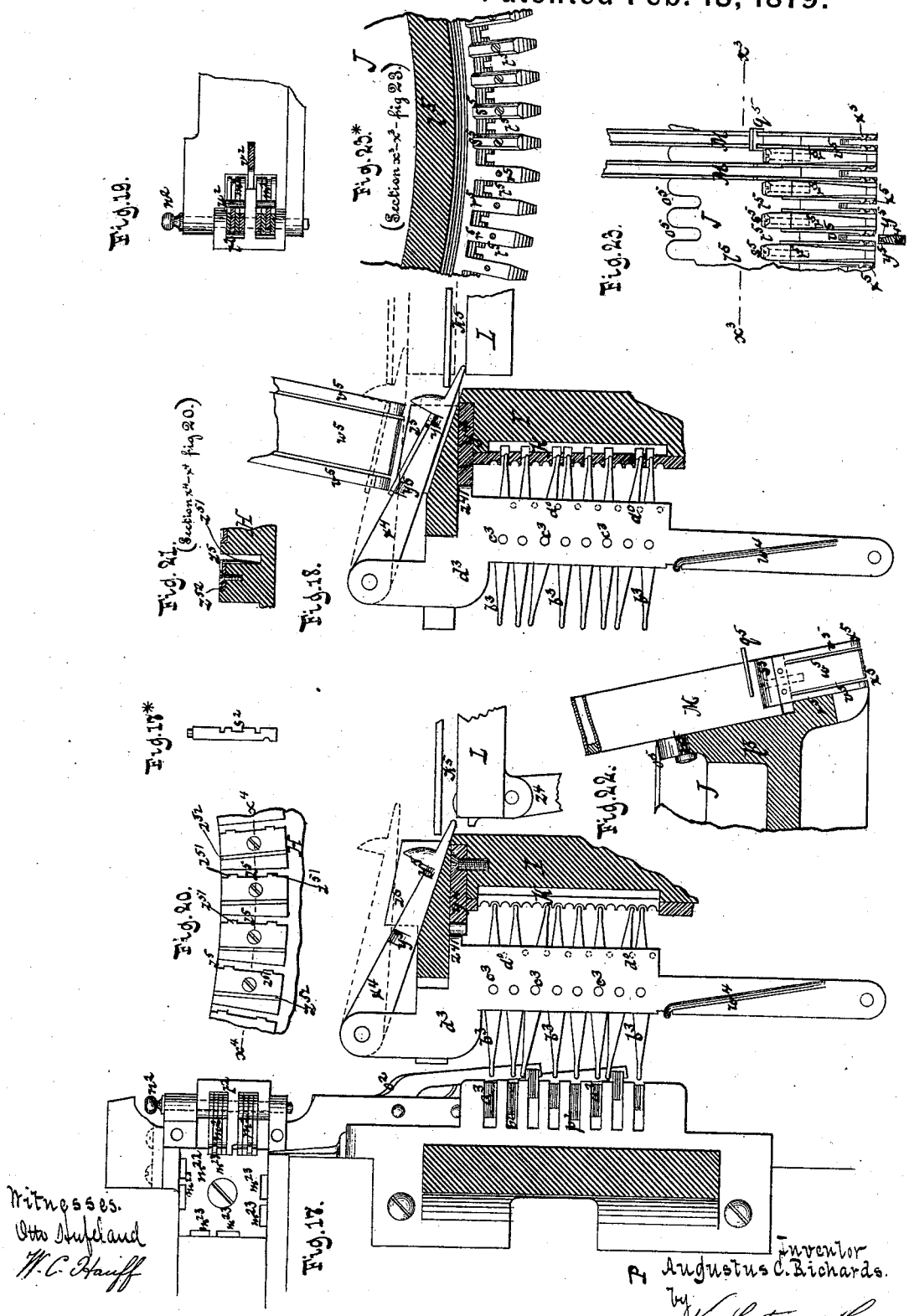

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Type-Distributing Machine.

No. 212,503. Patented Feb. 18, 1879.

Fig. 24.

