

(No Model.)

6 Sheets—Sheet 1.

W. E. TAYLOR.
MATRIX CLEANING MACHINE.

No. 576,971.

Patented Feb. 9, 1897.

Fig. 17.

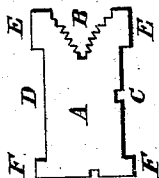


Fig. 11.

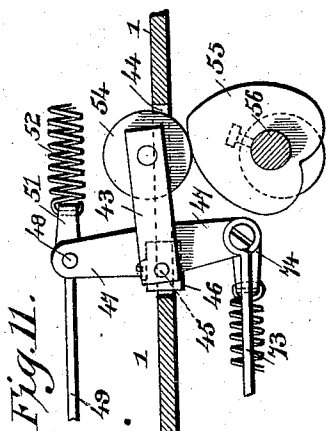


Fig. 20.

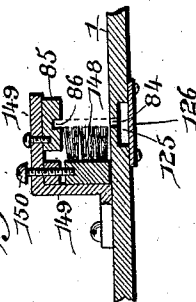
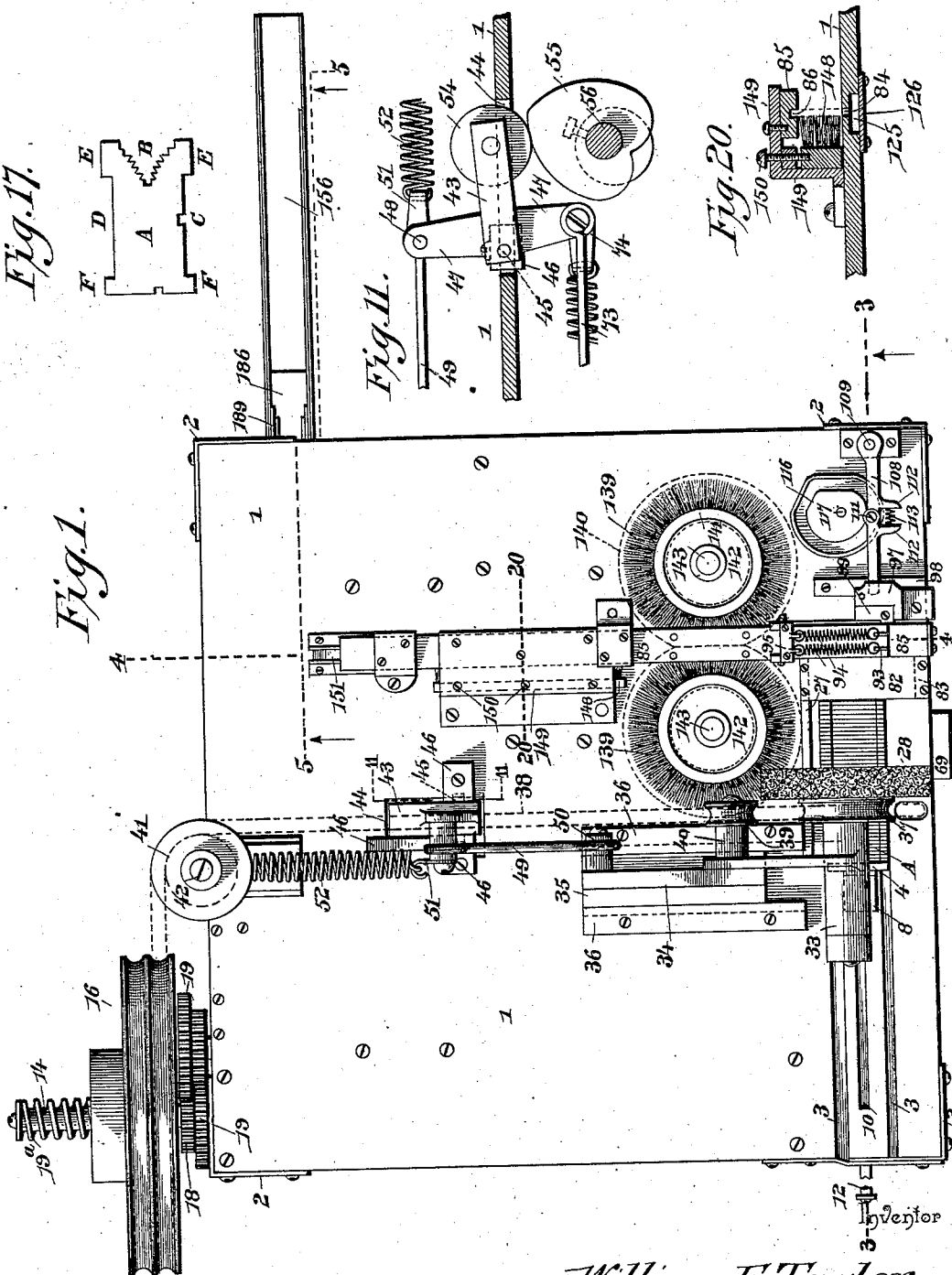


Fig. 1.



Witnesses

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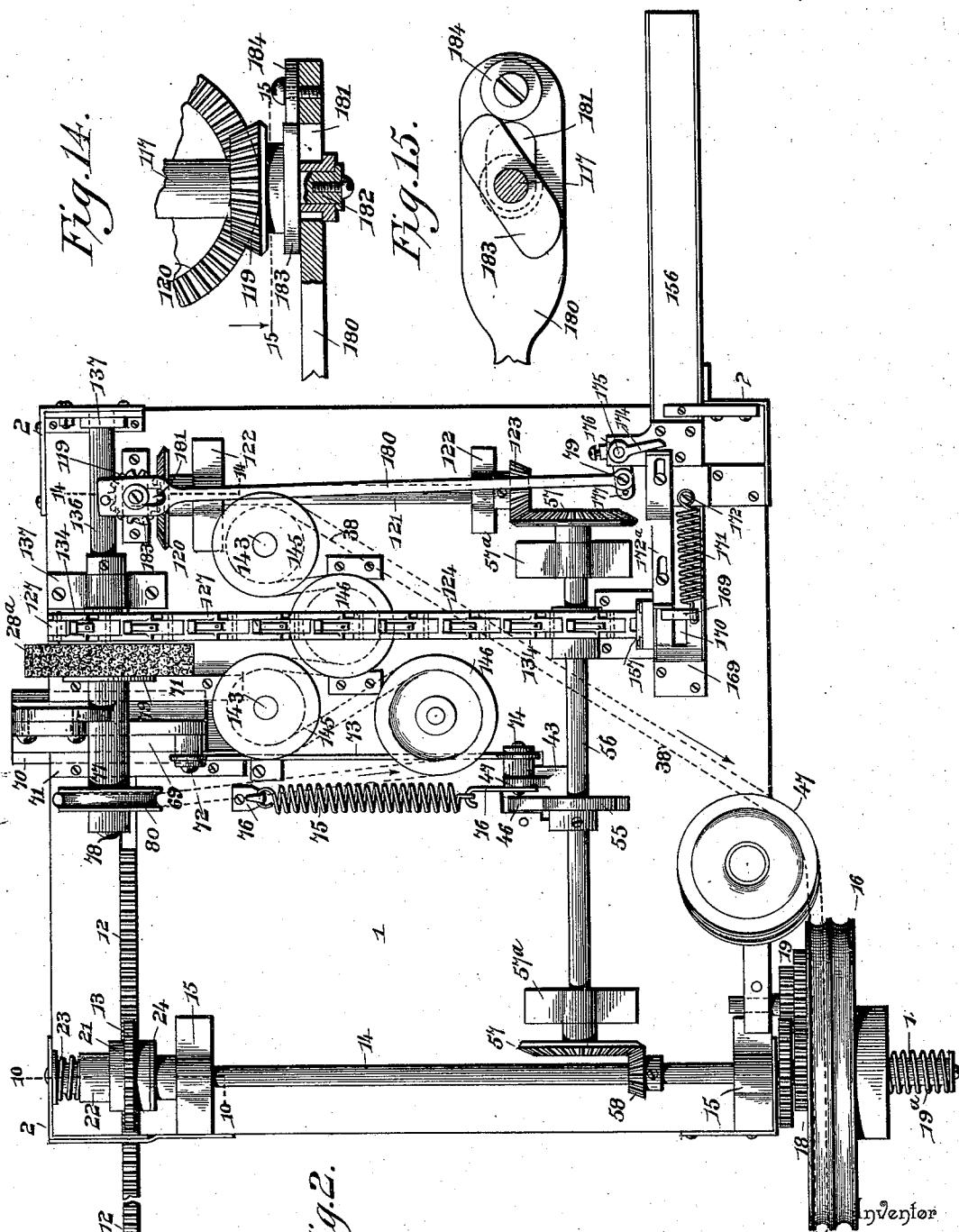


Fig. 14.

Fig. 15.

Fig. 2.

