J. S. BANCROFT & M. C. INDAHL.

DRIVING PRESS FOR TYPE MATRICES.

APPLICATION FILED MAR. 12, 1909.

962,409. Patented June 28, 1910.

11 SHEETS—SHEET 1.

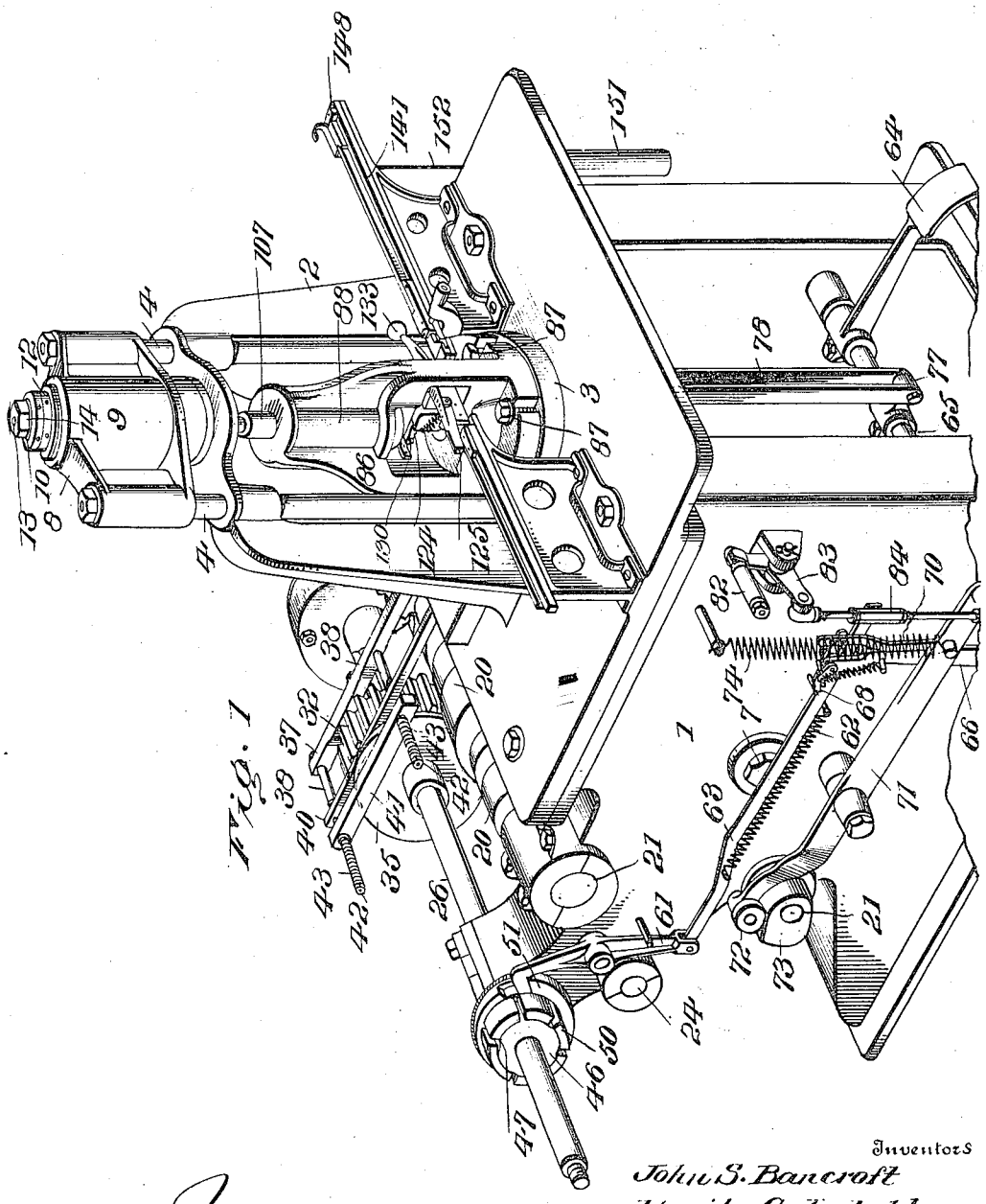

Fig. 1

Witnesses

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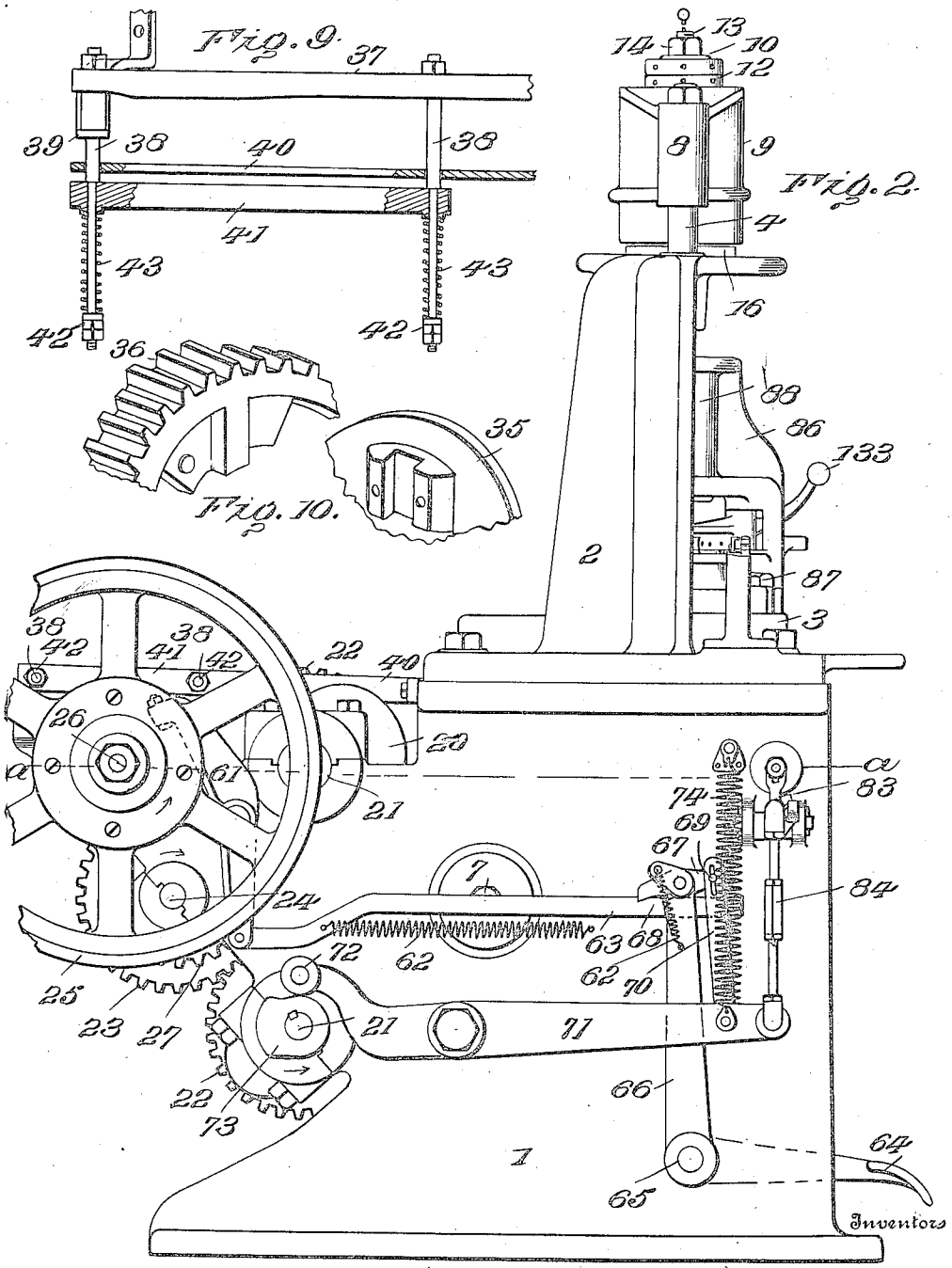