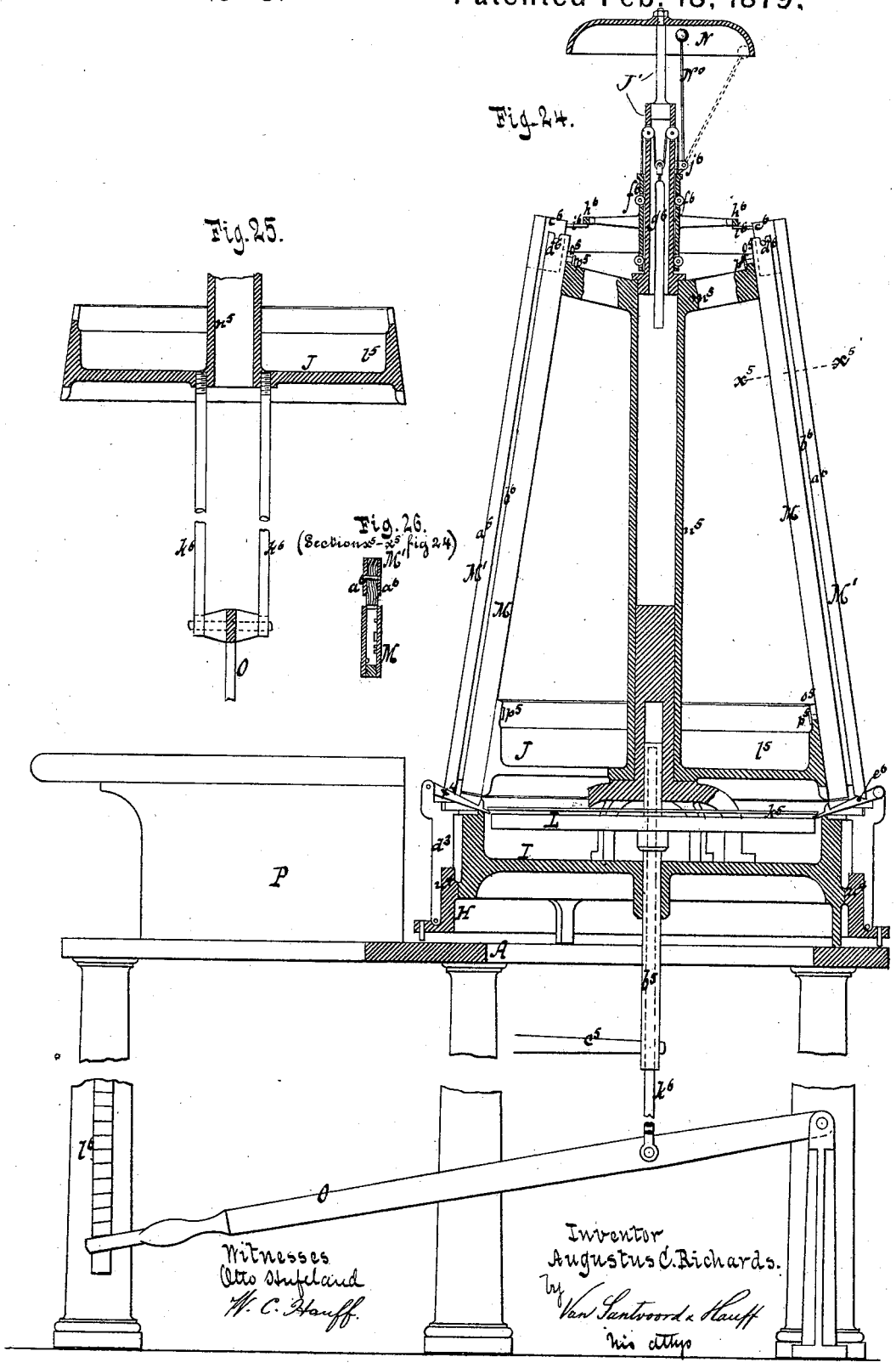

Fig. 25.

Fig. 26. (Sections x^5-x^5 fig 24)

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UNITED STATES PATENT OFFICE.

AUGUSTUS C. RICHARDS, OF IRVINGTON, NEW YORK.

IMPROVEMENT IN TYPE-DISTRIBUTING MACHINES.

Specification forming part of Letters Patent No. **212,503**, dated February 18, 1879; application filed July 5, 1878.

To all whom it may concern:

Be it known that I, AUGUSTUS C. RICHARDS, of Irvington, Westchester county, and State of New York, have invented a new and useful Improvement in Type-Distributing Machines, which invention is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side view. Fig. 2 is a longitudinal vertical section in the plane x' x', Fig. 3. Fig. 3 is a plan or top view.

The remaining figures are details, which will be referred to as the description progresses.

Similar letters indicate corresponding parts.

This invention relates to certain improvements on that class of machines for distributing types for which a patent was granted to John T. Slingerland, June 6, 1871, No. 115,777, and in which the dead matter, column after column, is placed on a galley, thence fed, line after line, into a channel, from which the types are transferred, one after the other, into suitable cases arranged on the circumference of a cone, as will more fully appear from the following description.

In the drawings, the letter A designates a frame, of cast-iron or any other suitable material, which supports on one end the galley, together with the mechanism for feeding the column and the lines, and for transferring the types, one after the other, to the distributing mechanism, which occupies the other end of the frame A, as shown in Figs. 1, 2, 3, and 24. B is the galley, on which is placed the dead matter to be distributed, one column after the other, and which is provided with a column-feeder, C, (see Figs. 3, 4, and 5,) by which the column is constantly pressed toward the type-channel *a*.

The column-feeder is fitted on the edge of the galley so that it slides thereon with ease, and its action depends upon a coiled spring, which is inclosed in a barrel, *b*, (see Figs. 5 and 5*,) which connects with the column-feeder by a catgut cord, *c*, running over a pulley, *e*. (See Figs. 3, 4, and 5.) The barrel *b* is made in the form of a fusee, so that the strain exerted by said spring on the column-feeder decreases as the feeder moves toward the type-channel *a*. If the column-feeder is in its outward position, the cord *c* is wound on the small portion of the fusee *o;* but as the column-feeder moves in, the cord *c* is taken up by the gradually-increasing fusee, so as to reduce the strain on the column-feeder in proportion to the decrease of the matter to be pushed forward by said feeder. By this arrangement I produce a similar effect to that produced in Slingerland's machine by a spiral spring, connected to the column-feeder by a cord running over a series of pulleys; and by my fusee I am enabled to regulate the strain on the column-feeder with perfect accuracy, which is difficult to accomplish by Slingerland's device.

In the side flange of the column-feeder is fitted a latch, *h*, (see Figs. 4 and 4*;) and if the column-feeder is drawn clear back this latch can be made to catch over the outer edge of the galley, and thereby the column-feeder can be retained against the action of its spring, and time is obtained to put in a new column.

The galley is adjusted to the width of the column by means of a side plate, D, (see Figs. 3 and 4,) which is provided near its outer end with a fulcrum-screw, *l*, (see Figs. 1 and 3,) which is adjustable in a slot, *m*, in the galley. The inner or free end of the side plate is pressed up against the column of type by a bell-crank lever, *k*, which has its fulcrum on a pivot, *j*, (see Figs. 3 and 4,) and which is subjected to the action of a spring, *n*. The pivot *j* is secured in a slotted plate, j^0, which is adjustable on the galley by a set-screw, k^0, so that the bell-crank lever *k* can be adjusted to the width of the column.

From the inner edge of the side plate projects a lip, *o*, (see Figs. 3 and 4,) which bears against that line of the column next to the line of type being fed by the line-feeder, so that the full pressure of the spring *n* is brought to bear on said first line, and this line held tight enough to form the inner wall of the type-channel *a*, and also to neutralize the pressure of the column-feeder and prevent the column of type from pressing against the line-feeder, which would interfere with the free action of said line-feeder on its return motion.

By making the bell-crank lever *k* adjustable, the pressure exerted by it on the column side

plate is rendered uniform at all times, and its releasing-nose q is adjusted at the same time, as will be more fully explained hereinafter.

E is the line-feeder, which slides on the outer wall of the type-channel a, and the motion of which is produced by mechanism shown in Figs. 2 and 7. The line-feeder connects by a cord, o^0, with the barrel G, containing a coiled spring, and is provided with a downwardly-projecting flange, p, which serves to release the column side plate by striking against the nose q, projecting from the bell-crank lever k, whenever the line-feeder is allowed to follow the action of its spring.

When a new line is to be fed into the type-channel a, the line-feeder flies back, and as the flange p strikes the nose q the column side plate, D, is relieved from the pressure of the bell-crank lever k, the first line of the column is released, and the whole column can follow the action of the column-feeder.

The line-feeder is moved forward by a feed-pawl, s, which is attached to the upper end of a lever, t, that has its fulcrum on a pivot, u, (see Fig. 2,) and is subjected to the action of a cam, v, and of a spring, w. At the moment the low portion of said cam comes opposite the friction-roller t^0, secured to the lever t, the spring w causes the line-feeder to advance until the line of type in the type-channel strikes the abutment at the extreme end of said channel; and as the motion of the cam proceeds, the feed-pawl is drawn back, ready for a new forward motion, the line-feeder being retained in the meantime by a stop-pawl, a^1, which swings on a pivot, b^1, secured in a bracket, c^1, which is firmly secured to the outer wall of the type-channel.