Witnesses

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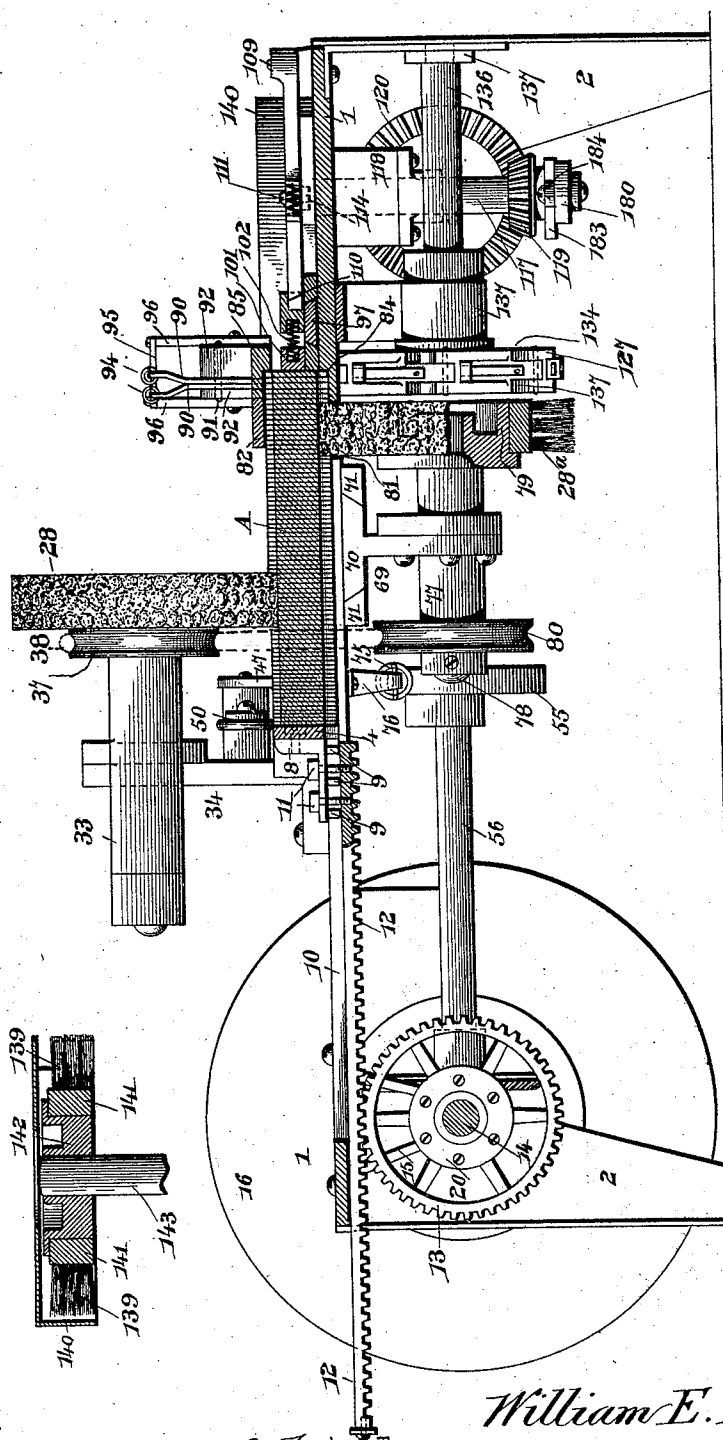
No Model.)

6 Sheets—Sheet 3.

W. E. TAYLOR.
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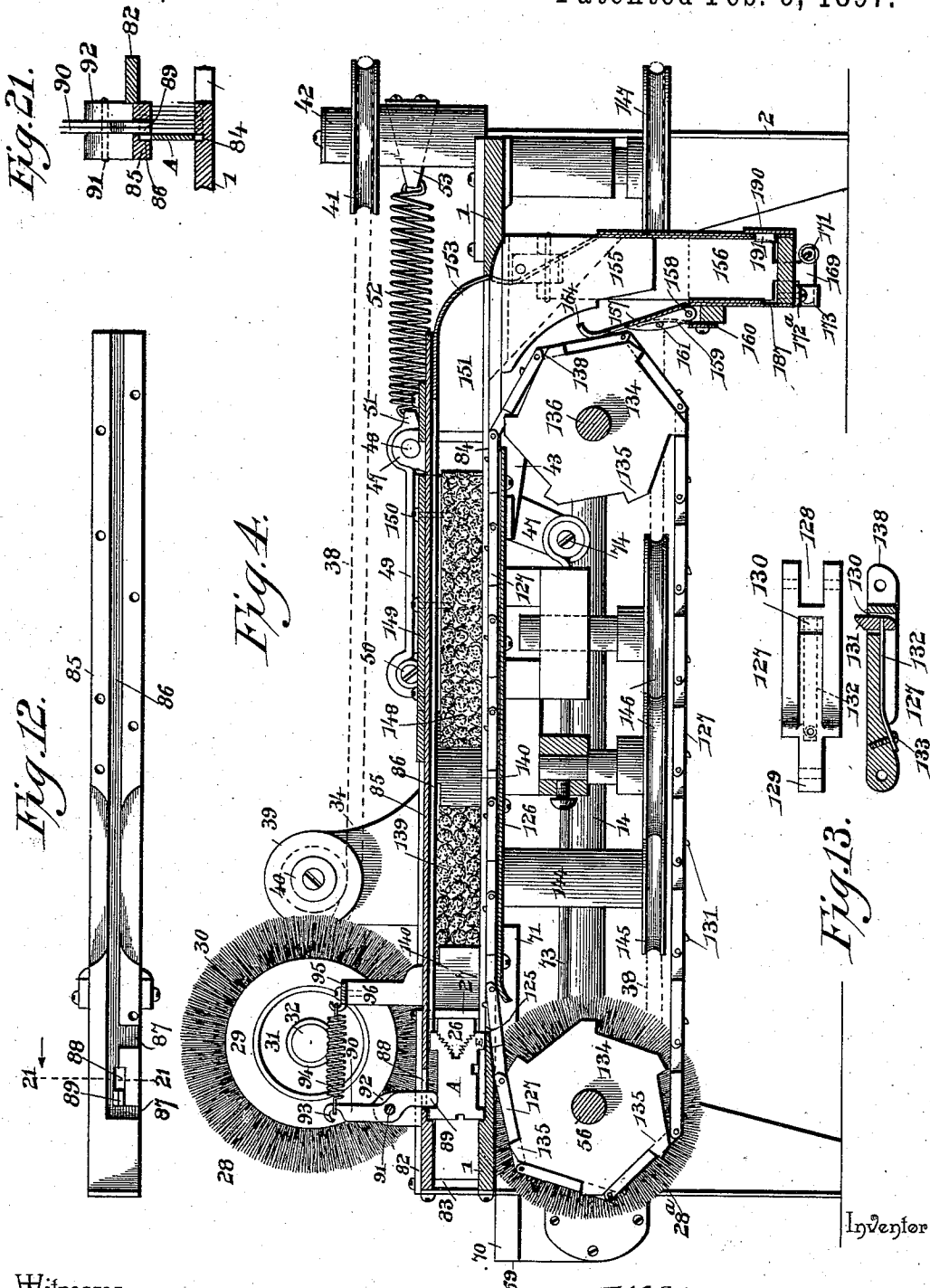
(No Model.)

6 Sheets—Sheet 4.

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Witnesses

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6 Sheets—Sheet 5.

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Fig. 8.

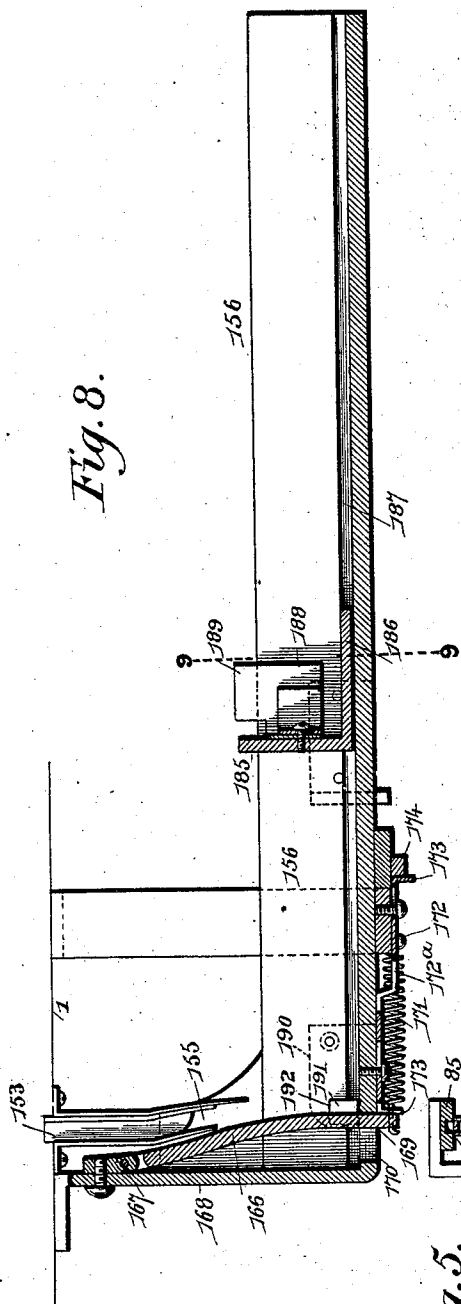


Fig. 9.

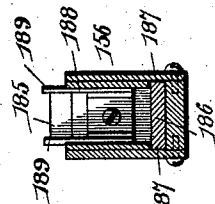
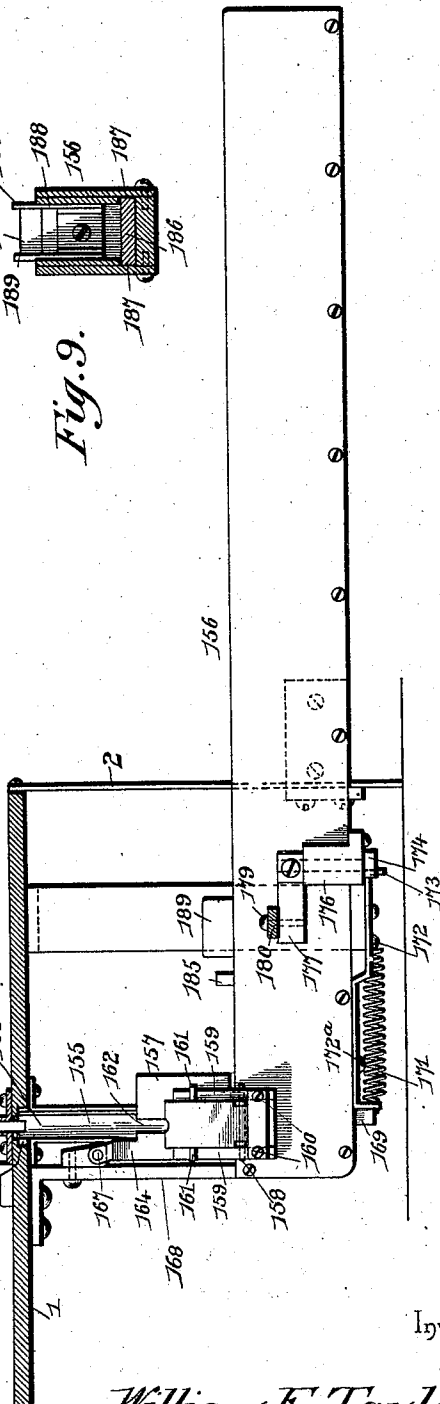


Fig. 5.