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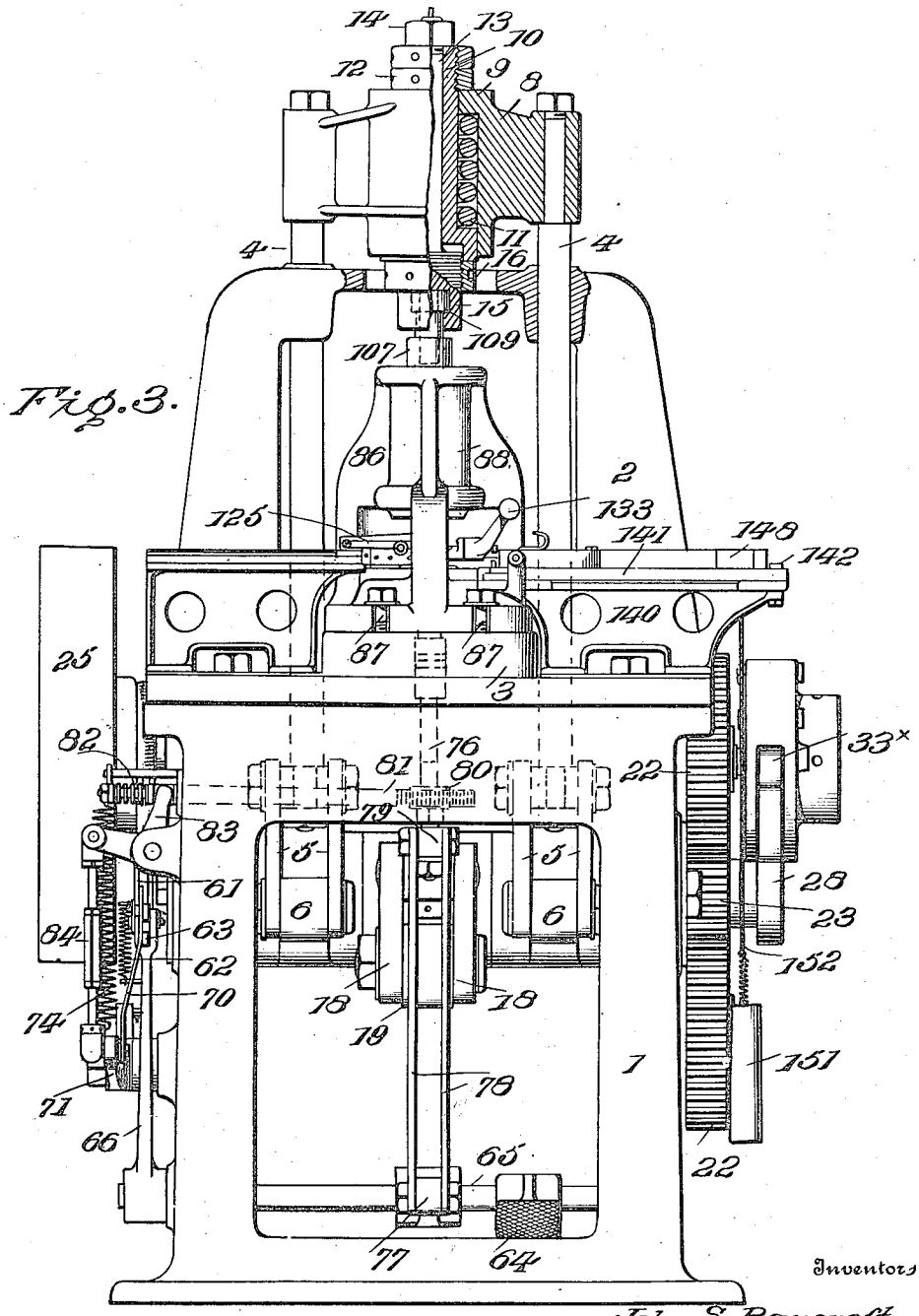
11 SHEETS—SHEET 3.

Fig. 3.



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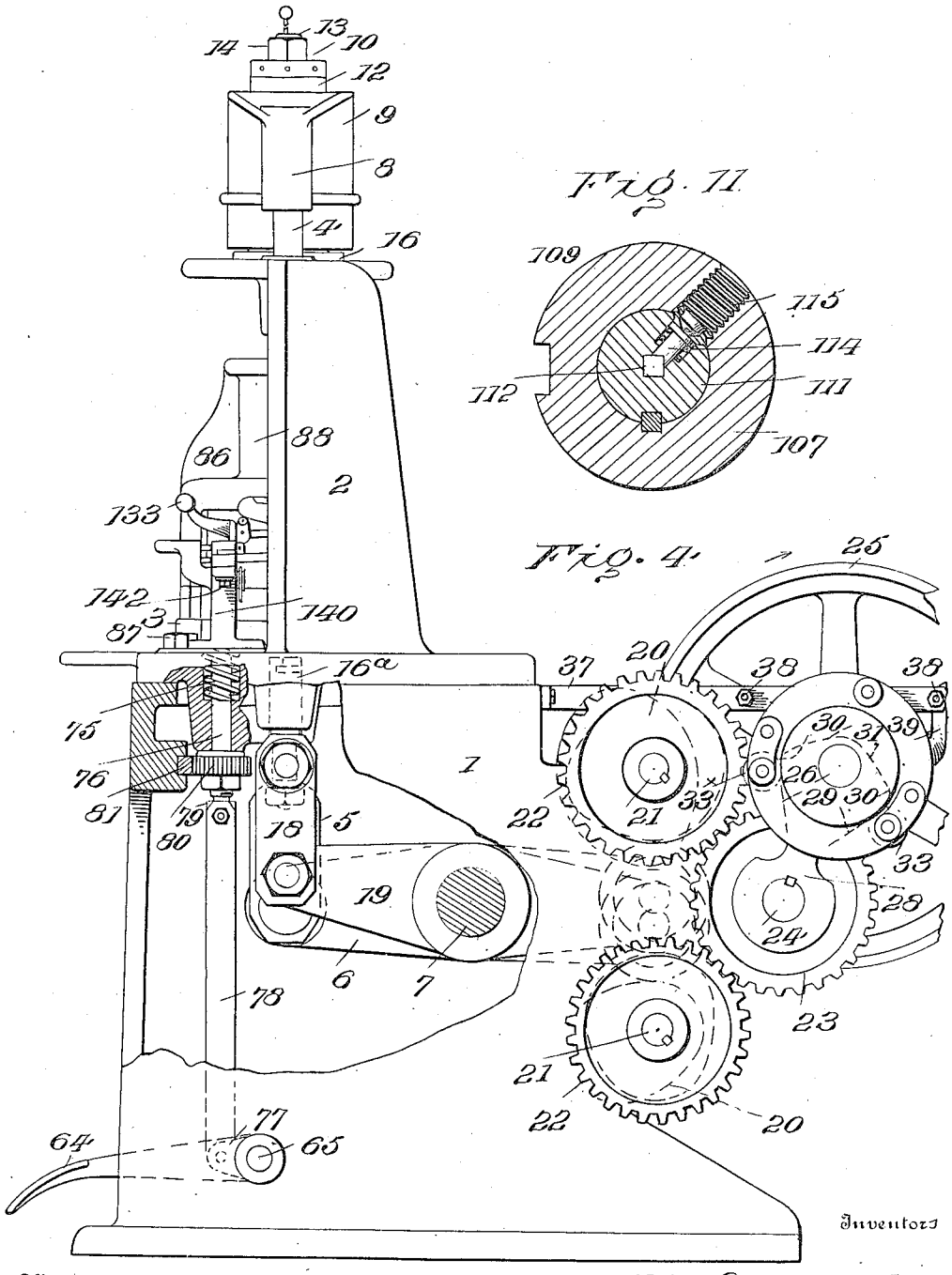

Fig. 1.

Fig. 4.