In the side of the feed-pawl is secured a pin, d^1, which extends beneath the stop-pawl a^1, and under the feed-pawl is situated the gravitating-lever e^1, which has its fulcrum on a pivot, f^1, secured on the outside wall of the type-channel. In the front edge of the lever e^1 is a recess, g^1, and in the flange p of the line-feeder is secured a pin, h^1. When the line-feeder has reached the forward end of its stroke, the pin h^1 enters the recess g^1 in the gravitating-lever e^1, said lever is raised up and brought in contact with the feed-pawl, the feed-pawl is lifted, and the pin d^1 throws the stop-pawl a^1 out of gear with the line-feeder, and the line-feeder, being free to follow the action of its spring, flies back. As it reaches the outer end of its stroke, the pin h^1 is caught by a spring-hook, i^1, to prevent recoil, and at the same moment both the pawls drop into gear with the line-feeder, and, as soon as the cam v allows it, the spring w draws the line-feeder up in contact with the line of type in the type-channel. To insure the action of the gravitating-lever e^1, it is subjected to the action of the spring j^1, which is so arranged that the same, after having been raised by the pin h^1, is caused to fly up by the action of said spring, and thereby the pawls are thrown out of gear with the line-feeder without fail. Furthermore, a pin, k^1, is secured in the flange p of the line-feeder, and as the line-feeder flies back this pin strikes the inner curved edge of the gravitating-lever and depresses the same with a positive motion.

For the purpose of arresting the action of the feed-lever t, and to stop the feed, an eccentric, v^*, Fig. 2, is placed close to the edge of said feed-lever. This eccentric is mounted on a shaft which can be turned by a handle, t^*, Fig. 1, and by turning this handle in the proper direction the feed-lever is forced back clear of the cam v. The handle t^* is situated in a convenient position to be reached by the attendant.

By the action of the line-feeder the type are pushed along in the type-channel a, and opposite to the edge of the galley (see Fig. 4) is situated an eccentric-button, q^1, the purpose of which is to prevent the last type from tumbling in front of the subsequent line of the column about being fed into the channel a. When the line-feeder has gone back, under the action of its spring, this button is exposed to the action of a spring, l^1, which keeps it in such a position that the type can freely pass the same.

If the line-feeder reaches the inner end of its stroke, the flange p strikes the button q^1, so as to clamp the last type against the edge of the galley. If a spring is used for this purpose, as is described in Slingerland's Patent No. 115,777, the type are constantly exposed to a uniform pressure, and the last type cannot be retained with sufficient force.

While passing through the type-channel, the type are exposed to the breaker r^1, (see Fig. 4,) which consists of a dog, connected to the outer wall of the type-channel by a pivot, s^1, and which is subjected to the action of a lever, t^1, actuated by a cam, u^1. (See Figs. 1, 2, and 4.) Said lever has its fulcrum on a pivot, v^1, (see Figs. 2 and 5,) and it is pressed down on its cam by a spring, w^1. (Also shown in Figs. 1, 4, and 5.) As the cam revolves, the lever is alternately raised by said cam, and then it is depressed by the spring, and whenever it is depressed the breaker r^1 is forced in the position shown in Fig. 4, and the type are effectually separated one from the other.

In order to allow the breaker to act, a cavity is formed in that portion of the inner wall of the type-channel opposite to said breaker, and into this cavity is placed a spring, m^1, which yields under the action of said breaker, as illustrated in Fig. 4. This breaker is indispensable, since the type, after having been printed from, are liable to stick together very hard, and considerable power is required sometimes to separate them. After having passed the breaker r^1, the type are exposed to the action of a roller, n^1, which is mounted in a slide, n^{12}, which moves (see Figs. 1, 2, and 13) up and down between guides n^{13}, and is depressed by a spring, n^{14}. A hand-lever, n^{15}, serves to raise the slide n^{12}, so as to relieve the type from the

pressure of the roller n^1. The object of the roller n^1 is to keep the type down on the bottom of the type-channel.

The mouth of the type-channel *a* is closed by an abutment, d^2, (see Figs. 4, 13, and 13*,) against which the first type in the line is pushed by the action of the line-feeder.

In order to allow the line-feeder to perform its functions with ease, and yet retain the type firmly in position at the required moment, that portion of the outer wall of the type-channel between the breaker r^1 and the abutment d^2 is made movable, being composed of an arm, e^2, Fig. 2, which swings on the pivot s^1 of the breaker, and which is actuated by a lever, f^2, and a cam, g^2, (see Figs. 1, 3, and 4,) the lever f^2 being made to turn on the pivot v^1, Figs. 2 and 5, and being depressed upon the face of its cam g^2 by a spring, h^2. (See Figs. 1 and 4.) When the lever is raised by the cam g^2, the arm e^2 releases the type in the type-channel, being pushed out by a spring, l^2, (see Fig. 4,) and when the lever is allowed to follow the action of its spring h^2 the arm e^2 is forced in toward the type. In the end of the arm e^2, next the abutment d^2, is a series of detents, k^2, (see Figs. 4 and 6,) being composed of slides fitted irregularly or otherwise in the arm e^2, and pressed in toward the type by springs j^2. The object of these detents is to retain the type next to the first type in the line; and said detents are placed in an irregular or other position, one above the other, so that one or more of them are sure to press upon the second type and retain the same while the first type in the line is lifted up, the motion of the detent-arm being so regulated that the detents, and also the free end of the arm e^2, are pressed against the type just before the lifter rises.

Before the lifter begins to act, however, the distributing mechanism receives its signal, whereby the first type, after having been transferred to the distributing mechanism, is caused to pass into its proper type-case. This object is effected as follows: Each type, with the exception of thin spaces, is provided in its edge with one or more nicks, and as a type advances to the abutment d^2, one or more of the nick-levers m^2 drop into the nicks, except in the case of a thin space. These nick-levers are shown in Figs. 3, 4, 6, 13, and 17. They have a common fulcrum on a vertical pivot, n^2, Fig. 17, and their tails bear against upright intermediate levers, o^2, one of which corresponds to each of the nick-levers, Fig. 6, and the lower ends of which bear each against one of a series of horizontal levers, p^2, which swing on a vertical pivot, q^2, and are pushed out against the intermediate levers by means of springs r^2. (See Figs. 4 and 6.) By the action of these springs, therefore, the intermediate levers are caused to press against the tails of the nick-levers, imparting to said nick-levers a tendency to turn on their fulcrums, so that their points will drop into the nicks of the type opposite to them—that is, the type which is bearing against the abutment d^2—whenever they are free to follow the action of the said springs r^2. It must be understood that the points of these nick-levers extend over the line of type only the thickness of the thinnest nicked type; otherwise the nick-levers would bear against the second type in some cases and prevent the first from giving its signal. Each of the types, excepting thin spaces, is also provided with a governing-nick, s^2, (see Figs. 6 and 17*,) which is situated, by preference, at the middle of the type, but may be located at any convenient spot of the type, and which is intended to receive the governor t^2. This governor is a lever, which has its fulcrum on the pivot n^2, secured in a projection of the inner wall of the type-channel *a*, (see Figs. 17 and 19,) and the tail of which is shorter than the tails of the nick-levers, and bent so as to make room for the pin u^2, which extends up close behind the edge of all the nick-levers, as shown in Figs. 4, 6, and 19.