Witnesses

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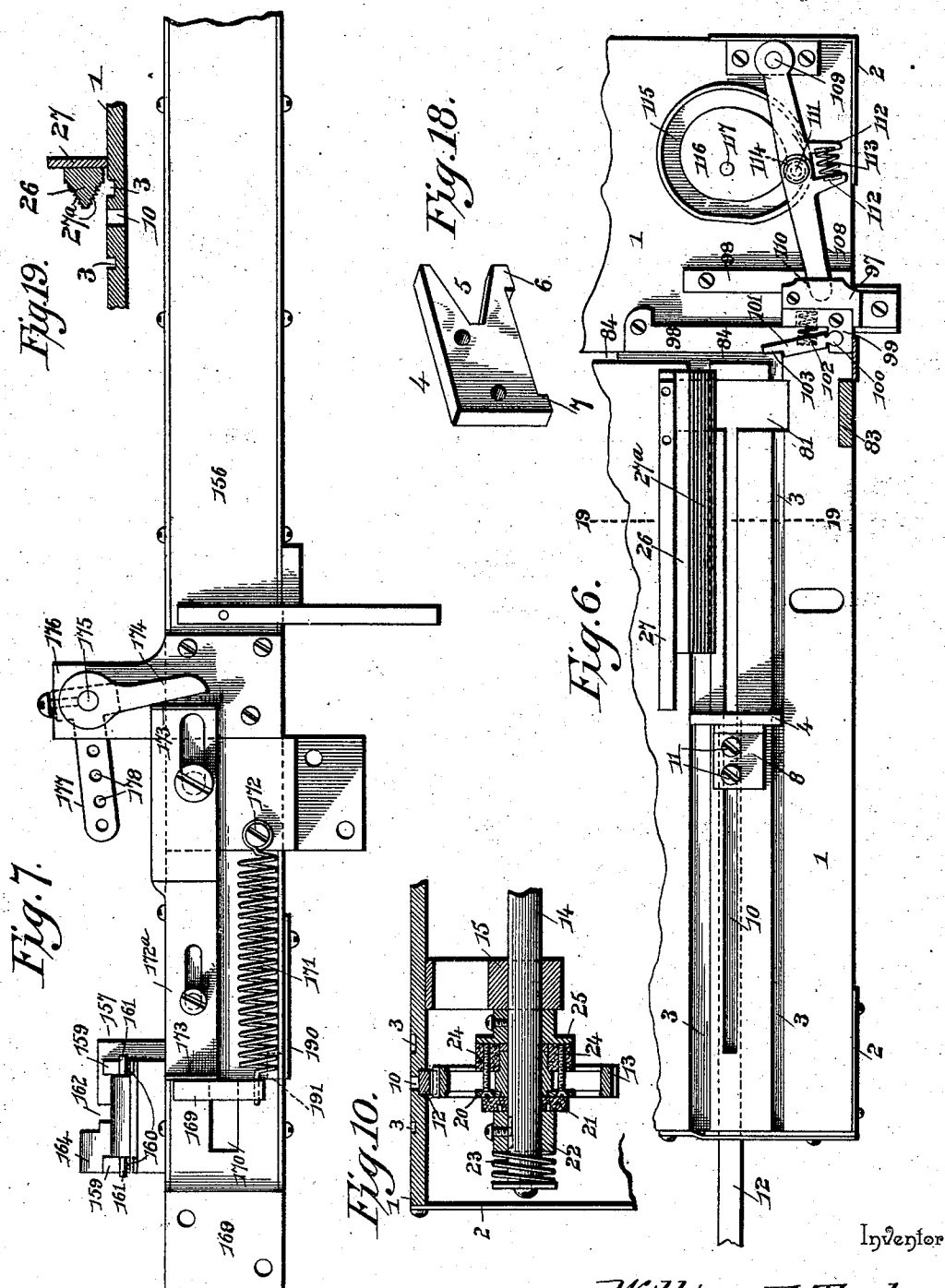
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6 Sheets—Sheet 6.

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Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM EDWARDS TAYLOR, OF OMAHA, NEBRASKA.

MATRIX-CLEANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 576,971, dated February 9, 1897.

Application filed July 17, 1896. Serial No. 599,556. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EDWARDS TAYLOR, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented a new and useful Matrix-Cleaning Machine, of which the following is a specification.

This invention relates to matrix-cleaning machines; and it has for its object to provide a new and useful machine of this character designed to automatically clean both edges and sides of the matrices used in linotype or type-setting machines of the character represented by the well-known Mergenthaler linotype-machines.

Heretofore the matrices of linotype-machines were cleaned by washing them in benzene, but the use of this chemical is objectionable for the reason that it places the metal of the matrices in such a condition as to cause the castings to cling or adhere to the same, and while this objectionable feature has been recognized in connection with cleaning by benzene the only substitute therefor is the method now in use, which is to rub the matrices one by one on a cloth or felt covered board. This method is very tedious and consumes much time, because in an ordinary linotype-machine there are usually over sixteen hundred matrices in a set, but the cleaning of the same is an absolute necessity, for very often even a speck of dirt on a single matrix may cause a delay in the operation of the machine of only a fraction of a second, but which delay will be sufficient to allow another letter to slip in ahead of it, and thereby require the entire linotype to be reset.

The present invention is intended to overcome the difficulties and objections to the usual methods of cleaning matrices and to provide means for not only cleaning both edges and sides of the matrices automatically in a very short time, but also to provide for assembling the matrices after cleaning, right side up, in a galley, ready for being replaced in the linotype-machine in their usual order.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a top plan view of a matrix-cleaning machine constructed in accordance with this invention. Fig. 2 is a bottom plan view thereof. Fig. 3 is a sectional view on the line 3 3 of Fig. 1. Fig. 4 is a similar view on the line 4 4 of Fig. 1. Fig. 5 is a similar view on the line 5 5 of Fig. 1. Fig. 6 is an enlarged detail top plan of a portion of the feed-table, illustrating more clearly the sliding feed-head and the operating mechanism for the sliding shifting block. Fig. 7 is an enlarged detail bottom plan view of the galley. Fig. 8 is a central longitudinal sectional view of the construction illustrated in Fig. 7. Fig. 9 is a detail section on the line 9 9 of Fig. 8. Fig. 10 is an enlarged detail sectional view on the line 10 10 of Fig. 2. Fig. 11 is an enlarged detail sectional view on the line 11 11 of Fig. 1. Fig. 12 is a bottom plan view of the guide-plate located above the matrix-channel. Fig. 13 is a detail plan and sectional view of one of the chain-links. Fig. 14 is an enlarged detail sectional view on the line 14 14 of Fig. 2. Fig. 15 is a detail sectional view on the line 15 15 of Fig. 14. Fig. 16 is an enlarged detail sectional view of one of the horizontal cleaning-brushes. Fig. 17 is a detail elevation of a linotype-matrix. Fig. 18 is a detail in perspective of the sliding feed-head. Fig. 19 is a detail sectional view on the line 19 19 of Fig. 6. Fig. 20 is a detail sectional view on the line 20 20 of Fig. 1, showing the manner of mounting the stationary cleaning-brush. Fig. 21 is a detail sectional view on the line 21 21 of Fig. 12, showing the relative position of the several matrices in connection with the toe projections of the separator-levers.

Similar characters of reference designate corresponding parts in the several figures of the drawings.

The matrix-cleaning machine contemplated by the present invention is designed particularly for cleaning matrices of the form used in the Mergenthaler linotype-machines, but of course may be adapted for cleaning different forms of matrices. However, for the purpose of illustrating the invention and its use I have illustrated in the drawings a matrix A of the Mergenthaler type. Each matrix A essentially consists of a flat piece of metal of a general rectangular configuration, provided

at one end with a reëntrant V-shaped notch B, the sides or edges of which notch are serrated or tooth. The matrix A is further provided with the usual front nicked edge C, which is known as the "matrix face" or "face edge," while the opposite edge (designated by the letter D) is usually known as the "reverse edge" of the matrix. At its ends and on opposite side edges the matrix is further provided, respectively, with the head and heel projections E and F, the head projections E being located at the end of the matrix within which is formed the reëntrant V-shaped notch B. With this general understanding of the construction of a linotype-matrix and the terms by which the different parts of the matrix are usually known, I shall now proceed to describe the construction and operation of the machine invented by me for cleaning these matrices without the use of benzene or the necessity of handling the same manually, except in feeding the machine and removing the cleaned matrices therefrom.

The operating parts of the cleaning-machine are preferably mounted on and carried by a horizontal machine table or bed 1, preferably supported at its corners on the legs or standards 2, although the table or bed may be supported or arranged in any convenient or desirable manner. In the operation of the cleaning-machine the first step is to provide for cleaning both the face and reverse edges C and D of the matrices, and subsequently the opposite flat sides thereof, so in the description of the construction of the machine the different parts thereof will be referred to progressively, according to the travel of the matrices through the machine.

The horizontal machine-table is provided in its upper face, near one edge, with a pair of horizontal slide-grooves 3. The slide-grooves 3 are arranged parallel with each other and are spaced a distance apart equal to the length of a matrix A and extend across the face of the table from one edge to a point short of the directly or diametrically opposite edge of the table, and these slide-grooves 3 form guides for the movement of the sliding feed-head 4. The sliding feed-head is arranged to slide on top of the table 1 longitudinally of the grooves 3, and is of the same general shape as the matrix A, being provided at one end with a reëntrant V-shaped notch 5 and at opposite ends of its lower side edge with the head and heel projections 6 and 7, respectively, which register with and slide in the grooves 3, so that the feed-head 4 will be held perfectly steady in its sliding movement over the horizontal upper face of the feed-table.