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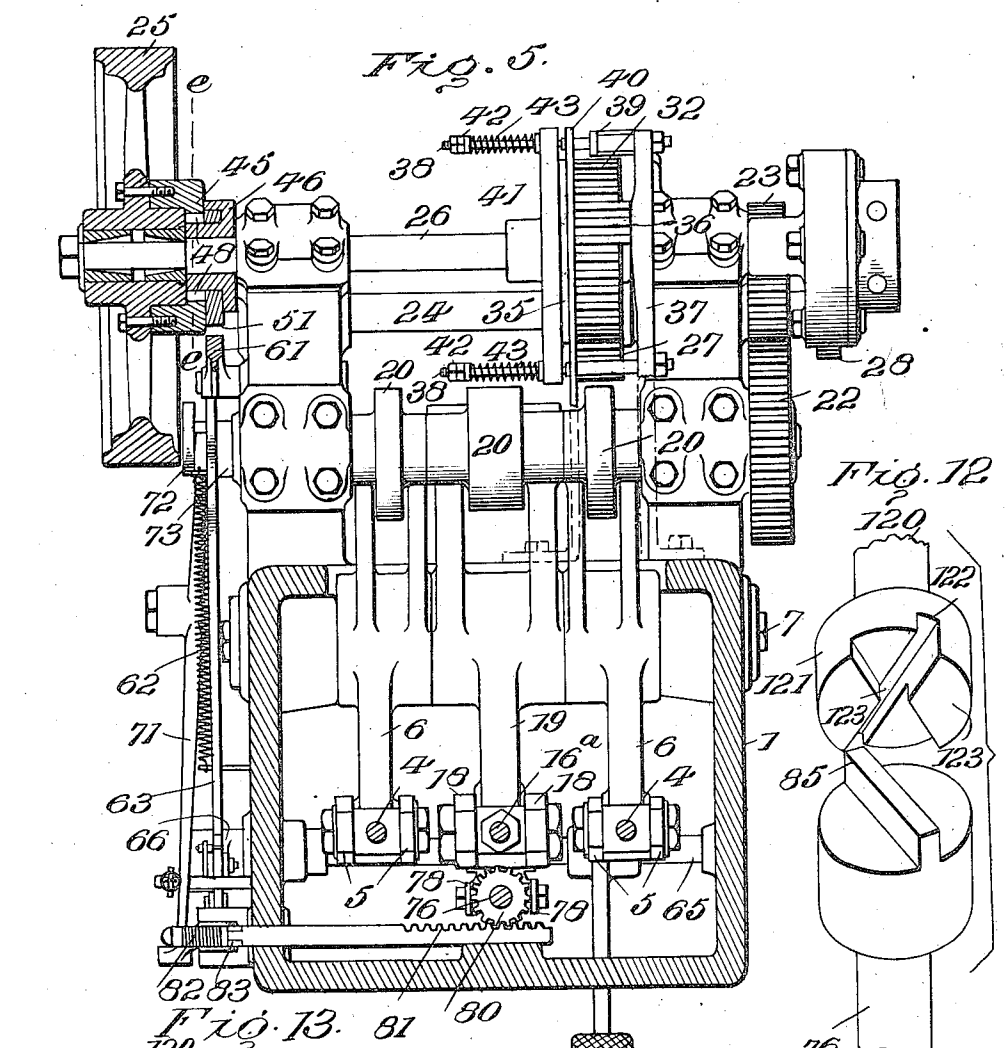

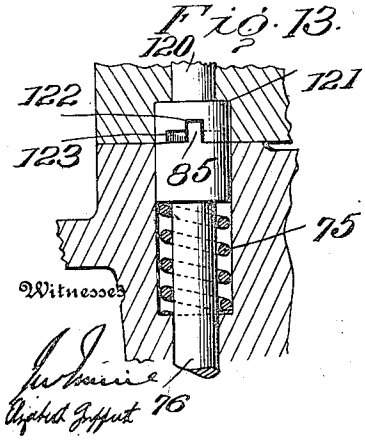

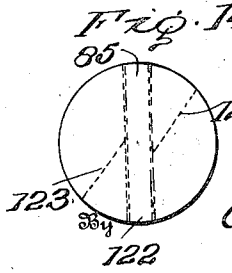

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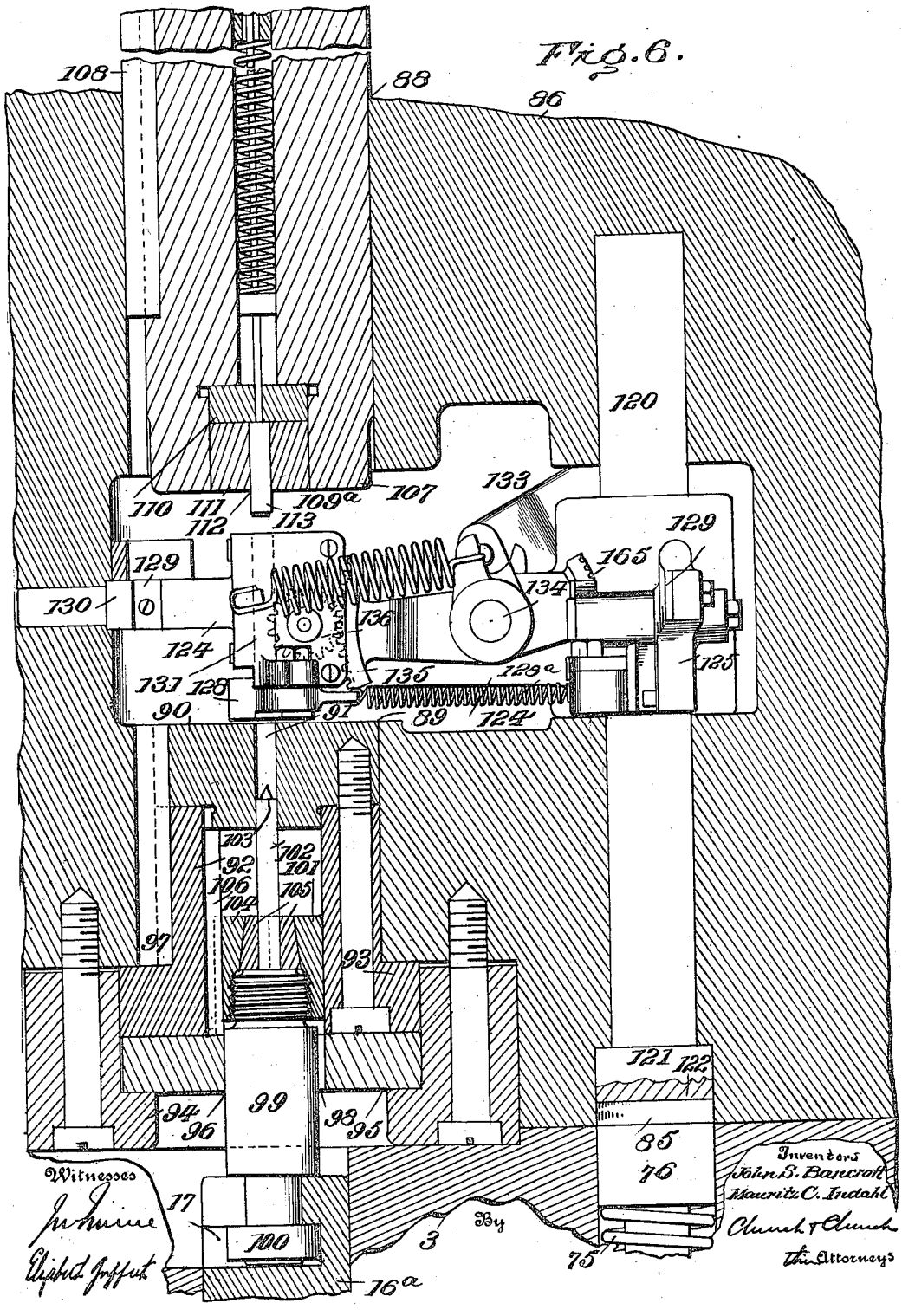
Fig. 6.