In order to steady the governor and insure its correct position in relation to the nick-levers, said governor is made **E**-shaped, as shown in Figs. 17 and 19, and its horizontal top and bottom bars overlap the nick-levers, and increase the stability of the fulcrum-pin n^2 in the governor. Opposite the tail of the governor is an elbow-lever, v^2, which is acted on by a bell-crank lever, x^2, Figs. 4 and 5. When this bell-crank lever is moved in the proper direction, it causes the elbow-lever v^2 to bear against the tail of the governor, and to force its point out of the governing-nick. Said bell-crank lever is situated close to the side of the breaker-lever t^1, and in this breaker-lever is secured a stud, y^2, which bears on the bell-crank lever whenever the breaker-lever is raised by the action of its cam u^1, and causes the same to throw the governor out of the governing-nick, and at the same time the pin w^2 in the governor recovers all the nick-levers, with the intermediate levers, o^2 and p^2. The principal object of the governor, however, is to prevent any of the nick-levers from giving a wrong signal if the first type should by some accident be raised, and not be close down and resting upon the bottom of the type-channel; for if the type is not in correct position the governor is not able to fall in the governing-nick, and the pin u^2 prevents either of the nick-levers from falling in any of the nicks which may be opposite its point; and since the governing-nicks and the point of the governor are much wider than the signaling-nicks, the governor is not able to fall in any of the signaling-nicks, and therefore it cannot fall in at all unless the type is in the correct position, and therefore it is impossible to give the wrong signals. In case the first type is raised it merely gets the signal of a thin space, and is deposited in the thin-space channel. Those portions of the type-channel through which extend the points of the nick-levers are protected by a tempered

steel plate, m^{22}, which is secured to the type-channel, as shown in Figs. 4 and 17. This plate is square, and provided with notches m^{23} in each of its four sides, so that when the notches in one of its sides become worn one of the other sides can be brought into working position.

The bell-crank lever x^2 has its fulcrum on a pivot, z^2, (see Fig. 5,) which is firmly secured on the side of the carriage which supports the galley and the type-channel a, and the motion of the breaker-lever is so timed that by its action on the bell-crank lever x^2 the governor, and consequently all the nick-levers, are recovered before the lifter begins to take action on the type; but previous to the time when the governor is recovered the signal of the nick-levers is transmitted to the distributer in the following manner: On the end of each of the levers p^2, Figs. 4, 6, and 17, is an inclined plane, a^3, and all these inclines stand opposite to a series of fingers, b^3, which are secured by pivots c^3 to the distributers d^3, so that they turn freely up or down, Figs. 13, 17, and 18, but are retained by friction in any position which they may assume, their movements being limited by small pins d^0, Figs. 17 and 18. The distributers are secured to a wheel which has an intermittent rotary motion, and just in front of the inclines a^3 is a series of recovering-inclines, e^3, Figs. 4 and 6, which are secured in a frame firmly secured to the carriage, and which slopes down in opposite directions to the signal-inclines a^3, so that the fingers of the distributers, in passing those recovering-inclines, will have their outer ends thrown in their lower position. If one or more of the nick-levers fall in nicks in the first type in the type-channel, the corresponding signal-inclines are thrown out in the path of the fingers b^3 of the distributers, (see Fig. 17;) and as the distributer passes said inclines the corresponding fingers are turned as seen in said figure, where, counting from the bottom, the second and sixth fingers of the distributer are being turned up, while the remaining pass the corresponding inclines without coming in contact with them. The type which produces this signal is shown in Fig. 17*.

By inspecting Fig. 6 it will be seen that the incline-levers p^2 are pivoted at their ends, whereby the same are enabled to swing in and out without being liable to stick or be retarded in their motion by friction, which is inevitable if the same are made in the form of slides.

By inspecting Fig. 4 it is seen that the signaling-inclines are in front of the type-channel a, the distributers moving past said inclines in the direction marked opposite to them, so that each distributer receives a set corresponding to the first letter in the type-channel before it arrives opposite the mouth of said type-channel. As soon as the distributer has passed the signaling-inclines, and before the wheel which carries said inclines moves its next step, the nick-levers and the governor fall back so as to free the type, and said type is lifted up and delivered to the distributer by the following means: The abutment d^2 extends across the whole width of the type-channel, (see Figs. 4 and 13*,) and is provided with a recess, d^{21}, (see Figs. 13 and 13*,) while the bottom of the type-channel is provided with a projection, d^{22}, which supports the central part of the first type in the type-channel, leaving an opening, d^{23}, beneath which is situated the lifter f^3, (see Figs. 6 and 13,) which is provided with a rib, g^3, fitting the recess d^{21} in the abutment, and with two wings, which act on the type on both sides of the projection d^{22}, so that the type is raised up square without fail. The said lifter is firmly secured to a slide, h^3, which moves in a guide, i^3, (best seen in Fig. 6,) and which is exposed to a spring, j^3, (see Figs. 2 and 13,) which has a tendency to force the slide and the lifter upward. In the slide h^3 is a recess, k^3, which engages with the head of a lever, l^3. (See Fig. 6.) This lever receives an oscillating motion by a cam, m^3, with which it is held in contact by the action of the spring j^3; and whenever one of the low portions of the cam m^3 comes opposite the end of said lever the slide h^3 is forced up by the spring j^3, and the type in the type-channel is forced up by the action of the lifter f^3.

The cam m^3 is, by preference, made in the form of a cam-groove or as a covered cam, so as to impart to the lifter a positive motion in either direction, and it is so shaped that the upward motion of the lifter is instantaneous, whereby the first type in the line is carried up without disturbing the type next to it, which type, being subjected to the action of some of the detents k^2, has a tendency to retain its position close down to the bottom of the channel. If the lifter is made to act slowly or gradually, the friction between the first type and that next to it is liable to occasionally cause the second type to rise somewhat with the first, whereby the correct operation of the machine would be disturbed; though, on account of the governor, the type thus thrown out of its correct position would not go into any of the ordinary type-cases, but, when delivered to the distributing mechanism, would be passed in the thin-space channel—a channel intended to receive all those types for which neither of the distributers has received a signal; for, by reference to the previous description of the governor, it will be recollected that if a type, when brought to the end of the type-channel, and opposite the tips of the governor and the nick-levers, should not be clear down on a level with the bottom of the type-channel, then the governor-nick in said type will not be in position to allow the governor to fall in, neither of the nick-levers is able to fall in, and consequently no signal will be given to the distributer passing at that moment to the position opposite the type-channel, and the type being subsequently delivered to this dis-

tributer will go into the thin-space channel, as above stated, and as will be hereinafter more fully explained.