The horizontally-sliding feed-head 4 is provided at one side with an offstanding brace-plate 8, working flat on top of the table 1 between the grooves 3 and provided on its under side with an alined series of short guide-studs 9, which slide in a longitudinally-arranged guide-slot 10, formed in the table 1 between and parallel with the grooves 3. The

said brace-plate 8 is further provided with screw-openings alternating with the threads 9 and receiving the fastening-screws 11, which pass through the guide-slot 10 and are secured in the inner end of the feed rack-bar 12, supported to slide at the underside of the table 1 directly under the longitudinal guide-slot 10.

The teeth of the sliding feed rack-bar 12 mesh with the upper edge of a clutch gear-wheel 13. The clutch gear-wheel 13 is loosely mounted on the main drive-shaft 14, near one end thereof, said main drive-shaft being journaled in suitable bearing-hangers 15, attached to the under side of the table 1. The main drive-shaft 14 is extended at one end beyond one side of the table and has loosely mounted on such extended end a peripherally-grooved belt-wheel 16, carrying at its inner side a pinion 18, meshing with a nest of speed-reducing gears 19, suitably arranged at the inner side of the belt-wheel 16; but it will of course be understood that any suitable gearing of this character may be employed, according to the speed at which it is required to run the machine. At the outer side of the peripherally-grooved belt-wheel 16 the shaft 14 has arranged thereon an adjusting-spring 19^a, coiled around the shaft and bearing against the outer side of the wheel 16 to normally hold the pinion 18 thereof in mesh with the nest of speed-reducing gears 19, as will be readily understood by those skilled in the art.

Motion is imparted to the main drive-shaft 14 by means of a suitable belt connection with the wheel 16, but motion is imparted to the loose gear-wheel 13 by a friction slip-clutch arrangement that is quite an important feature in connection with the feeding of the matrices to the point from which they are carried to the cleaning devices for the opposite flat sides thereof. The said loose gear-wheel 13 is provided at one side with a friction hub-plate 20, against which works a rawhide collar 21, fitted to one end of a sleeve 22, feathered on the end of the shaft 14 opposite the wheel 16 and having arranged to bear against its outer end the adjusting-spring 23, which exerts a spring tension against the loose sleeve 22 and normally holds the rawhide clutch-collar 21 firmly against and in frictional contact with the hub-plate 20, carried by the wheel 13. At its side opposite the friction hub-plate 20 the said loose clutch gear-wheel 13 has securely fastened thereto a rawhide clutch-ring 24, which clutch-ring 24 is normally held by the tension of the spring 23 against the flat face of a shaft-collar 25, secured fast on the shaft 14. By reason of the use of the rawhide collar and ring 21 and 24 the gear-wheel 13 will ordinarily rotate with the shaft 14 and will move the feed rack-bar 12 in a direction to carry the sliding feed-head 4 forward; but in the event of any resistance to the forward movement of the feed-head the rawhide collars will slip and allow the gear-wheel to stop irrespective

of the rotation of the drive-shaft, and it will also be observed that the clutch connections with the gear-wheel will slip when it is desired to move the feed-head manually toward the edge of the table for the purpose of arranging additional matrices in front of the feed-head for feeding to the cleaning devices for the edges of the matrices.

For the purpose of holding the matrices firmly on the feed-table during the time the face and reverse edges thereof are being cleaned a horizontal holder-bar 26 is employed. The horizontal holder-bar 26 may be conveniently secured to an upright attaching-plate 27, fastened on top of the machine-table so as to lie directly over the groove 3, which receives the head projections of both the feed-slide and matrices, and the said horizontal holder-bar 26 extends from the extreme inner terminal of the said slide-groove 3 to an intermediate point of such groove to provide for holding the matrices during the time the cleaning-brushes are operating upon their face and reverse edges. The horizontal holder-bar 26 for the matrices is substantially of a V shape in cross-section, and the beveled sides thereof are longitudinally corrugated or ribbed, as at 27, to correspond with the serrated or toothed sides of the notch B in each matrix, and the said holder-bar is of such a width as to allow the notched ends of the matrices and also of the feed-head to loosely register therewith, it being obvious that when the notched ends of the matrices are engaged with the V-shaped holder-bar 26 the interlocking engagement of the ribs of the holder-bar and the teeth of the matrices will positively prevent the head and heel projections of the matrices from becoming disengaged with the slide-grooves 3, which form guides for retaining the matrices in a proper upright position during their travel over the upper side of the table in front of the feed-head.

In the operation of the machine the feed-head 4 is moved to its extreme limit of movement in one direction, so that a bunch or line of matrices, as many as can be held in one hand, may be placed in front of the feed-slide. Before placing the matrices on the table the same are arranged in regular order and are then placed on the feed-table in front of the feed-head, face edge down, with their head and heel projections respectively engaging the separate parallel slide-grooves 3. By releasing the hold on the feed-head the clutch connections with the gear-wheel 13 will rotate such wheel and move the feed-head and matrices forward, the notched ends of the matrices being carried into engagement with the V-shaped holder-bar 26, as already described. Just after the notched ends of the matrices pass onto and in engagement with the horizontal holder-bar 26 the same are carried by the forwardly-moving feed-head 4 under the upper vertically-arranged revolving cleaning-brush 28, and which brush rotates in contact with the upper reverse edges D of the matrices

and provides for cleaning such edges. The brush 28 essentially comprises a ring or collar 29 and the brush-bristles 30, fitted in the periphery of the ring or collar. The brush ring or collar 29 frictionally fits the periphery of a rotating hub 31, fitted on one end of a short brush-shaft 32, mounted in a suitable bearing 33, arranged at the outer upper end of a reciprocating brush-carriage 34, arranged on top of the feed-table 1.

The reciprocating brush-carriage 34 is provided with a dovetailed slide-foot 35, which works flat on top of the table 1, between a pair of dovetailed guide plates or strips 36, secured on top of the machine-table, and the reciprocation of the brush-carriage 34 provides means for carrying the rotating cleaning-brush 28 from end to end of the upper reverse edges D of the matrices as the same are moved thereunder, and thereby insuring the thorough cleaning of dust and dirt from these edges of the matrices. The rotating hub 31 for the brush 28 is provided at one side with a belt-wheel portion 37, over which passes the brush-belt 38, which also passes around an adjacent idler-pulley 39, mounted on a short pulley-spindle 40, projected from one side of the reciprocating brush-carriage 34. The belt 38 receives its motion from the belt-wheel 16 at one end of the shaft 14, and the upper portion of said brush-belt is guided over the top of the machine-table by being passed around an upper horizontal grooved guide-wheel 41, journaled on the upper end of a vertical stub-shaft 42, secured on top of the machine-table at one side edge thereof.

For the purpose of imparting to the upper brush-carriage 34 a reciprocating movement an oscillating adjusting-head 43 is employed. The oscillating adjusting-head 43 works within an opening 44, formed within the table 1, and is provided at one end with oppositely-projecting trunnions 45, journaled in bearings 46 at opposite side edges of the opening 44, and the said head 43 is further provided on upper and lower sides thereof with the short rock-arms 47, to the upper of which rock-arms is pivotally connected at 48 one end of an adjusting-arm 49, the other end of which adjusting-arm is pivotally connected at 50 to the slide-foot 35 of the carriage 34. At the point of connection between the arm 49 and the rock-arm 47 is mounted a hook-plate 51, engaged by one end of a retractile spring 52, the other end of which spring is conveniently attached to a hook-plate 53, illustrated as fastened to the vertical stub-shaft 42, below the upper guide-wheel 41 for the brush-belt. The oscillation of the head 43 in one direction through the medium of the adjusting-arm 49 provides for carrying the brush 28 toward one end of the matrices, while the action of the spring 52 carries the brush 28 toward the opposite end of the matrices, the brush of course rotating at all times to provide for a thorough cleaning of the reverse of the matrices.

The oscillating adjusting-head 43 has mounted at one side of its unpivoted end a contact-roller 54, engaged by a cam 55, mounted on a counter-shaft 56, arranged below the table 1 and mounted in suitable bearing-hangers 57^a, attached to the under side of the table. The counter-shaft 56 carries at its opposite end beveled gear-wheels 57, one of which wheels, at one end of the shaft, meshes with a beveled gear-pinion 58, secured on the main drive-shaft 14 and providing means for rotating the shaft 56, and, through the medium of the cam 55, causing the unpivoted or free end of the head 43 to be oscillated in an upward direction.

The oscillation of the adjusting-head 43 not only provides for the reciprocation of the brush-carriage 34, which carries the upper revolving cleaning-brush 28, but also provides for the reciprocation of a lower brush-carriage 69, mounted at the under side of the table. The lower brush-carriage 69 is also provided with a dovetailed slide-foot 70, which works flat against the under side of the table between a pair of dovetailed guide plates or strips 71, and the said lower reciprocating brush-carriage 69 has pivotally connected to its inner end, as at 72, one end of an adjusting-arm 73, the other end of which adjusting-arm is pivotally connected at 74 to the lower rock-arm 47 of the oscillating adjusting-head 43. A retractile spring 75, arranged below the table 1, is connected at its opposite ends to hook-plates 76, respectively attached to the under side of the table 1 and to the lower rock-arm 47 of the oscillating adjusting-head 43, said retractile spring 75 serving the same function in connection with the lower brush-carriage 69 as the retractile spring 52 serves in connection with the upper reciprocating brush-carriage.