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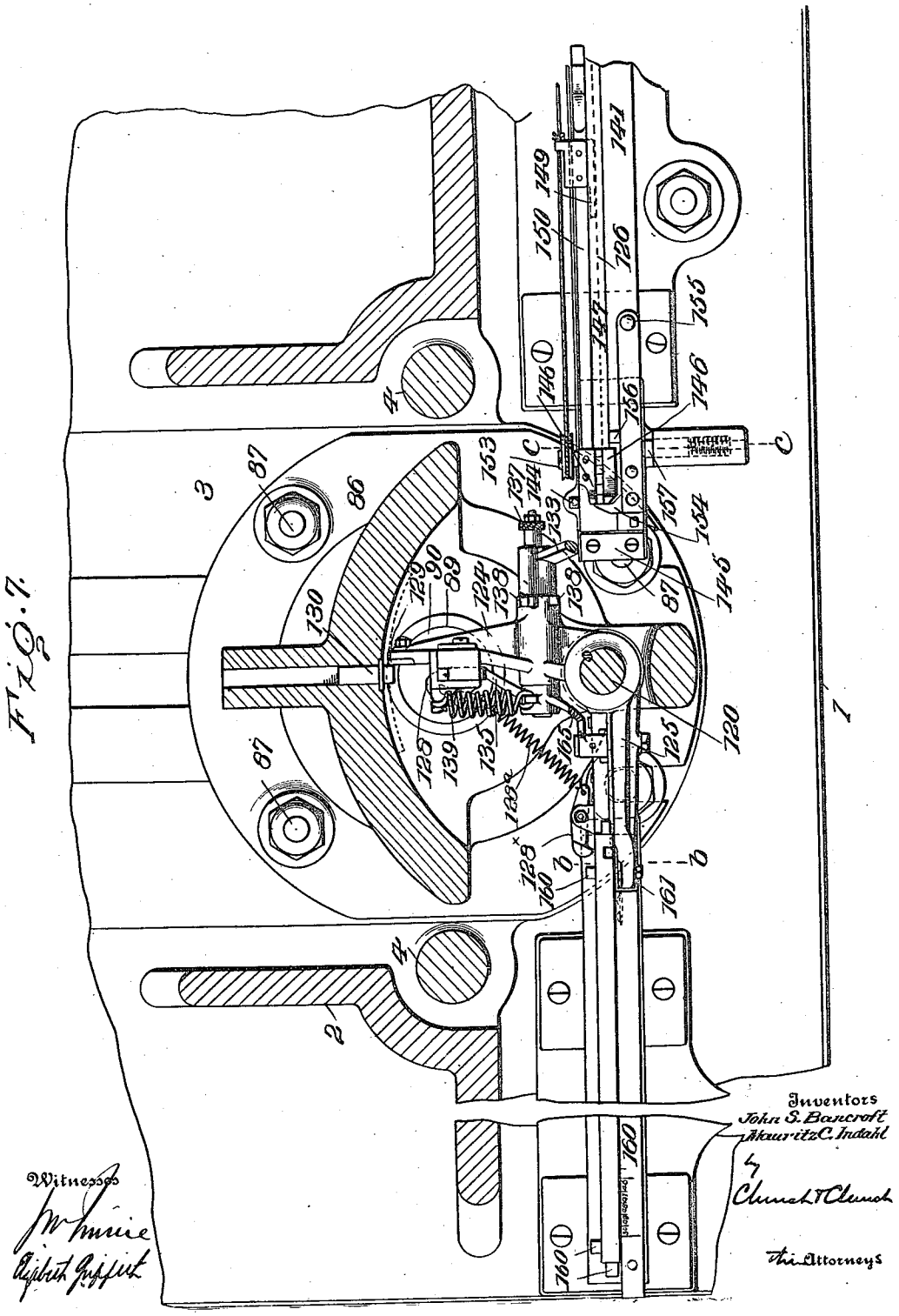

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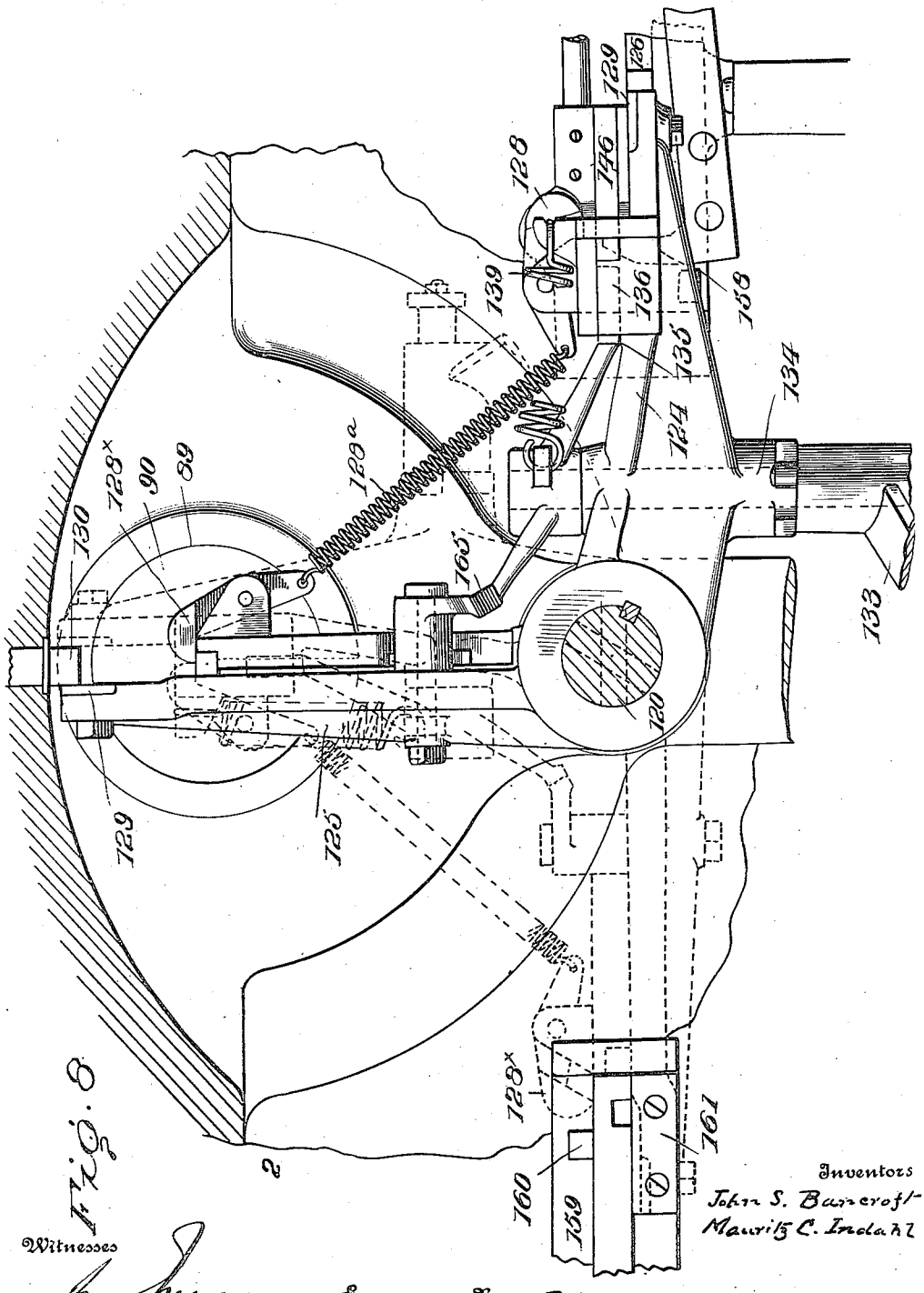

Fig. 8.

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Fig. 15.

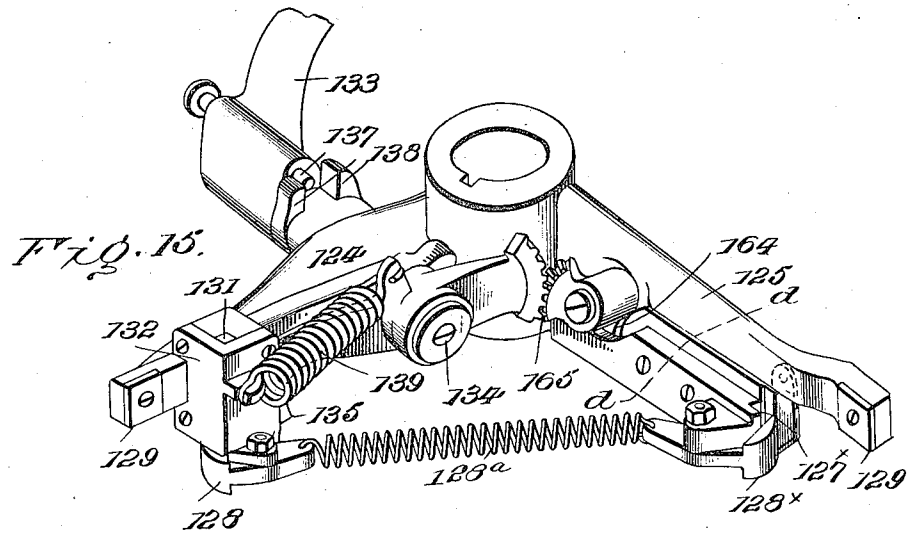

Fig. 17.