In order to insure the correct position of the type in the type-channel, however, and that each type will produce the required signal, a roller, p^{12}, is provided. (See Figs. 2 and 13.) This roller is mounted in the end of a lever, p^{13}, which has its fulcrum on a pivot, p^{14}, and connects by a link, p^{15}, with the lever c^4. (Shown in dotted lines in Fig. 13, and in full lines in Fig. 2.) By the action of this lever an oscillating motion is imparted to the lever p^{13}, and the roller p^{12} is caused to swing up to the position shown in dotted lines in Fig. 13, and then it is brought down upon the line of type, so as to drive the first type in the line down upon the bottom of the type-channel, if the same should have been raised by the previous action of the lifter. When this roller p^{12} is used the governor can be dispensed with.

Immediately after the type has been lifted up, as above described, it is grasped by oscillating nippers x^3, and then delivered to the conveyer y^3, which serves to deposit the same on the distributer, standing ready to receive it. These parts are seen in Figs. 1, 2, 3, 5, and 13. The conveyer is also shown in detail in Figs. 14, 15, and 16. The nippers are composed of two jaws, x^{31} and x^{32}, which are mounted on a pin, z^3, having its bearing in a standard, a^4, which rises from the carriage, supporting the type-channel. The pin z^3 turns freely in the standard a^4, and the jaw x^{31} is firmly secured to said pin, while the jaw x^{32} turns loosely thereon, being drawn up toward the jaw x^{31} by a spring, x^{33}. (See Fig. 13.) The jaw x^{32} is longer than the jaw x^{31}, so that when the nippers swing back over the type the jaw x^{31} passes over its head, while the jaw x^{32} strikes against it. The pin z^3 extends through the standard a^4, and on its rear end is firmly mounted a crank, b^4, which is acted on by a lever, c^4. (See Figs. 2 and 5.) This lever turns freely on a pivot, d^4, and it is provided at its lower end with a roller-stud, e^4, which is held in contact with a cam, h^4, by a spring, f^4. When one of the low portions of the cam h^4 comes opposite the roller-stud e^4, the nippers x^3 swing back, and as the loose jaw x^{32} strikes the first type in the chamber a its motion is arrested, while that of the rigid jaw x^{31} proceeds, and thereby the nippers are opened against the action of their spring x^{33}. At this moment the action of the lifter f^3 takes place, and as the motion of the cam h^4 proceeds, the lever c^4 is thrown in the position shown in Fig. 2, and as the jaw x^{31} of the nippers is carried back toward the jaw x^{32} the nippers close up and grasp the type previously lifted by the action of the lifter f^3, and then carry it out to the position shown in Fig. 13. By this outward motion of the nippers the type is carried between the jaws of the conveyer y^3; and as the nippers are somewhat narrower than the type, and the jaws of the conveyer close up, the type is grasped by said jaws and withdrawn from the nippers, and then deposited on the distributer, as will be presently explained.

As the nippers swing back to grasp the type being raised by the lifter f^3, the roller p^{12}, being connected to the same lever which imparts motion to the nippers, is caused to swing back, so as to allow the first type in the line to follow the action of the lifter and to permit the nippers to grasp said type.

The jaws of the conveyer y^3 are mounted on a rock-shaft, j^4, which has its bearings in a bifurcated standard, k^4, (see Figs. 2, 3, and 13,) which rises from the base-cylinder I. Said conveyer consists of two jaws, y^{31} and y^{32}, which are connected by a hinge-joint, y^{33}. The jaw y^{31} is firmly mounted on the rock-shaft j^4, while the jaw y^{32} turns loosely thereon, and is adapted to open from, or close up to, the rigid jaw. In this rigid jaw is secured a spring-bolt, y^{34}, which has a tendency to open the loose jaw. On the outer surface of this loose jaw is secured a friction-roller, y^{35}, which, by the action of the spring-bolt y^{34}, is held in contact with a cam-plate, y^{36}, secured to a pivot, y^{37}, which extends through a swivel-head, y^{38}, fitted to one of the arms of the standard k^4. (See Figs. 2, 15, and 16.) This swivel-head is retained in position by a spring-bolt, y^{39}, Fig. 16, and if this spring-bolt is retracted said swivel-head, together with the cam-plate y^{36}, can be turned round, so that the loose jaw y^{32} can be thrown wide open, and the inner surfaces of both jaws y^{31} and y^{32} can be conveniently reached. On the inner face of the rigid jaw y^{31} is secured a pusher, y^{40}, detached views of which are shown in Figs. 14* and 14**. Said pusher is exposed to the action of a spring, y^{41}, which has a tendency to draw it back, as shown in full lines in Fig. 13. In the pusher is fitted an auxiliary pusher, y^{42}, which is exposed to the action of a spring, y^{43}, that has a tendency to force the same out to the position shown in Fig. 14*, and in full lines in Fig. 13.

From the lower edge of the rigid jaw y^{31} extends the projection y^{44}, which forms the bearing for a pivot, y^{45}, on which swings a spring-lever, y^{46}. The upper end of this spring-lever engages with a recess in the edge of the pusher y^{40}, and if the conveyer swings down to the position shown in dotted lines in Fig. 13 the outer end of the spring-lever y^{46} strikes a cam-plate, y^{47}, projecting from the bifurcated standard k^4, and the pusher is forced outward so as to deposit the type previously held between the jaws of the conveyer on the distributer. During this motion the auxiliary pusher recedes against the action of its spring y^{43}; but it serves to hold the type securely down on the distributer-lifter after said type has left the jaws of the conveyer, and it prevents the type from rebounding until the main pusher comes to bear on the same.

The conveyer y^3 is moved from the position shown in full lines in Fig. 13 by means of a crank, y^{48}, which is firmly secured to the rigid

jaw, and which connects by a rod, y^{49}, with the lever y^{50}. (See Fig. 2.) This lever has its fulcrum on a pivot, y^{51}, secured in a bracket attached to the main frame A, and its loose end is armed with a roller-stud, y^{52}, (see Fig. 11,) which engages with the cam-groove y^{53}. As the conveyer begins to turn down from the position shown in full lines in Fig. 13 to that shown in dotted lines, the roller y^{35} on the outer surface of the loose jaw y^{32} travels up on the cam-plate y^{36}, and it closes up so as to grasp the type and withdraw the same from the nippers, and by the time the conveyer has reached the position shown in dotted lines in Fig. 13 the roller y^{35} has passed the high portion of the cam-plate y^{36}, and the jaw y^{32} is allowed to open, so as to release the type and allow the same to follow the action of the pusher.