The lower brush-carriage 69 slides beneath the table 1 directly at one side edge thereof and at one side of the plane of the upper cleaning-brush 28, and said carriage 69 is provided with a bearing-sleeve 77, in which is journaled a short brush-shaft 78, on one end of which shaft 78 is mounted a brush-hub 79, carrying the lower vertically-arranged revolving cleaning-brush 28^a, a duplicate in construction of the brush 28, and adapted to frictionally fit on the periphery of the rotating hub 79, carried by the short brush-shaft 78. At the end of the shaft 78 opposite the brush 28^a the said shaft has fitted thereon a grooved belt-pulley 80, around which passes the brush-belt 38, said belt thereby providing for rotating both the upper and lower cleaning-brushes 28 and 28^a.

The lower cleaning-brush 28^a projects through a brush-opening 81, formed in the table 1 directly adjacent to the inner terminals of the slide-grooves 3 and intersecting such grooves at right angles thereto. The brush-opening 81 is also located near one end of the holder-bar 26 in order that the brush 28^a may operate on the lower face edges

C of the matrices before such matrices are moved off of the holder-bar 26 to another part of the machine. The reciprocations of the lower brush-carriage 69 provide for carrying the lower cleaning-brush 28^a from end to end of the face edges C of the matrices, so that such edges of the matrices will be cleaned in the same manner as the reverse edges D are cleaned by the upper brush 28. Supported directly above the brush-opening 81 and parallel with the table 1 is a horizontal retaining-plate 82, preferably secured at one end on the upper edge of the attaching-plate 27 for the holder-bar 26 and at its other end to an upright supporting-plate 83, fitted on the upper side of the table at one edge thereof. The horizontal retaining-plate 82 is arranged in such a position that the matrices will be carried directly thereunder and will serve to prevent the heel ends of the matrices from being thrown so high by the action of the lower brush 28^a as to interfere with the feed of the matrices beyond the brush-opening 81 and the brush working therein, as will be readily understood without further explanation.

The machine-table 1 is further provided therein with a narrow transverse matrix-channel 84, which extends across the table at direct right angles to the slideway formed by the slide-grooves 3 and intersects with the terminals of said slide-grooves directly adjacent to the brush-opening 81 for the lower cleaning-brush 28^a. The transverse matrix-channel 84 is in the form of a slot for the greater portion of its length; but that portion of the channel which intersects and communicates with one terminal of the grooves 3, adjacent to the brush-opening 81, is simply a groove, so as to support the matrices therein until advanced into the slot portion of the channel 84, for the purpose to be presently described. The transverse matrix-channel 84 receives therein the lower face edges of the matrices which travel singly through the channel, and arranged directly above and longitudinally of the channel 84 is a horizontal guide-plate 85, disposed parallel with the table 1 and spaced therefrom a distance equal to the width of the matrices. The guide-plate 85 is provided in its under side throughout its entire length with a guide-groove 86, which is arranged not only parallel with the channel 84, but in precise vertical alinement therewith, so as to receive therein the upper reverse edges D of the matrices as they are advanced through the channel, said channel and the groove in the guide-plate serving to maintain the matrices firmly in an upright position as they are carried across the table at direct right angles to their former course between the upper and lower arranged cleaning-brushes 28 and 28^a. Near one end the horizontal guide-plate 85 is further provided in its under side with a pair of short-spaced entrance grooves 87, communicating with the guide-groove 86 at one side and lying directly

above the terminals of the grooves 3 at one side of the brush-opening 81, so as to receive the head and heel projections of the matrices as they are fed past the brush-opening into the matrix-channel and guide-groove of the guide-plate. The said guide-plate 85 is also provided therein between the entrance-slots 87 with a lever-opening 88, in which work the toe projections 89 at the lower end of a pair of separator-levers 90, arranged side by side and pivotally mounted intermediate of their ends on a common pivot-pin 91, between a pair of pivot-lugs 92, secured on the upper side of the guide-plate 85. The upper ends of the separator-levers 90 are provided with hooks 93, engaged by one end of the retractile springs 94, the other ends of which springs are connected with the hook-plate 95, supported on a pair of posts 96, clamped to and projecting above the guide-plate 85. The lower toe projections 89 project into the guide-groove 86, but are of a combined width less than the width of said guide-groove, so as to allow a single matrix of an ordinary width to be freely shifted through the channel and the guide-groove. The sliding feed-head 4 moves the bunch of matrices over the brush-opening 81, and the head and heel projections of the matrices on their upper reverse edges pass into the entrance-grooves 87 of the guide-plate 85, and the upper heel projections of the matrices engage at one side of the toe projections 89 of the separator-levers immediately before being forced entirely into the guide-groove 86. By reason of this operation more than one matrix at a time is prevented from entering the matrix-channel and the guide-groove of the guide-plate ready to be shifted longitudinally of the channel. The toe projections 89 extend sufficiently across the guide-groove 86 to catch the upper heel projection of the second matrix, so as to hold this matrix while the matrix lying within the guide-groove at one side of said toe projections 89 is being shifted along. The use of the toe projections 89 is very important in case the matrices should be gummy and stick together to provide for positively separating the matrices. When a thick matrix is fed through the entrance-grooves 87, the same cannot be shifted through the guide-groove 86 at one side of the toe projections 89 in the same way that a thin matrix is shifted, but when such thick matrix is shifted longitudinally of the channel, the upper heel projection thereof pulls against the toe projection of one or both of the separator-levers, according to the thickness of the matrix, and oscillates such lever or levers on the pivot-pin 91, thereby forcing the toe projections out of the way and allowing the thick matrix to pass along through the channel, it being obvious that after the passing of the thick matrix the retractile springs 94 return the separating-levers to their proper upright position. In the case of thin matrices the same will readily

pass along the channel and the guide-groove 86 without tripping the separating-levers, but when the two thin matrices come together the toe projections 89 of the separator-levers will hold the second matrix by its upper heel projection until the matrix in advance thereof has been shifted longitudinally through the way provided by the channel 84 and the guide-groove 86.

From the foregoing it will be understood how the matrices, after leaving the lower cleaning-brush, are separated and introduced one by one into the longitudinal matrix-channel and the guide-groove immediately thereabove, and when thus positioned each separate matrix is designed to be shifted out of the groove portion of the channel 84, which intersects and communicates with the grooves 3 by means of the reciprocating shifting block 97. The reciprocating shifting block 97 is mounted to slide between a pair of guide-plates or clips 98, secured on the upper face of the table 1 at one side of the channel 84, directly beyond one terminal of the grooves 3, and the said shifting block 97 is provided at one side with a pivot-lug 99, in which is loosely mounted the pivot-rib 100, formed at one end of the pivoted catch plate or dog 101. The catch-plate 101 is normally held adjusted away from the shifting block 97 by the adjusting-spring 102, interposed between said block and one side of the plate 101, the said plate 101 being further provided in the side opposite the block 97 and at its free end with a catch-shoulder 103, which is designed to engage behind the heel end of each matrix to provide for positively shifting such matrix along the matrix-channel into the open or slot portion of such channel.

The shifting block 97 is reciprocated or moved in opposite directions by means of a jointed lever-arm 108. The jointed lever-arm 108 is pivotally mounted at one end on the pivot-pin 109, projected from the upper side of the machine-table 1, and the opposite end of said lever 108 is loosely engaged with one side of the shifting block 97, as at 110, the loose engagement 110 preferably being the loose registering of one end of the lever in the recess or opening of the block 97, as shown in the drawings. The jointed arm 108 is provided at a central point between its ends with a break-joint 111. At opposite sides of this joint the separate sections of the lever are provided with the offstanding fingers 112, between which is interposed a stiff relief-spring 113, the tension of which is sufficiently strong to hold the fingers 112 apart and to close the joint 111; but when any unusual resistance occurs in the machine, or when there is an obstruction to the free movement of the shifting block 97, the joint would break and allow the separate sections of the lever-arm to fold, and thereby relieve the strain without injuring the machine. The spring 113 is of a stronger tension than the springs 94, so as to

be strong enough to allow the lever-arm 108 to shift a thick matrix along the matrix-channel without breaking at its joint.

At its joint 111 the lever 108 carries at its under side the cam-roller 114, loosely traveling in the peripheral cam-groove 115, formed in the upper side of the rotating cam 116, working on top of the table 1 and mounted at the upper end of the short vertical cam-shaft 117. The shaft 117 turns in a suitable bearing 118 at the under side of the table and carries near its lower end a horizontal beveled gear-pinion 119, meshing with an adjacent beveled gear-wheel 120 at one end of a horizontal gear-shaft 121, mounted in bearing-hangers 122 at the under side of the table, and carrying at its end opposite the wheel 120 a pinion 123, which meshes with the beveled gear-wheel 57 at one end of the counter-shaft 56. Through the medium of the connections described the cam 116 operates the shifting block 97 back and forth to allow the catch-shoulder 103 of the plate 101 to first engage behind the heel end of the free matrix within the channel, and then when the cam 116 reaches a certain point in its rotation it draws the shifting block 97 in the opposite direction, and thereby shifts the matrix into the open portion of the channel 84, where it will be caught and carried along by the endless carrier-chain 124.

The endless carrier-chain 124 is arranged to work below the table 1 with its upper horizontal portion traveling in a guide-groove 125, formed in the under side of the table at the lower side of the channel 84, and the upper portion of the chain 124 is held firmly in the groove 125, so as to form the floor of the slot portion of the channel by means of the retaining-plate 126, fastened to the under side of the table over the said guide-groove 125. The endless carrier-chain 124 essentially comprises a series of flat jointed chain-links 127, substantially rectangular in form, and each of which links is provided at one end with a bifurcation 128 and at its opposite end with a pivot-tongue 129, pivotally secured in the bifurcation 128 of the adjacent link to complete the chain formation. Each link 127 of the chain is longer than the length of a matrix, and each of said links is further provided near one end with a stud-opening 130, through which normally projects a beveled catch-stud 131, mounted on the free end of a leaf-spring 132, arranged at the inner side of each link and secured fast at one end, as at 133, to such link.