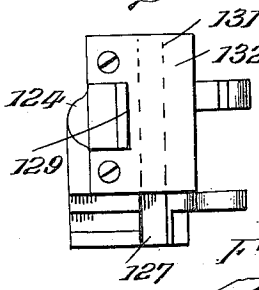

Fig. 16.

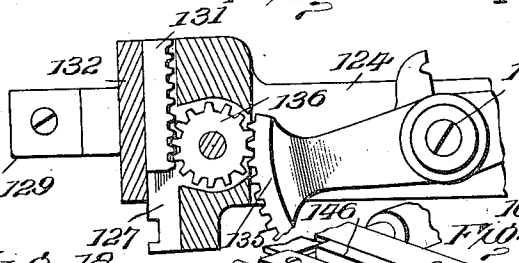

Fig. 22.

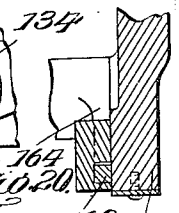

Fig. 18.

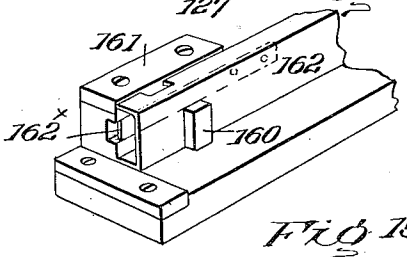

Fig. 20.

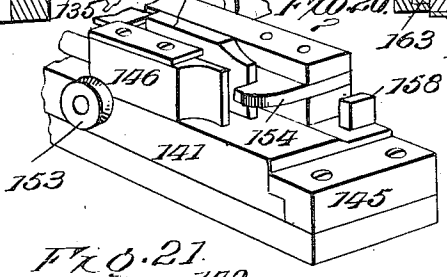

Fig. 19.

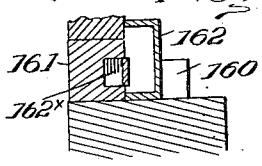

Fig. 21.

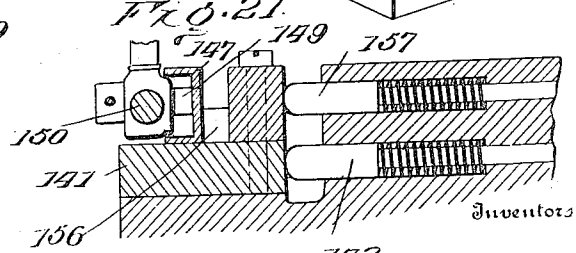

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Fig. 23.

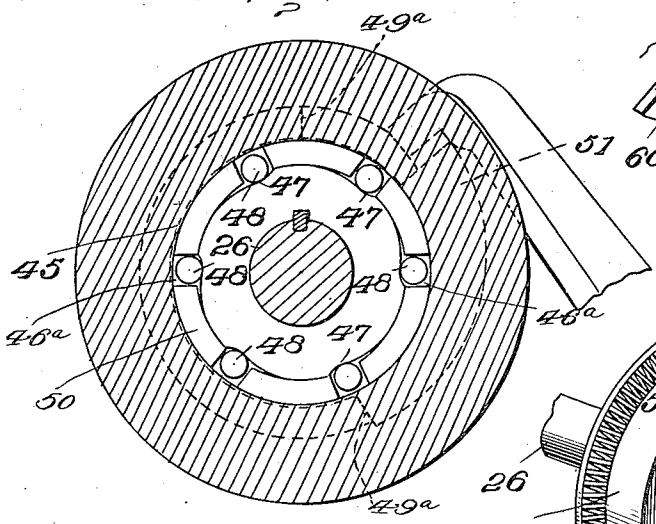


Fig. 29.

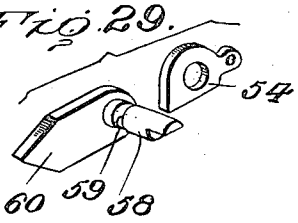
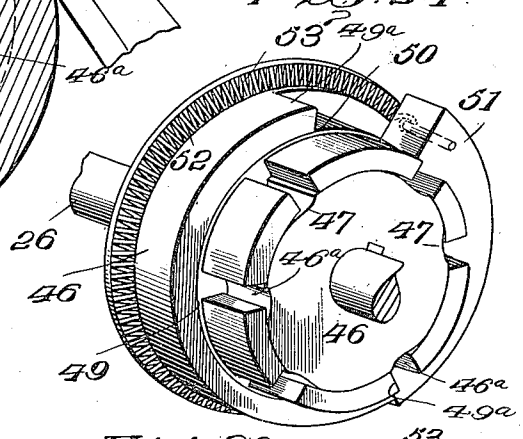


Fig. 24.



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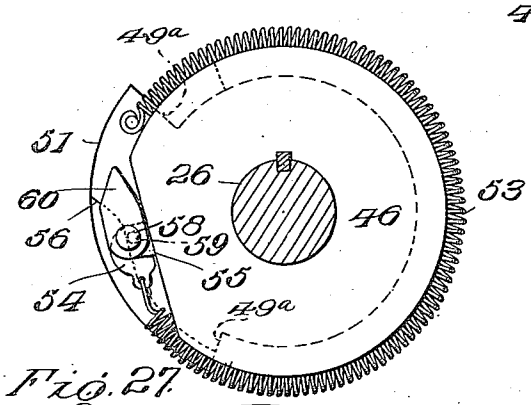


Fig. 26.

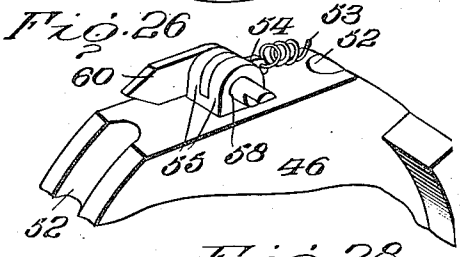


Fig. 27.

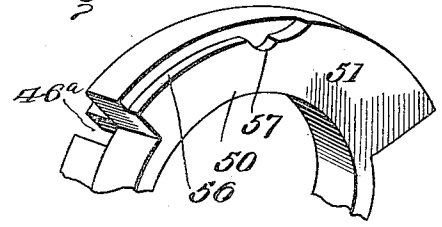
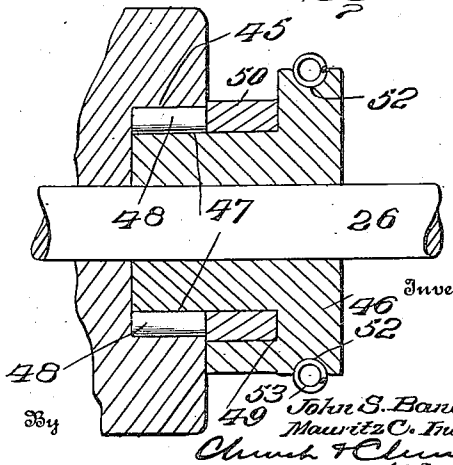


Fig. 28.



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11 SHEETS—SHEET 11.