The distributer d^3 consists, chiefly, of flat metal plates, which are pivoted at their bottom ends to a ring or wheel, H, which embraces the cylindrical base I, on which rests the type-cone J, said wheel being supported by three or more bolsters, t^4, (see Figs. 2 and 13,) secured to the platform or main frame A. (See Fig. 2 and others.) From the upper edge of the wheel H projects a rim, u^4, which is provided with a number of slots, v^4, Figs. 1 and 13, corresponding in numbers and position to the distributers, and forming the guides for the same. Weak springs w^4 (see Figs. 13, 17, and 18) have a tendency to draw the distributers inward. On each of the distributers is secured a series of fingers, b^3, which receive the signals of the type by the action of the nick-levers m^2 and inclines a^3, as previously described; and the inner ends of these fingers are opposite a ring, K, which is secured to the base-cylinder I, and which is provided with a system of perforations, a portion of which is shown in Fig. 8.

On the circumference of the cone J are secured the type-cases M, into which the type are to be delivered, and the perforation of the ring K under each case corresponds to the signal produced by the nicks in the type which are to go into said type-case. As the fingers on the distributers are also set to correspond to the nicks in the type and to the perforations of the ring K, each distributer on arriving under that type-case where the perforations of the ring K correspond to its set, is allowed to be driven in by the action of its spring w^4, and the type previously deposited on said distributer is lifted up into the type-case, as will hereinafter be more fully explained; but where the perforations of the ring K do not correspond to the set of the distributer, some of the fingers strike the solid portions of the said ring and prevent the distributer from falling in.

When a distributer has fallen in, it is recovered at the subsequent forward motion of the wheel H by a scalloped rim, y^4, secured to the top of the base I, and so constructed that the depressions in said rim are situated one under each type-case, while the projections or raised parts thereof bear against lips z^{41} on the distributers, and force the same back against the action of their springs as the motion of the wheel H progresses. A plan of this scalloped rim is shown in Fig. 9, and a front view of a portion thereof in Fig. 8.

To the top of each distributer is pivoted a lifter, x^4, which receives the type from the conveyer y^3, as follows: Just below the conveyer the perforated ring K is cut away, as shown in Figs. 8 and 13, so that the fingers of all the distributers can freely follow the action of the recovering-inclines e^3; and in order to force the fingers out against the recovering-inclines, the circumference of the scalloped rim at that point is continuous, as shown in Fig. 9.

The lifter of each distributer, as the same passes under the conveyer, is raised by the action of a hook, z^4, (see Fig. 13,) which is attached to a ring, L, by a pivot, and which receives an oscillating motion by an inclined forked standard, a^5, as will be presently more fully explained.

The ring L is fitted loosely in the base-cylinder I, and it is firmly secured to a vertical spindle, b^5, which extends down through the center of the base-cylinder, and engages with the lever c^5, (see Fig. 2,) to which an oscillating motion is imparted by a cam-groove, d^5. (Also shown in Fig. 10.) By the action of this lever, therefore, a rising and falling motion is imparted to the ring L, and whenever said ring rises the hook z^4 is thrown forward, so as to catch the point of the lifter x^4, and to raise the same close up to the mouth of the conveyer. At the same moment the pusher y^{40} of the conveyer forces the type held by said conveyer out and deposits the same on the raised lifter. As soon as a type has been thus deposited on the lifter, the lifting-ring L is drawn down, and, by the action of the hook z^4, the lifter x^4 is also carried down with a positive motion, and then the distributer is carried forward by the motion of the wheel H, so that its fingers engage with the perforations of the ring K whenever the lip z^{41} of the distributer comes opposite to one of the depressions of the scalloped rim. If the perforations of the ring K at that point correspond to the set of the fingers, the distributer falls in and its type is lifted into its type-case above; but if the perforations in the ring K do not correspond to the set of the fingers, the distributer cannot fall in, and it moves on with its type until it arrives under that case where it can fall in for the purpose of delivering its type.

The lifters of all the distributers which are in a position to fall in engage with an annular recess, K^5, formed in the lifting-ring L, said recess being opposite to the points of the lifters when the ring L is in its lowest position. (See Figs. 2, 17, and 18.) Just below the conveyer, however, a portion of the lifting-ring is cut away to make room for the hook z^4. (See Fig. 13.)

By the upward motions of the lifting-ring

the lifters of all such distributers which have fallen in at that particular moment are carried up, and the type resting on said lifters are forced into the appropriate type-cases M, as shown in dotted lines in Fig. 18.

It is obvious that the upward and downward motion of the lifting-ring must take place at those times when the distributer-wheel H remains stationary; but the mechanism whereby these motions are produced is so simple that it will be readily understood by the previous description.

The type-cases M are secured to the circumference of the cone J, which is made of cast-iron, the type-cases being secured thereto in such a manner that they can be readily taken off when filled and transferred to the setting-machine, or the type can be lifted out, as best suits the attendant.

The cone J consists of two sections, l^5 m^5 which are cast solid with the central hub, n^5, one at the top and one at the bottom, and each of which is provided with a series of recesses, o^5, to admit pins p^5, which project from the backs of the type-cases, (see Figs. 2, 22, 23, and 24,) said pins being provided with heads, so that when they are caused to engage with the recesses o^5 the type-cases are securely retained in position. Each of the type-cases is provided near its bottom with a slot to receive a slide, q^5, which serves to support the line of type contained in a case when the same is to be taken off from the cone. From the bottom of the lower section, l^5, of the cone projects a rim, r^5, on which a ring, s^5, is secured, and both the rim r^5 and ring s^5 are milled out to form spaces t^5, for the reception of the bottom ends of the cases. (See Figs. 22, 23, and 23*.) To the inner surfaces of the recesses t^5 in the ring s^5 are secured, one opposite to the other, thin plates of steel, each of which is divided in a middle section, w^5, and two outside sections, v^5, each of which forms a separate spring. The distance between the inner surfaces of these springs is equal to the width of the distributer-lifter x^4, and the outside springs, v^5, are provided on their inner surfaces each with a nose, x^5, (see Fig. 23,) and the distributer-lifters x^4 are provided with chamfered recesses y^5 opposite to the outside springs, v^5. (See Fig. 18.) If one of the distributer-lifters is raised up to the position shown in dotted lines in Fig. 18, the noses x^5 slide over the type resting on said lifter, while the middle springs, w^5, prevent said type from moving sidewise, and after the noses x^5 have passed the type they drop into the recess y^5 in the lifter, so that they catch beneath the type and retain the same, while the lifter recedes to the position shown in full lines in Fig. 18.

The several distributers work in radial slots z^5 (see Figs. 20 and 21) in the upper surface of the distributer-wheel H, and the lower ends of the springs v^5 w^5 are in close proximity to the upper surface of said wheel, (see Fig. 18,) so that the type cannot drop off from the distributer-lifters while they are being raised up between the springs.

In the radial slots z^5 are placed friction-springs z^{51}, (see Figs. 20 and 21,) for the purpose of preventing accidental displacement of the lifters and of the type resting thereon after the same have been depressed by the pusher y^{40} of the conveyer. These springs are constructed of thin steel plates, each of which is provided with two downwardly-projecting branches, which latter form the springs proper. The bodies of the spring-plates are strengthened by supporting-plates z^{52}, which are soldered to said spring-plates, so that they can be readily secured to the wheel H each by a single screw.