The carrier-chain 124 is supported properly in position on the oppositely-arranged chain-wheels 134, each of which chain-wheels 134 is provided with a peripheral series of spaced pairs of shouldered sprockets 135, forming peripheral seat-notches in which the links of the chain snugly register, while the pivot-tongues 129 of the links pass in between the sprockets 135 and allow the shoulders thereof to engage against the ends of the

links of the chain, so as to move the same positively and provide for carrying the matrices along the channel in the table of the machine. One of the chain-wheels 134 is mounted on the counter-shaft 56, which therefore provides for imparting motion to the chain, while the opposite chain-wheel is mounted on a short idler-shaft 136, supported in suitable bearing-hangers 137 at the under side of the machine-table. Each link 127 of the endless chain is provided with rounded portions 138 at the bifurcated end, the function of which portions will be hereinafter referred to; but when a matrix has been shifted by the catch plate or dog 101 into the open or slot portion of the channel 84 the lower head projection E of the matrix becomes engaged by one of the spring-projected catch-studs 131 of the endless carrier-chain, and as the chain continues to move and engage each succeeding matrix in the same manner the matrices are carried along in the channel 84 and the guide-groove 86 between a pair of horizontal rotating cleaning-brushes 139, arranged, respectively, at opposite sides of the channels 84, so as to provide for thoroughly cleaning the opposite sides of the matrices as the same are carried along by the endless carrier-chain. The horizontal cleaning-brushes 139 are preferably incased by the circular brush-housings 140, arranged thereover and secured on top of the machine-table, and said brushes are of substantially the same construction as the other cleaning-brushes 28 and 28^a.

The brushes 139 have their rings or collars 141 frictionally fitted on the flanged rotating hubs 142, arranged to rotate horizontally above the table 1, and at this point it is to be observed that the frictional mounting of the several brushes on their rotating hubs allow such brushes to slip in the event of obstruction or resistance of any character. The flanged rotating hubs 142 for the circular rotating cleaning-brushes 139 are mounted on the upper ends of short vertical brush-shafts 143, journaled in bearing-collars 144, mounted at the under side of the table and carrying at their lower ends the horizontal grooved belt-pulleys 145, around both of which pulleys passes the brush-belt 38. The brush-belt 38 is also carried around a pair of horizontal grooved idler-pulleys 146, arranged adjacent to the pulleys 145, and from one of the pulleys 145 to the lower inclined grooved guide-wheel 147, supported at the under side of the machine-table below the upper guide-wheel 41, and receiving the lower portion of the brush-belt which passes around the drive-belt wheel 16. By the arrangement of the brush-belt in the manner described the same provides for imparting the proper rotation to the four rotary cleaning-brushes, whereby such brushes will clean both edges and sides of the matrices in the manner described.

After leaving the pair of horizontal rotary cleaning-brushes 139 the matrices are carried

through the channel 84 by the chain 124 against a horizontal stationary auxiliary brush 148. The auxiliary brush 148 is arranged in a horizontal position at one side of the channel 84, so that its bristles will project across the path of the matrices being carried through the channel, and said horizontal auxiliary brush 148 is preferably detachably clamped on top of the table within an angled bracket-housing 149 by means of the set-screws 150, passing through the upper portion of the bracket 149 and impinging on the brush-head. The said horizontal auxiliary brush 148 is so arranged directly in advance of the horizontal rotary brushes 139 as to provide means for preventing each matrix from being thrown forward in advance of the movement of the chain by the action of the rotating cleaning-brushes 139, while at the same time the said stationary brush necessarily assists in cleaning one side of the matrices.

Immediately after leaving the stationary brush 148 the matrices are carried into a guide-hood 151, mounted on the table over the channel 84 above the position of one of the chain-wheels 134 for the carrier-chain. Immediately below the hood 151 the carrier-chain commences to pass below and away from the channel 84 and necessarily carries the matrices therewith. Said guide-hood 151 is provided with a curved rim conforming to the direction of travel of the carrier-chain directly therebelow and continues into the inclined wall 153, which forms the rear wall of the vertical deflecting-chute 155, attached to the under side of the machine table immediately below the guide-hood and serving to receive the matrices, as they fall from the links of the chain, and deflects the same into one end of the horizontal elongated galley-box 156. The elongated galley-box 156 is suitably fastened to or suspended from the under side of the machine-table so that its inner end will receive the lower end of the deflecting-chute 155, whereby the matrices, as they are released from the links of the chain, will be deflected for assembling within the inner end of the galley-box.

The galley-box 156 is of a sufficient length to accommodate therein a large number of the matrices ready for being placed within the linotype-machine, and at its extreme inner end and one side thereof the galley-box supports a fly-plate 157. The fly-plate 157 is pivotally mounted at its lower edge at 158, at one side edge of the galley-box, and is normally held deflected in an inclined position outward from the galley-box by means of the adjusting leaf-springs 159, secured fast at their lower ends to one side of the galley-box, as at 160, and having their upper free ends engaged behind projections 161, on the outer side of the fly-plate. The said fly-plate 157 is provided in its upper unpivoted edge with a notch 162, which receives the face edges of the matrices from the links of the chain, and at

one side of the notch 162 the said plate is provided with an inwardly-curved bill 164, which is engaged by the rounded end portions 138 of the links of the chain to provide for moving the fly-plate inwardly against the tension of the adjusting leaf-springs, so as to release the matrices from the chain-links and to throw the same in an upright position within the inner end of the galley-box.

The fly-plate 157 operates in conjunction with an assembling-plate 166, working within the rear end of the galley-box and serving to assemble the matrices one after the other in regular order as the same are thrown in front of the assembling-plate in an upright position by the inward movement of the fly-plate 157. The assembling-plate 166 is of a greater length than the depth of the galley-box 156 and is pivotally secured at its upper end, as at 167, to an upright extension 168 of the rear wall of the galley-box, and which extension of the rear wall of the galley-box also forms one of the hangers for the box. The pivotal hanging of the assembling-plate 166 allows the said plate a vibrating movement for assembling or packing the matrices in front of the same, and said assembling-plate is provided at its lower end with a T-shaped tongue 169, projected through and working in a slot 170 in the bottom of the galley-box at the rear end of such box. The T-shaped tongue 169 has connected thereto one end of a retractile spring 171, arranged beneath the galley-box and secured at its other end, as at 172, to a fixed point of attachment, said spring serving to retract the vibrating assembling-plate in a direction toward the outer open end of the galley-box, and the said assembling-plate is moved in an opposite direction by the sliding adjusting-plate 172^a, mounted for a sliding movement on the bottom of the galley-box and provided with flanged ends 173, one of which flanged ends works at one side of and against the T-shaped tongue at the lower end of the assembling-plate.

The flanged end 173 of the sliding plate opposite the end which engages with the tongue of the assembling-plate is disposed at one side of a cam-arm 174, mounted on the lower end of a short turn-post 175, journaled in a bearing 176, fitted to one side of the galley-box, and the upper end of the turn-post 175 has mounted thereon one end of a short rock-arm 177, provided with a series of openings 178, adapted to receive the connecting pin or screw 179, which serves to adjustably connect with the rock-arm 177 one end of the pitman 180. The pitman 180 is arranged below the table and is provided at the end opposite its connection with the rock-arm 177 with a slot 181, loosely taking over the lower reduced spindle extremity 182 of the short vertical cam-shaft 117, and directly above the slotted end of the pitman the said cam-shaft has mounted thereon a double or two-point cam-plate 183, the two points of which cam-plate are adapted to operate against the con-

tact-roller 184, fitted to the upper side of the pitman at one end thereof. During one rotation of the vertical cam-shaft referred to the pitman 180 is given two complete reciprocations and therefore, through the medium of the connections described, gives the assembling-plate two complete vibrations for each matrix thrown in front of the same by the fly-plate. Each matrix will therefore be given two blows by the assembling-plate, so that if the first blow does not get the matrix out of the way of the following matrix the second blow will positively insure this result, which is quite an important feature of the invention for properly assembling the matrices in an upright position, one after the other, in the galley-box.

The galley-box 156 accommodates for a sliding movement therein the upright gage-plate 185, working in front of the assembling-plate and provided with a foot-piece 186, having its side edges sliding in the longitudinal guide-grooves 187, formed at the inner lower side edges of the galley-box. At its outer side the sliding gage-plate 185 has attached thereto the U-shaped spring 188, the opposite side portions of which frictionally contact with the opposite inner sides of the galley-box and are provided with finger extensions 189 at their upper edges, which may be conveniently grasped by the fingers for pressing the sides of the spring inward and thereby relieving the gage-plate, so that the same can be readily moved inward to a position directly at one side and in front of the assembling-plate when an assembled bunch of matrices has been removed from the galley-box. The galley-box 156 has mounted at one side thereof a plate-spring 190, carrying at its free end a catch-lug 191, normally projected through a lug-opening 192 in one side of the galley-box and adapted to bind against the head projections of the matrices, which are thrown into the galley-box, so as to prevent the last matrix in the box from falling back against the assembling-plate when such plate is adjusted inward by the action of the sliding adjusting-plate 172.

In connection with the assembling of the matrices one after the other and right side up within the galley-box it is to be observed that the normally outwardly-inclined fly-plate 157 is arranged over one open side of the deflecting-chute 155, and when the curved bill 164 of the fly-plate is engaged by the rounded end portion of each link such fly-plate closes against such chute and not only releases the matrix from the chain-link but straightens or corrects the position of the matrix and causes the same to fall within the galley-box right side up in front of the assembling-plate. The vibrations of the assembling-plate serve to move the last matrix out of the way of the succeeding matrix and at the same time packs the matrices closely together against the sliding gage-plate, which automatically moves outward as the bunch of matrices increases in size.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described machine will be readily apparent to those skilled in the art, and while a certain specific construction has been referred to for cleaning and assembling the matrices it will be understood that other modified constructions will accomplish the same results, and therefore any changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. A linotype-matrix-cleaning machine having a separate brush for operating against each side edge and flat side of a matrix.

2. A linotype-matrix-cleaning machine having a separate cleaning-surface arranged for operating against each side edge and flat side of a matrix.