Fig. 30

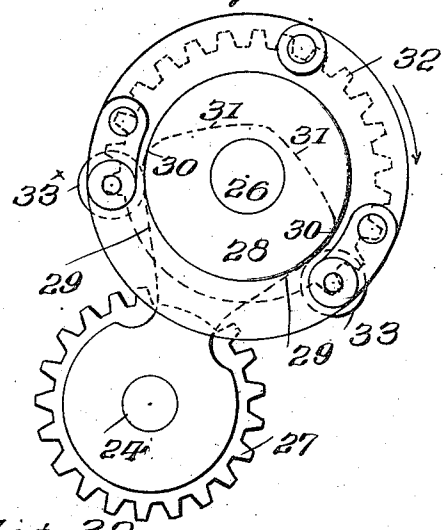


Fig. 31

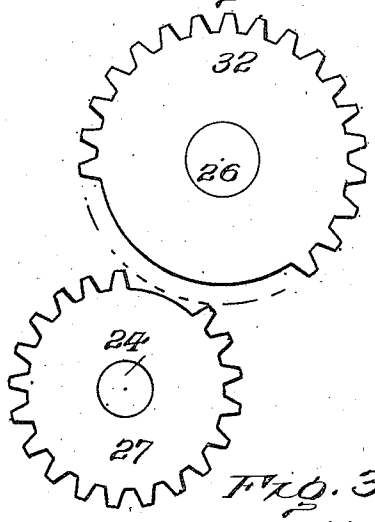


Fig. 32

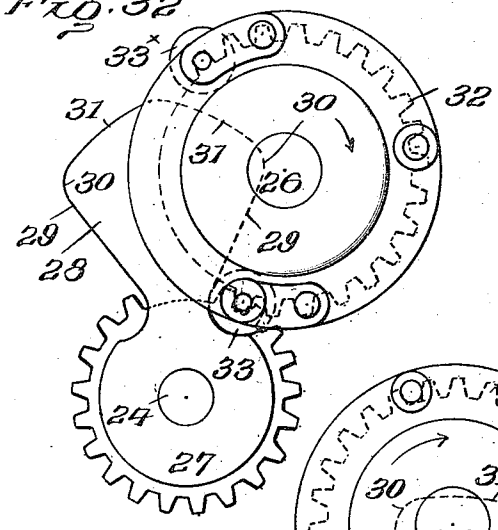


Fig. 33

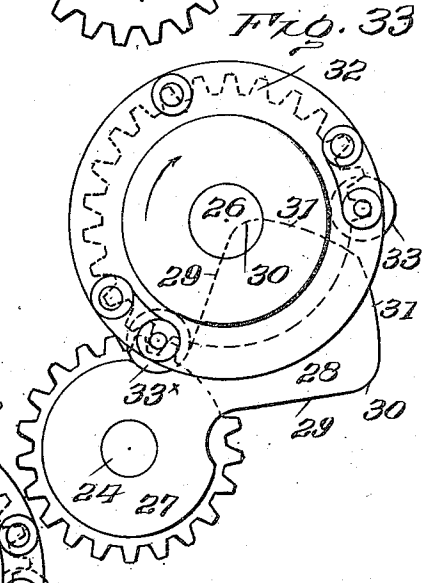
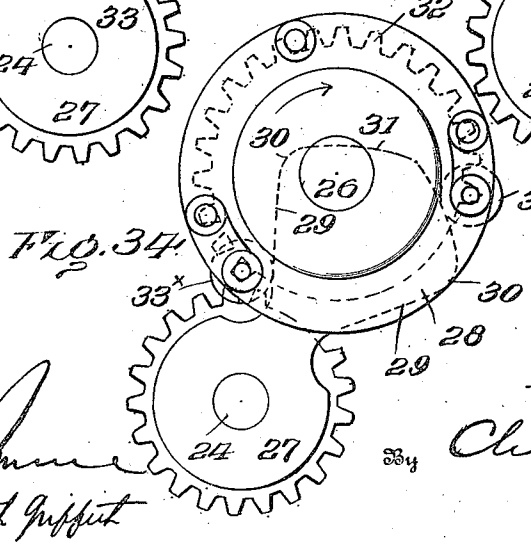


Fig. 34



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UNITED STATES PATENT OFFICE.

JOHN SELLERS BANCROFT AND MAURITZ C. INDAHL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO LANSTON MONOTYPE MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF VIRGINIA.

DRIVING-PRESS FOR TYPE-MATRICES.

962,409. Specification of Letters Patent. Patented June 28, 1910.

Application filed March 12, 1909. Serial No. 482,873.

To all whom it may concern:

Be it known that we, JOHN SELLERS BANCROFT and MAURITZ C. INDAHL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Driving-Presses for Type-Matrices; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

This invention relates generically to driving or stamping presses and specifically to machines of this class specially designed and adapted to produce the drive in matrices such as are employed in type casting machines. These matrices are produced by driving a punch (shaped to correspond with the character desired) into one end of a metal blank of parallelopiped form, the sides and end whereof serve as gages for positioning the matrix cavity relative to the mold and for determining the height of the printing surface.

It is required that the drive be completed at a single stroke of the punch, as it is practically impossible to maintain such exact registry between the punch and matrix cavity as will permit of a second application of the punch thereto without liability of deformation; and as the degree of pressure required to sink the punch to the desired depth is very considerable, the actuating devices are necessarily heavy and the inertia incident to stopping and starting is correspondingly great. The punches vary considerably in area as well as form, the faces being uniformly flat and the sides more of less diverging, so that at times there is developed a tendency on the part of the punch to drift laterally and thereby produce a displacement of the matrix cavity in relation to the sides of the blank in which it is driven. This is true notwithstanding the fact that the driving is performed while the blank is surrounded by a solid steel die containing a perforation of exact predetermined dimensions into which the punch is fitted and guided to move longitudinally into contact with the blank, for the pressure developed is such that not only is the solid die slightly expanded but the material of the matrix is placed under elastic tension and when expelled from the die expands sufficiently to prevent its reëntrance therein. But this extreme degree of accuracy in the placing and forming of the drive and the control of the punch actuating mechanism, while of primary importance from a technical point of view in a machine of this character, are not the only desiderata, and are superior only to facility in the presentation and withdrawal of the blanks, and accessibility of the mechanism for repair and substitution in case of the breaking down or failure to accurately perform allotted functions.

Now the object of the present invention is to increase the accuracy and efficiency of the machine as a whole, to which end it consists, first, in so constructing and arranging the actuating mechanism for the punch that the pressure and strains incident to the formation of the drive, instead of being directed upon and borne by the framework of the machine, will be transmitted through the actuating devices to and be resisted by the blank support, thereby avoiding rupture and distortion of the supporting frame; second, in providing the punch actuating mechanism with an automatic braking mechanism and an alternately accelerating and reducing driving gear, whereby, when coupled with the driving member or shaft, the inertia of rest of the punch actuating devices is gradually overcome and the speed of motion accelerated until it reaches its maximum, after which it is gradually diminished and the brake automatically applied coincident with or immediately following the disconnection of the driving member, thereby greatly modifying the destructive effects of the starting and stopping movements or operations; third, in providing a detachable and removable sub-press containing the blank holder or die and opposing plungers, the one carrying the punch, and the other the counter therefor, so that the matrix producing mechanism as a whole may be withdrawn from the actuating devices for substitution or repair; fourth, in so constructing and arranging the blank carrying and delivering devices that by the manipulation of a single lever the

transfer and insertion of the blank can be performed; and, fifth, in certain minor features relating to novel constructions, arrangements and combinations of elements, all as hereinafter fully described and pointed out in the appended claims.