Each of the type-cases is provided with a knocker, M′, which serves to retain the type in the proper position. Each of these knockers (see Figs. 24 and 26) consists of two strips of metal, a^6, between which is secured a strip of wood, b^6, and a piece of metal, c^6, the latter being situated between the top ends of the strips a^6. In the metal piece c^6 is secured a pin, d^6, which engages with a recess in the top end of the appropriate type-case M, so that the lower end of the knocker can swing in and out. The bottom edge of one of the strips a^6 is beveled off, (see Figs. 2 and 24,) and each of the lifters is provided with a pin, e^6, which projects from one of its sides, so that whenever one of the lifters rises to deliver a type into one of the type-cases M, its pin e^6 acts on the beveled edge of the appropriate knocker M′ and forces the same back, and when the lifter drops the knocker strikes against the faces of the type in the type-case M. By this means such of the types as have moved forward are forced back to the bottom of the type-cases.

Whenever one of the type-cases becomes full of types an alarm is given by the following means: On the upper part of the tubular hub n^5 of the cone J is fitted a sleeve, f^6, which is balanced by a weight, g^6. (See Fig. 24.) On the sleeve f^6 is secured a ring, h^6, which extends over pins i^6, extending from the upper ends of the knockers M′. On the top of the stem J′ is secured a gong, N, and to the outside of said stem is attached a clapper, N⁰, the shank of which swings on a pivot, j^6. The lower end of this shank bears against the top edge of the sleeve f^6, so that when said sleeve occupies the position shown in Fig. 24 the clapper N⁰ can be turned back to the position shown in full lines in Fig. 24; but if the sleeve is raised the clapper is thrown out to the position shown in dotted lines in the same figure, and the gong is sounded. The metal pieces c^6 of the knockers M′ extend into the type-cases M, and whenever one of the said type-cases becomes filled up the appropriate knocker is raised, the sleeve f^6 is forced up, and the gong is sounded. The full type-case is then replaced by an empty one, and by turning the

clapper back to the position shown in full lines in Fig. 24 the sleeve f^6 is returned to its original position.

In order to obtain access to the parts beneath the cone J, a lifting mechanism is provided, which serves to raise said cone and to sustain it at a convenient height. This lifting mechanism consists of a lever, O, which connects by two rods, k^6, Figs. 24 and 25, with the cone J. The outer end of the lever O engages with a rack-bar, l^6, Fig. 24, so that when said lever is raised it is retained in the desired position.

The galley, together with the mechanism for feeding the column and the lines, and for transferring the type, one after the other, to the distributing mechanism, is secured on a carriage, P, which slides on guide-rails m^5, (see Figs. 4 and 5,) so that the same, together with all the parts connected to it, can be moved away from the distributing mechanism, and that convenient access can be had to the conveyer y^3 and the mechanism connected thereto, and also to the lifter and to the signaling mechanism, which latter parts occupy the inner end of the carriage P.

A hand-lever, Q, Figs. 1, 4, and 5, serves to move the carriage toward and from the distributing mechanism. This lever has its fulcrum on a pivot, n^6, which is secured on the platform A, and it connects by means of a rod, o^6, with the carriage. When the carriage is moved toward the distributing mechanism it is arrested in the desired position by a stop, p^6, Figs. 1 and 4, and the lever Q is locked by a hook, q^6, which extends from a rock-shaft, r^6, and is made to catch over the handle of said lever Q. The carriage, therefore, cannot be moved before the rock-shaft r^6 has been turned and the hook q^6 has been made to release the handle of the lever Q.

The rock-shaft r^6 is operated by a handle, s^6, which is secured to the hook q^6, and on said rock-shaft are mounted three eccentrics, t^6 u^6 v^6, (see Figs. 1, 4, and 6;) and if the hook q^6 is drawn off from the handle Q, the eccentric t^6 raises the lever t^1, the eccentric u^6 raises the lever f^2, and the eccentric v^6, Fig. 6, depresses the lever l^3, together with the lifter-slide h^3 and lifter f^3, and thereby the levers t^1, f^2, and l^3 are brought into such positions that they clear the cams u^1, g^2, and m^3, when the carriage P is moved away from the distributing mechanism.

By referring to Fig. 5 it will be seen that the lever x^2, which controls the motion of the governor t^2, bears down upon a roller-stud, y^2, secured in the side of the lever t^1. The lever x^2 is made in two sections, which are connected by a pivot, x^{21}, and a stiff spring, x^{22}, forces the outer section of said lever down upon the roller-stud y^2. (See Fig. 5.) The object of this arrangement is to allow the outer section of the lever x^2 to yield when the lever t^2 is raised by the action of the eccentric t^6. At the same time the spring x^{22} is of such strength that the lever x^2 performs its functions when the parts are in working position.

The mechanism which imparts a step-by-step motion to the distributer-wheel H consists of a wheel, R, (see Figs. 2 and 12,) on the periphery of which are formed two grooves, h^8, which engage with pins h^9, secured in the under surface of the wheel H. As the wheel R revolves in the direction of the arrow marked on it in Fig. 2, it imparts to the wheel H the desired motion, propelling it two steps for each of its revolutions.

It remains to explain the position of the several cams in relation to the driving-shaft m^8.

By referring to Figs. 1, 2, and 5, it will be seen that said shaft is situated beneath the platform A, and that on one of its ends is mounted the driving-wheel n^8. It has its bearings in suitable journal-boxes o^8, secured to the platform A, and on it are mounted the cam v, which imparts motion to the line-feed lever t, the cam d^5, which imparts motion to the lifting-ring L, and the cam y^{53}, which imparts motion to the conveyer y^3. The shaft m^8 is geared by bevel-wheels m^{81} and m^{82} with the shaft p^8, (see Figs. 1 and 5,) which has its bearings in boxes q^8, and is geared by bevel-wheels p^{81} and p^{82} with the shaft r^8, running parallel with the driving-shaft m^8, and making one revolution to each two revolutions of said driving-shaft. On the shaft r^8 is mounted the cam R, which imparts to the distributer-wheel H the required step-by-step motion, and also the cam h^4, (see Fig. 2,) which actuates the lever c^4 and nippers x^3. On the upper side of the platform A is situated a shaft, s^8, (see Figs. 3, 4, 5, and 6,) which is geared with the shaft p^8 by cog-wheels s^{81} and s^{82}, and on which are mounted the cam u^1, which imparts motion to the breaker-lever t, the cam g^2, which imparts motion to the detent-lever f^2, and the cam m^3, which imparts motion to the lifter l^3. From this description it will be seen that the entire driving mechanism is secured to the platform A, leaving the carriage P free to be moved in and out, as above described.