3. A linotype-matrix-cleaning machine having moving cleaning-surfaces arranged to operate against both side edges and both flat sides of a matrix.

4. A linotype-matrix-cleaning machine having cleaning-surfaces arranged to successively operate respectively against the edges and sides of a matrix, substantially as set forth.

5. A linotype-matrix-cleaning machine having moving cleaning-surfaces arranged to successively operate respectively against both edges and sides of the matrix, substantially as set forth.

6. A linotype-matrix-cleaning machine having sets of revolving brushes, there being a separate set of such brushes for operating respectively against the opposite side edges and the opposite flat sides of a matrix.

7. A linotype-matrix-cleaning machine having separate sets of moving cleaning-surfaces for operating respectively against the edges and sides of the matrix, and means for carrying the matrices in a bunch in contact with the edge-cleaning surfaces and singly in contact with the side-cleaning surfaces, substantially as set forth.

8. A linotype-matrix-cleaning machine having separate sets of revolving brushes for operating respectively against the edges and sides of the matrix, and means for carrying the matrices in a bunch in contact with the edge-cleaning brushes, and singly in contact with the side-cleaning brushes, substantially as set forth.

9. A linotype-matrix-cleaning machine having separate pairs of vertically and horizontally arranged cleaning-brushes, and means for carrying matrices between both pairs of brushes, substantially as set forth.

10. A linotype-matrix-cleaning machine having separate sets of vertically and horizontally arranged cleaning-brushes, and means

for carrying the matrices in a bunch between the vertically-arranged brushes, and singly between the horizontally-arranged brushes, substantially as set forth.

11. A linotype-matrix-cleaning machine having cleaning-surfaces arranged to operate on both edges and sides of the matrix, and assembling mechanism for assembling the cleaned matrices in the same relative position as when fed into the machine, substantially as set forth.

12. A linotype-matrix-cleaning machine having cleaning mechanism, and assembling mechanism operating continuously with the cleaning mechanism for assembling the cleaned matrices in proper upright positions, substantially as set forth.

13. In a matrix-cleaning machine, a machine-table, a pair of vertically-arranged rotating cleaning-brushes supported by the table, a matrix-feeding device working in a plane between the two brushes, and separate cleaning mechanism for the sides of the matrices, substantially as set forth.

14. In a matrix-cleaning machine, the machine-table, a pair of vertical rotating cleaning-brushes supported by the table, a sliding feed-head mounted to slide on the surface of the table in a plane between the plane of the two brushes, slip-clutch mechanism for operating said slide, and cleaning devices for the sides of the matrices, substantially as set forth.

15. In a linotype-matrix-cleaning machine, a pair of vertically-rotating cleaning-brushes for the edges of the matrices, a matrix-holder arranged in a plane between the two brushes, means for sliding the matrices on the holder between the two brushes, and cleaning mechanism for the sides of the matrices, substantially as set forth.

16. In a matrix-cleaning machine, the machine-table, a pair of vertically-arranged rotating cleaning-brushes supported by the table, a sliding feed-head working on the table in a plane between the plane of the two brushes, and slip-clutch mechanism for operating said head, substantially as set forth.

17. In a matrix-cleaning machine, the machine-table, a pair of vertically-rotating spaced cleaning-brushes for the edges of the matrices, a horizontal matrix-holder arranged in the plane between the two brushes and having longitudinal corrugations or ribs to engage the toothed notches of the matrices, means for sliding the matrices on the holder, and cleaning mechanism for the sides of the matrices, substantially as set forth.

18. In a matrix-cleaning machine, the machine-table a pair of vertically-rotating spaced cleaning-brushes supported by the table, a horizontal matrix-holder arranged on the table between the two brushes and of a V shape in cross-section to register with the V-shaped notches and ends of the matrices, said V-shaped holder having longitudinally corrugated or ribbed sides to engage with the teeth

in the notches of the matrices, and a sliding feed-head working on the table in a line with said holder, substantially as set forth.

19. In a matrix-cleaning machine, the machine-table provided in its upper face with a pair of horizontal slide-grooves to receive the head and heel projections of the matrices and with a longitudinal guide-slot between said grooves, a pair of vertical rotating spaced cleaning-brushes supported by the table, cleaning mechanism for the sides of the matrices, a sliding feed-head working on the table and provided with head and heel projections registering in said slide-grooves, a feed rack-bar supported to slide at the under side of the table and having a connection at its inner end through the guide-slot with said feed-head, a main drive-shaft mounted on the table, and a gear-wheel meshing with said rack-bar and having a slip-clutch connection with said drive-shaft, substantially as set forth.

20. In a matrix-cleaning machine, the table, a pair of vertical rotating spaced cleaning-brushes for the edges of the matrices, cleaning mechanism for the sides of the matrices, a sliding feed-head working on the table in a plane between the two brushes, a feed rack-bar having a connection with said feed-head, a main drive-shaft mounted under the table, a clutch gear-wheel meshing with said rack-bar and loosely mounted on the shaft, said gear-wheel being provided at one side with a friction hub-plate, and at the directly-opposite side with a rawhide ring, a shaft-collar secured fast on the shaft at one side of the rawhide clutch-ring of the gear-wheel, and a spring-actuated sleeve feathered on the shaft and carrying a rawhide collar frictionally contacting with the friction hub-plate of the gear-wheel, substantially as set forth.

21. In a matrix-cleaning machine, the separate sets of brushes for cleaning the edges and sides of the matrix, each of said brushes comprising a central rotating hub, and a brush ring or collar carrying bristles and frictionally fitted to the periphery of said hub, substantially as set forth.

22. In a matrix-cleaning machine, the machine-table, a pair of vertically-arranged rotating cleaning-brushes supported by the table, a sliding feed-head working on the table and in a plane between the plane of the two brushes, and means of reciprocating the two brushes from end to end of the matrices, substantially as set forth.

23. In a matrix-cleaning machine, the table provided in its upper face with a pair of slide-grooves to receive the head and heel projections of the matrices, and near one end of such grooves with a brush-opening, a pair of vertical rotating cleaning-brushes arranged respectively above and below the table for cleaning the edges of the matrices, the lower of said brushes working in said brush-opening, a corrugated V-shaped holder-bar arranged on the table between the two brushes, a sliding feed-head working on the table and provided with

head and heel projections similar to those of the matrices registering in said slide-grooves, means for operating said feed-head, means for reciprocating the two brushes from end to end of the matrices, and separate cleaning mechanism for the sides of the matrices, substantially as set forth.

24. In a matrix-cleaning machine, the table provided at a suitable point with a brush-opening, a pair of vertical rotating cleaning-brushes supported respectively above and below the table for cleaning the edges of the matrices, the lower of said brushes working in said brush-opening, a retaining-plate supported directly over the brush-opening to prevent the rise of the matrices, a holder-bar for locking the matrices to a fixed sliding movement while traveling between the two brushes, and feeding mechanism for said matrices, substantially as set forth.

25. In a matrix-cleaning machine, the feed-table, a pair of reciprocating brush-carriages mounted respectively on top of and under the table, rotating vertically-arranged cleaning-brushes mounted on said carriages, means for simultaneously reciprocating the carriages, and feeding mechanism for carrying bunches of matrices sidewise between the two brushes, substantially as set forth.

26. In a matrix-cleaning machine, a table provided at a suitable point with a brush-opening, upper and lower brush-carriages mounted to slide in suitable guides respectively on top of and beneath the table, each of said brush-carriages carrying a short horizontal brush-shaft, vertically-rotating circular cleaning-brushes mounted on the brush-shafts of the reciprocating carriages, and the lower of which brushes works in and projects through the brush-opening in the table, a suitably-operated oscillating adjusting-head having connections with both brush-carriages for the simultaneous reciprocation thereof, and feeding mechanism for sliding the matrices on the table between the two brushes and at right angles to the movement of the brush-carriages, substantially as set forth.

27. In a matrix-cleaning machine, the table provided at a suitable point with a brush-opening, upper and lower brush-carriages mounted to reciprocate in suitable guides respectively on top of and beneath the table, each of said brush-carriages carrying a vertical rotating cleaning-brush, an oscillating adjusting-head mounted in an opening in the table and carrying at one end a contact-roller, said oscillating adjusting-head being further provided on upper and lower sides thereof with short rock-arms respectively connected with the upper and lower reciprocating brush-carriages, retractile springs connected at one end with the rock-arms of the oscillating adjusting-head and at their other ends to a fixed point of attachment, feeding mechanism for sliding the matrices on the table between the two brushes and at right angles to the movement of the brush-carriages, and a suit-

ably-operated shaft carrying a cam engaging said contact-roller, substantially as set forth.

28. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, a pair of vertically-arranged brushes supported by the table for cleaning the edges of the matrices, feeding mechanism for sliding the matrices between said brushes into said matrix-channel, a pair of horizontal cleaning-brushes arranged respectively at opposite sides of said matrix-channel, and mechanism for carrying the matrices singly between said horizontal cleaning-brushes, substantially as set forth.

29. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, suitably-arranged cleaning-surfaces for the edges of the matrices, feeding mechanism for sliding the matrices between said cleaning-surfaces into the matrix-channel, cleaning-surfaces arranged respectively at opposite sides of said channel, and mechanism for carrying the matrices singly between the cleaning-surfaces at opposite sides of the channel, substantially as set forth.

30. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, a slideway for matrices leading into the matrix-channel at one end, cleaning-brushes arranged below and above said slideway, means for feeding the matrices over the slideway into the matrix-channel, cleaning-brushes arranged at opposite sides of said channel and having their bristles projecting across the same, and mechanism for carrying the matrices singly through said channel between the cleaning-brushes at opposite sides of the same, substantially as set forth.

31. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, a slideway for matrices leading into the matrix-channel at one end, cleaning-brushes arranged above and below the slideway, cleaning-brushes arranged at opposite sides of the channel, a separating device arranged at one end of the slideway to prevent more than one matrix being fed into the channel at one time, means for feeding the matrices over the slideway, and means for carrying the matrices singly from said separating device through the channel between the brushes at opposite sides thereof, substantially as set forth.

32. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, a slideway for matrices leading into the matrix-channel at one end, cleaning-brushes at opposite sides of the channel, a horizontal guide-plate arranged parallel with the table above the channel, and provided in its under side with a longitudinal guide-groove and with a pair of short spaced entrance-grooves communicating with the guide-groove and lying directly above one terminal of said slideway, said entrance-grooves receiving the head and heel projections of the matrices, and said guide-plate being further provided

between the entrance-slots with an opening, separator-levers arranged side by side and pivotally mounted between their ends on the guide-plate, said levers being further provided at their lower ends with toe projections projected into said guide-groove but of a combined width less than the width of said groove, springs connected with the upper ends of said levers to normally hold the toe projections within said guide-groove, means for feeding the matrices over the slideway, and means for carrying the matrices singly from the toe projections of the separator-levers through the channel and guide-groove between the cleaning-brushes at opposite sides of the channel, substantially as set forth.

33. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, a slideway for matrices leading into the matrix-channel at one end thereof, cleaning-brushes arranged above and below the slideway, cleaning-brushes arranged at opposite sides of the channel, an endless carrier-chain working below said channel and having catches traveling through the channel for engagement with the projections of the matrices, a matrix-separating device arranged at one end of the slideway, means for feeding the matrices over the slideway, and a shifting device for automatically engaging each matrix singly to shift the same from the separating device onto the endless carrier-chain, substantially as set forth.

34. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, a slideway for the matrices leading into the matrix-channel at one end thereof, suitably-arranged cleaning-surfaces for operating against the edges and sides of the matrices, an endless carrier-chain working below the channel and having catches for engagement with the projections of the matrices, a matrix-separating device arranged at one end of the slideway, means for feeding the matrices over the slideway, and a reciprocating shifting-block working at one side of the matrix-channel and carrying a spring-actuated shouldered catch-plate or dog adapted to engage the heel end of each matrix singly for the purpose of shifting the same onto the endless carrier-chain, substantially as set forth.

35. In a matrix-cleaning machine, the combination with the machine-table-supporting cleaning devices and having a matrix-channel for guiding the matrices in one direction; of a carrier-chain having projections traveling in said channel, a reciprocating shifting block slidably mounted on the table at one side of the channel, a spring-adjusted catch-plate or dog pivotally connected with said block and provided with a catch-shoulder adapted to engage the heel ends of the matrices to shift the same onto the carrier-chain, a jointed lever-arm pivotally mounted at one end on the table and loosely connected at its other end with said shifting block, said jointed

lever-arm having a central normally spring-closed break-joint, and carrying at the lower side of said joint a cam-roller, and a suitably-rotated cam-shaft carrying at its upper end a rotating cam working on top of the table and provided with a peripheral cam-groove receiving said cam-roller, substantially as set forth.

36. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, a slideway for matrices leading into the matrix-channel at one end, cleaning-surfaces for the matrices arranged above and below the slideway and at opposite sides of said channel, an endless carrier-chain working below the channel and having catches traveling through the channel for the projections of the matrices, and a shifting device for shifting the matrices singly from said slideway onto said carrier-chain, substantially as set forth.

37. In a matrix-cleaning machine, the table provided with a transverse matrix-channel and a slideway for matrices leading into the matrix-channel at one end and at right angles thereto, circular rotating cleaning-brushes arranged above and below the slideway and at opposite sides of the matrix-channel, vertically-arranged chain-wheels supported beneath the table, an endless carrier-chain arranged on said chain-wheels and essentially comprising a series of flat jointed chain-links each carrying a spring-adjusted catch-stud traveling through the matrix-channel, and a shifting device for shifting the matrices singly from one terminal of the slideway onto said carrier-chain, substantially as set forth.

38. In a matrix-cleaning machine, the table provided with a transverse matrix-channel, and a slideway for the matrices leading into the matrix-channel at right angles thereto, cleaning-brushes arranged in the path of the matrices above and below the slideway and at opposite sides of the matrix-channel, oppositely-arranged chain-wheels supported beneath the table and provided with a peripheral series of spaced pairs of shouldered sprockets, an endless carrier-chain arranged on said wheels and essentially comprising a series of flat jointed links, each provided at one end with a bifurcation and at its opposite end with a tongue pivoted in the bifurcation of the adjacent link, a leaf-spring secured to the inner side of each link and carrying at its free end a beveled catch-stud normally projected through an opening in the link and traveling in the matrix-channel for engagement with the projections of the matrices, and a shifting device for shifting the matrices singly from one terminal of the slideway onto said chain, substantially as set forth.

39. In a matrix-cleaning machine, the table provided with a transverse matrix-channel and a slideway for matrices leading into the channel at right angles thereto, circular rotary cleaning-brushes arranged in the path of the matrices above and below the slideway

and at opposite sides of the channel, a stationary horizontal auxiliary brush detachably clamped on the table at one side of the channel beyond the brushes at opposite sides of the channel, said stationary brush having its bristles projected across the path of the matrices through the channel, a suitably-supported endless carrier-chain having catch-studs traveling through the matrix-channel, and a shifting device for shifting the matrices singly from one terminal of the slideway onto said carrier-chain, substantially as set forth.

40. In a matrix-cleaning machine, the machine-table provided with a transverse matrix-channel, suitably-arranged cleaning-surfaces for the edges and sides of the matrices, a galley-box supported beneath the table and having matrix-assembling mechanism disposed below the matrix-channel, and a carrier-chain for carrying the matrices through the channel and delivering the same to the assembling mechanism of the galley-box, substantially as set forth.

41. In a matrix-cleaning machine, the table provided with a matrix-channel, suitably-arranged cleaning-surfaces, a carrier for moving the matrices through the channel, a galley-box supported beneath the table and provided at one end with assembling mechanism disposed below the matrix-channel, and suitable guides for deflecting the matrices singly from the channel and carrier to the assembling mechanism of the galley-box, substantially as set forth.

42. In a matrix-cleaning machine, the table provided with a matrix-channel, suitably-arranged cleaning-surfaces, a carrier for moving the matrices through the channel, a guide-hood mounted on the table over the channel at one end of the carrier, a deflecting-chute arranged at the under side of the table immediately below the guide-hood, and a galley-box supported beneath the chute and provided at its inner end with matrix-assembling mechanism receiving the matrices singly from said deflecting-chute, substantially as set forth.

43. In a matrix-cleaning machine, the table provided with a matrix-channel, suitably-arranged cleaning-surfaces, a carrier for moving the matrices through the channel, an elongated galley-box supported beneath the table and arranged adjacent to one end of the carrier to receive the matrices as they are released therefrom, a spring-retarded sliding gage-plate mounted within the galley-box, and an automatically-vibrated assembling-plate mounted within the rear end of the galley-box to bunch the matrices against said gage-plate, substantially as set forth.

44. In a machine of the class described, the combination with the matrix-carrying mechanism, of a suitably-arranged galley-box, a spring-retarded sliding gage-plate mounted within the galley-box, an automatically-vibrated assembling-plate mounted in one end

of the box to bunch the matrices against the gage-plate, and a suitably-operated laterally-movable fly-plate pivotally supported at one edge of the galley-box and operating to release the matrices from the carrying mechanism and to throw the same in an upright position within the galley-box at one side of the vibrating assembling-plate, substantially as set forth.

45. In a matrix-cleaning machine, the table provided with a matrix-channel, suitably-arranged cleaning-surfaces, an endless carrier-chain supported below the table and having catch-studs traveling through the matrix-channel, an elongated galley-box supported beneath the table at one side of one end portion of the chain, a spring-retarded sliding gage-plate mounted within the galley-box, an automatically-vibrated assembling-plate pivotally suspended at its upper end within the rear end of the galley-box, a laterally-movable fly-plate pivotally supported at its lower end on one edge of the galley-box and provided in its upper unpivoted edge with a notch and at one side of said notch with an inwardly-curved bill engaged by the ends of the chain-links, and springs connected with said fly-plate for normally deflecting the same in an inclined position outward from the galley-box, substantially as set forth.

46. In a matrix-cleaning machine, the combination with the matrix-carrying mechanism, of a suitably-arranged galley-box, mounted at one end of the carrying mechanism, a spring-retarded sliding gage-plate mounted within the galley-box, a movable assembling-plate pivotally suspended at its upper end within the rear end of the galley-box, a suitably-operated laterally-movable fly-plate pivotally supported at one edge on the galley-box, means for imparting two complete vibrations to the assembling-plate for each matrix delivered in front of the same by the fly-plate, and a spring mounted at one side of the galley-box and carrying a catch-lug normally projected through an opening in the box to bind against the head projections of the matrices, substantially as set forth.

47. In a machine of the class described, the combination with the matrix-carrying mechanism, of a galley-box arranged at one end of the carrying mechanism, a spring-retarded sliding gage-plate mounted within the galley-box, means for delivering the matrices from the carrying mechanism singly into the galley-box, a movable assembling-plate pivotally suspended at its upper end within the rear end of the galley-box and provided at its lower end with a tongue projected through a slot in the bottom of the box, a retractile spring connected at one end to a fixed point of attachment, and at its other end to said tongue, an adjusting-plate slidably mounted on the galley-box and working at one end within the tongue of said assembling-plate, a short turn-post mounted at one side of the galley-box

and carrying at its lower end a cam-arm engaging against one end of said adjusting-plate, and at its upper end carrying a rock-arm, a suitably-arranged cam-shaft having a
5 reduced spindle extremity, a double or two-point cam-plate mounted on said shaft, and a pitman connected at one end with said rock-arm and provided at its other end with a slot loosely taking over the spindle extremity of
10 said shaft, said pitman carrying at its slotted

end a contact-roller engaged by said cam-plate, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM EDWARDS TAYLOR.

Witnesses:

OSCAR F. STEPHENS,
ARTHUR L. EMMONS.