In the accompanying drawings illustrating a preferred form of embodiment of the said invention: Figure 1 is a perspective view of the machine. Fig. 2 is a side elevation of the machine. Fig. 3 is a front elevation partly in section to disclose the manner of coupling the upper plunger with the cross-head. Fig. 4 is a side elevation opposite that of Fig. 2, partly in section to disclose the connection with the blank carrier. Fig. 5 is a horizontal section on the line *a*—*a*, Fig. 2. Fig. 6 is a vertical section through a section of the sub-press with the blank carrier in side elevation. Fig. 7 is a horizontal section through the sub-press and a portion of the main frame showing the blank carrier in plan. Fig. 8 is an enlarged top plan view of the blank carrier with a portion of the sub-press in section. Fig. 9 is a top plan view partly in section of the fixed braking members. Fig. 10 is a detail view showing a section of the driving shaft gear and friction disk detached and separated. Fig. 11 is a section through the punch carrying plunger showing the means for detachably securing the punch therein. Fig. 12 is a perspective view of the coupling joint between the blank carrier shaft and the actuating devices therefor. Fig. 13 is a side elevation of said coupling joint. Fig. 14 is a diagrammatic view of the engaging faces of said joint. Fig. 15 is a perspective view of the blank carrier detached from the balance of the machine. Fig. 16 is a partial sectional view of the blank carrier taken in the plane of the blank pusher. Fig. 17 is an elevation of the blank receiving and delivering member of the carrier. Fig. 18 is a perspective view of the receiving end of the matrix galley and its support. Fig. 19 is a section through the matrix galley and its support taken on line *b*—*b*, Fig. 7. Fig. 20 is a perspective view of the delivery end of the blank holding channel. Fig. 21 is a sectional view of the blank delivery channel and galley taken on line *c*—*c*, Fig. 7. Fig. 22 is a sectional view of the delivery arm of the blank carrier in line *d*—*d*, Fig. 7. Fig. 23 is a sectional view of the driving clutch on line *e*—*e*, of Fig. 5. Fig. 24 is a perspective view of the driven member of the clutch together with the opening and closing member and its retracting spring. Fig. 25 is an end view of the driven member of the clutch showing the means for attaching the spring thereto. Fig. 26 is a perspective view of the portion of the driven member of the clutch carrying the tensioning attachment for the spring. Fig. 27 is a perspective view of the portion of the clutch opening and closing member with interlocking shoulder for the tensioning attachment. Fig. 28 is a longitudinal sectional view through the driving, driven and opening and closing members of the clutch. Fig. 29 is a detail of the spring tensioning and relieving attachment. Fig. 30 is a side elevation of the driving gearing for the punch actuating devices. Fig. 31 is a side elevation of the mutilated gears forming part of said driving gearing corresponding in position with Fig. 30 Figs. 32 to 34, inclusive, are views illustrating the driving gearing in different positions.

Corresponding numerals designate like parts in the several figures.

Upon a base 1 of suitable form is erected the press-frame 2, the principal features whereof are rigid bed plate 3 and connected uprights provided with guides for two vertical rods 4, each of which latter is coupled by links 5 with one of a pair of levers 6, the latter fulcrumed on a shaft 7 supported in bearings on the base 1. Rods 4 are in parallel and are connected at their upper ends by a cross-head 8 of substantial proportions, provided with a central vertical bearing 9, preferably cylindrical and contracted, internally, at the upper end. Fitted to move vertically within said bearing 9 is a sleeve 10 and a spring 11, the latter interposed between a shoulder on sleeve 10 and the contracted portion of the bearing, and to the sleeve 10 above said bearing is applied an adjusting nut 12 supplemented by a jam nut or other means for retaining it in adjusted position. Sleeve 10 is thus held projected under the pressure of spring 11 the tension whereof can be varied through the adjustment of nut 12.

Extending longitudinally through sleeve 10 is the plunger 13, the upper end whereof carries an adjusting nut 14, contacting with one end of said sleeve, while the lower end is enlarged to form a socket 15 threaded exteriorly for the reception of an adjustable nut or collar 16 engaging the lower end of sleeve 10. Provision is thus made for varying the position of the plunger longitudinally of sleeve 10. The socket 15 is of T-shape and open at the rear for the passage of the head of the plunger of the sub-press, as will presently appear.

Supported in a bearing in the bed plate 3 in axial alinement with plunger 13 is the lower or opposing plunger 16^a, whose upper end is likewise equipped with an inverted and laterally open T-shaped socket 17 or equivalent detachable connection for the lower plunger of the sub-press, and said plunger 16^a is coupled by a link 18 with a lever 19 also fulcrumed on shaft 7 at a point intermediate levers 6. The rear or power ends of levers 6 and 19 are provided with

rollers lying between properly shaped opposing cams 20 carried by shafts 21 mounted in bearings in base 1 and connected to rotate in unison in the same direction, through gears 22 meshing with a gear 23 carried by a shaft 24, the latter coupled with the driving pulley 25 or equivalent power transmitting device in the manner about to be described.

Shaft 24 (hereinafter designated as the driven shaft) is coupled with a shaft 26 (hereinafter designated the driving shaft, inasmuch as it receives motion from the motor through pulley 25 and transmits same to the machine) through the system of gearing illustrated in Figs. 30 to 34 inclusive, whereof Fig. 30 represents the parts in their normal or starting position, the machine being at rest; Fig. 32 the conclusion of the starting movement when the driven shaft has acquired maximum speed; Fig. 33, the beginning of the stopping motion; and Fig. 34 approaching the termination of the stopping motion. Driven shaft 24 carries a segmental gear 27 and a cam 28, the opposite faces of which latter are symmetrical and comprise diverging surfaces 29 running into reverse curves 30 and terminating in converging surfaces 31. Driving shaft 26 is provided with a segmental gear 32 in the plane of gear 27 and with a head carrying two rollers or engaging shoulders 33, 33^{x}, each located relatively at one end of the segment but to one side thereof and in the plane of cam 28. The arrangement is such that when the driving shaft is at rest (Figs. 30, 31) the blank sections of the two segmental gears will be opposed and cam 28 will stand with its widest section between rollers 33, 33^{x}, the latter engaging the inner ends of the two curves 30, as represented in Fig. 30. If, now, motion is communicated to the driving shaft in the direction indicated by the arrow, the forward roller 33 through its engagement with cam 28 at a point remote from its axis will exert the maximum degree of power in starting the driven shaft in motion, and traversing incline 29 toward the axis of the cam the power exerted will be gradually diminished and the speed of the driven shaft correspondingly increased until it attains that of the driving segment 32, whereupon the two segments 32, 27, are brought into gear, as represented in Fig. 32, and cam 28 passes from between rollers 33 33^{x}. From this point on the two segments rotate together until the last teeth are about to disengage (Fig. 33) whereupon the inertia of the driven shaft and its connections coupled with the pressure of the forward roller 33 upon incline 31 causes cam 28 to be carried between rollers 33, 33^{x}.

The curve 30 of cam 28 is so proportioned that when roller 33 traverses it from a point slightly in advance of the position shown in Fig. 34, to that indicated in Fig. 30, or approximately 15°, said curve will be substantially concentric with the axis of segment 32 on the radius of roller 33, in consequence whereof there will be little or no transmission of power during this interval and the driven shaft will be brought gradually to rest when the driving shaft is arrested at the end of the one revolution, as is contemplated. It is not essential that both gears 32, 27, should be segmental or interrupted, as the action will be the same if 27 is segmental or interrupted, the other being continuously toothed. The object sought and accomplished by this arrangement is to materially diminish the shock incident to the inertia of rest and motion on the part of the driven members, and in this connection it may be stated that the word gradual as applied to the stopping and starting motions is a relative term inasmuch as the action of the press is in its nature percussive, the driving pulley being usually driven at approximately 100 revolutions per minute, and the driving shaft permitted but a single revolution for each impression. The gradual starting of the driven shaft and its connections thus provided for tends to relieve the shocks and destructive effect incident to the inertia of rest, while the dwell incident to the restoration of the parts to initial position permits a slowing up of the driven shaft and its connections at the time when the arresting means act upon the driving shaft and the opposing plungers have been fully retracted or separated.

The driving pulley 25 typifying the motor, is loose on driving shaft 26, and is coupled with the latter through a one-revolution clutch, to be presently described, and to relieve the opening member of said clutch from the duty of alone resisting the inertia of the moving parts in bringing them to rest at the conclusion of each revolution of the driving shaft, a periodically operating automatic brake mechanism is applied to the driving shaft. In the preferred form of embodiment illustrated, this brake mechanism includes a disk 35 fast on driving shaft 26 and located in close proximity to segmental gear 32. Associated with gear 32 as by being attached to one side thereof is a projection or cam 36, and in proximity to said cam is arranged a bar or plate 37 adapted to be engaged and displaced laterally by cam 36 as the gear 32 approaches the normal stopping position. This bar or plate 37 is bolted or otherwise secured at one end to the base 1, and it carries two bolts 38 projecting laterally thereof across the gear 32, the bolt 38 at the outer end of the plate or bar passing loosely through a bracket 39 also secured to base 1.