I distinctly disclaim everything shown and described in Slingerland's Patent No. 155,777.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the galley and with the column-feeder C, of a barrel containing a coiled spring, a fusee formed by or connected to said barrel, and a cord or chain extending from the fusee to the column-feeder, for controlling the pressure exerted by the column-feeder on the column of types, substantially as set forth.

2. The combination, with the column side plate, D, of a bell-crank lever, k, slotted plate j^9, and spring n, to retain a uniform pressure of said bell-crank lever on the column side plate when the latter is adjusted to columns of different widths, substantially as described.

3. The combination, with the line-feeder E,

feed-pawl s, stop-pawl a^1, and pin d^1, secured in the side of the feed-pawl, of a gravitating-lever, e^1, having a cam-edge, g^1, and of a pin, h^1, secured in the line-feeder, and adapted to act on the cam-edge g^1, substantially in the manner shown and described.

4. The combination, with the line-feeder E, pawls s a^1, and releasing-pin h^1, of a spring-catch, i^1, adapted to engage with the pin h^1, and to prevent recoil of the line-feeder, substantially as set forth.

5. The combination, with the line-feeder E, pawls s a^1, and gravitating-lever e^1, of a pin, k^1, to force the gravitating-lever back to its original position, and allow the pawls s a^1 to drop in gear with the line-feeder, substantially as described.

6. The combination, with the lever t, spring w, feed-pawl s, and line-feeder E, of an eccentric, v^*, adapted to arrest the feed-motion, substantially as set forth.

7. The combination, with the line-feeder E and the type-channel a, of an eccentric-button, q^1, adapted to clamp the last type in the line by the action of the line-feeder, substantially as described.

8. The combination, with the type-channel a, of a roller, n^1, mounted on a spring-depressed slide, n^{12}, and of a hand-lever, n^{15}, adapted to raise said slide, substantially as and for the purpose set forth.

9. The combination, with the type-channel a, the nick-lever m^2, and governor t^2, of a protecting-plate, m^{22}, provided with notches m^{23}, and adapted to be turned to bring a fresh face in working position if one face has worn, substantially as described.

10. The combination, with the type-channel a, of a projection, d^{22}, for supporting the middle portion of the types, substantially as and for the purpose set forth.

11. The combination, with the abutment d^2 and its central recess, d^{21}, of a lifter, f^3, provided with a rib, g^3, fitting the recess d^{21}, and with two wings, adapted to act on the type on both sides of the projection d^{22} on the type-channel, substantially as and for the purpose described.

12. The combination, with the type-channel a and lifter f^3, of a roller, p^{12}, a lever, p^{13}, which supports said roller, and a link, p^{15}, which connects the lever p^{13} to a lever, c^4, to cause the roller p^{12} to strike upon the types in the type-channel next the abutment d^2 immediately after each action of the lifter, substantially in the manner and for the purpose set forth.

13. The combination, with the oscillating nippers x^3, of a conveyer, y^3, which is mounted on a rock-shaft, j^4, and receives an oscillating motion from the main shaft of the machine, said oscillating motion being timed to correspond to the motion of the nippers, substantially as shown and described.

14. The combination, in the conveyer g^3, of two jaws, y^{31} y^{32}, connected by a hinge-joint, a spring-bolt, y^{34}, having a tendency to open the jaws, and a cam-plate, y^{36}, for controlling the position of the jaws in relation to each other, substantially as set forth.

15. The combination, with the cam-plate y^{36}, which controls the position of the jaws y^{31} y^{32}, of a swivel-head, y^{38}, and spring-bolt y^{39}, which locks the cam-plate in position, and can be drawn back so as to free the cam-plate and allow the jaws to open, substantially as described.

16. The combination, with the oscillating conveyer y^3, of a pusher, y^{40}, fitted into the jaw y^{31}, a spring-lever, y^{46}, and cam-plate y^{47}, constructed and adapted to operate substantially as and for the purpose described.

17. The combination, with the conveyer y^3 and its pusher y^{40}, of an auxiliary pusher, y^{42}, constructed and adapted to operate substantially as described.

18. The combination, with the nippers x^3, the oscillating conveyer y^3, having its motion timed to that of the nippers, and its pusher y^{40}, of a distributer, d^3, and its lifter x^4, all constructed and adapted to operate substantially in the manner shown and described.

19. The combination, with the distributer-lifters x^4 and the lifting-ring L, of a hook, z^4, adapted to catch over the tip of the lifter, and to move the same up and down, substantially as described.

20. The combination, with the type-cases M, of slides q^5, adapted to support the line of types contained in each case, substantially as described.

21. The combination, with the type-cases M and distributer-lifters x^4, of a rim, r^5, formed on the cone J, a ring, s^5, secured to the rim r^5, spaces t^5, formed in the ring s^5, and ring r^5, and springs v^5 w^5, fastened in the spaces t^5, substantially as and for the purpose described.

22. The combination, with the springs v^5 w^5, secured on the cone J, as described, of the distributer-lifters x^4, having recesses y^5 formed in their sides, substantially as and for the purpose set forth.

23. The combination, with the distributer-lifters x^4, and with the distributer-wheel H, having the slots z^5, of springs z^{51}, secured in said slots, substantially as and for the purpose described.

24. The combination, with the type-cases M and the distributer-lifters x^4, of knockers M′, constructed and adapted to operate substantially as and for the purpose set forth.

25. The combination, with the type-cases M and their knockers M′, of an alarm mechanism composed of a ring, h^6, sleeve f^6, hammer N^0, and gong N, substantially as and for the purpose described.

26. The combination, with the cone J, which supports the type-cases M, of a lifting mechanism composed of a lever, O, rods k^6, and retaining-rack l^6, substantially as set forth.

27. The combination, with the mechanism for feeding the column and the lines, and for transferring the types to the distributing

mechanism, of a carriage, P, adapted to slide toward and from the distributing mechanism, substantially as and for the purpose described.

28. The combination, with the carriage P, which supports the mechanism for feeding the column and the lines, and for transferring the types to the distributing mechanism, of a lever, Q, for moving said carriage, and of a latch or hook, q^6, for locking said lever, substantially as set forth.

29. The combination, with the carriage P, which supports the mechanism for feeding the column and the line, and for transferring the types to the distributing mechanism, and with the lever Q and its latch q^6, of a rock-shaft, r^6, carrying eccentrics for raising the levers t^1 and f^2, and for depressing the lever l^3, substantially as described.

30. The combination, with the rock-shaft r, the eccentric t^6, and lever t^1, of a lever, x^2, made in two sections, substantially as and for the purpose set forth.

31. The combination, with the distributer-wheel H, of a cam-wheel, R, adapted to engage with pins h^9, secured in said distributer-wheel, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand and seal this 21st day of June, 1878.

A. C. RICHARDS. [L. S.]

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.