Attached at one end to base 1 and provided with openings for the passage of bolts

38 is a plate 40 lying between disk 35 and the proximate face of gear 32, and beyond said disk a bar 41 is mounted upon bolts 38. Between said bar 41 and adjusting devices or nuts 42 carried by bolts 38 are arranged springs 43. The arrangement is such that as gear 32 approaches its normal position of rest cam 36 will engage bar 37 and move it laterally, thereby compressing springs 43 and advancing bar 41 into frictional contact with the outer face of disk 35, at the same time forcing said plate 40 into frictional engagement with gear 32. The object in employing disk 35 is to obtain an increased frictional surface for braking purposes, and when this is not desired said disk and one of the bars 41 or 40 may be dispensed with, the remaining bar 40 or 41 directly engaging gear 32. This braking mechanism is so constructed and arranged that cam 36 will engage bar 37 to deflect the latter at or about the time roller 33× begins to traverse outwardly on incline 29 and roller 33 advances upon the curve 30 of cam 28, so that the braking pressure will be applied automatically and simultaneously with the reduction in speed of the driven member; and, moreover, the braking pressure is elastic and susceptible of variation through the adjustment of nuts 42.

As before stated, the driving pulley 25 is coupled with driving shaft 26 through what is known as a one-revolution clutch, the details whereof are best seen in Figs. 2, 5 and 23 to 29 inclusive. The hub of pulley 25 is provided with an internal cylindrical bearing 45, formed integral with or detachably applied to one end of said hub, and to shaft 26 is secured a head 46 one end whereof is reduced and projects within bearing 45 and is provided with cam seats 47 for the reception of clutching rollers 48.

Head 46 is provided with an annular recess or bearing 49 for the reception of a sleeve 50 the latter formed with radial slots 46^a at one end for the accommodation of rollers 48 and provided with a radial arm or projection 51, through which motion is communicated to the rollers upon their seats 47 in opening or closing the clutch. A section of the outer wall of annular bearing 49 is cut away or omitted for the reception of arm 51, the opposing shoulders 49^a thus provided serving to limit the movement of sleeve 50 relative to head 46. The exterior of head 46 is grooved, as at 52, to receive a spring 53, one end whereof is detachably attached to sleeve 50 and the opposite end to the head 46, see Figs. 25 and 26, said spring operating to advance sleeve 50 upon head 46 in a direction to automatically close the clutch by causing rollers 48 to traverse toward the more prominent portions of their respective seats 47 until they become clamped between said seats and the surrounding bearing 45 on driving pulley 25. This requires that spring 53 should be applied under considerable tension, sufficient in amount to automatically close the clutch upon the release of arm 51. To insure the proper and secure attachment of the spring, one end is provided with an eye threaded upon a pin attached to arm 51 and held against displacement by the walls of groove 52, while the opposite end is attached to a plate 54 adapted to enter between bearings 55 on head 46. Arm 51 has one edge grooved or cut away to form an arc shaped ledge as at 56, Fig. 27, concentric with the bearing of sleeve 50 on head 46 and terminating at one end in a notch or depression 57.

Plate 54 and bearings 55 are perforated for the reception of a bolt 58, the latter fitting the openings in bearings 55 and having a cutaway portion opposite plate 54 forming a crank pin 59. The inner end of bolt 58 is reduced or cut away on the side opposite that in which crank pin 59 is located and the outer end of said bolt is provided with an actuating arm or finger-piece 60. To couple this end of the spring sleeve 50 is retracted to open position thereby bringing the openings in bearings 55 opposite the notch 57, whereupon plate 54 is brought to position between said bearings and bolt 58 inserted. To do this the bolt is turned with its crank 59 opposite the spring, so that the stress of the latter will be directed upon the straight side of the pin. If left in this position the end of bolt 58 will engage notch 57 and prevent the advance of sleeve 50 and the closing of the clutch, hence it is required that the bolt be partially rotated to bring the reduced or cutaway portion of its end outside of the segmental shoulder 56, thereby shifting crank pin 59 toward the shaft 26, until arm 60 contacts with head 46, as indicated in Fig. 25. The crank 59 being now below the center of bolt 58 the pressure of the spring will tend to rotate it in a direction to hold arm 60 down upon head 46, while the plate 54 entering the cutaway portion of the bolt prevents longitudinal displacement of the latter until said bolt is again turned to bring the crank in opposition to the spring, which can only be accomplished while the sleeve is retracted owing to the fact that shoulder 56 prevents the rotation of said bolt at other times.

Pivotally suported upon the base is the clutch operating lever 61 whose engaging end is adapted to be alternately projected into and withdrawn from the path of arm 51 to open and close the clutch. Lever 61 stands normally in the path of clutch arm 51, to which position it is advanced by a spring 62 suitably coupled with said lever, as through actuating bar 63, the latter, in this instance, coupled with a treadle 64 by

means of which lever 61 may be withdrawn from the path of arm 51, thereby permitting the automatic closing of the clutch.

In order to insure the return of lever 61 into the path of arm 51 before the latter completes a revolution, to the end that the driving shaft may be automatically and surely arrested at the conclusion of a single revolution following the withdrawal of lever 61, the treadle shaft 65 is provided with an arm 66 carrying pawl 67 in position to engage a shoulder 68 on actuating bar 63 when the treadle is depressed. The heel of pawl 67 is provided with a pin 69 riding in a slot in a link 70, the latter coupled with a lever 71 pivoted upon the base and carrying a roller 72 in position to be engaged by a cam 73 on one of the cam shafts 21. A spring 74 connected to lever 71 serves to hold the latter in contact with its cam, and a spring 75 (Figs. 3, 4 and 13) acting in opposition to spring 62 and of superior power to the latter, operates to advance pawl carrying arm 66 when pressure is removed from the treadle. The arrangement is such that when treadle 64 is depressed it places motor spring 75 under tension and retracts pawl 67 until it passes beyond shoulder 68, and when pressure upon the treadle is relaxed motor spring 75 advances bar 63 and tilts lever 61 to withdraw the latter from the path of clutch arm 51, whereupon the clutch closes automatically, and the driving and driven shafts are set in motion. At this time lever 71 engages the smaller concentric section of cam 73 and pawl 67 retains its engagement with bar 63 which condition continues until the driving shaft approaches the conclusion of a revolution, when cam 73 tilts lever 71 causing link 70 to positively raise the toe of pawl 67 from shoulder 68, whereupon lever 61 is released and again advanced by spring 62 into the path of clutch arm 51 ready to engage and shift the latter to open the clutch at the conclusion of its revolution. Although, as is obvious, motor spring 75 or its equivalent may be coupled with the pawl carrier 66 in any appropriate manner, in the present instance it is shown as applied to a shaft 76 mounted in a bearing on bed plate 3, and connected with treadle shaft 65 through arm 77 and links 78 to which latter one end of said shaft 76 is coupled by a swivel joint 79 of a character to permit rotation of the shaft.

Shaft 76 carries a gear 80 in mesh with a rack 81, the latter provided with a shoulder and an opposed spring 82 between which is received one arm of a bell crank lever 83. The other arm of this lever is connected through an adjustable coupling or link 84 with lever 71, so that as said lever is vibrated shaft 76 will receive an oscillatory motion about its axis.

The upper end of shaft 76 stands normally flush with the face of bed plate 3 and is provided with a rib 85 extending transversely of the axis of said shaft above the surface of plate 3. The parts are so arranged and proportioned that when the treadle is depressed to inaugurate the closing of the clutch, shaft 76 will be actuated to shift its rib 85 from a higher to a lower position while standing at one extreme of its oscillatory movement, and when cam 73 tilts lever 71 to disconnect clutch opening member 61 from motor 75, shaft 76 will be oscillated and held during the passing of the high section of said cam at the other extreme of its oscillatory movement to be subsequently returned to first position as lever 71 descends to the segment of shorter radius which it reaches as or just before the clutch is opened by the engagement of arm 51 with lever 61. The purpose of this arrangement will presently appear.

The mechanism thus far described constitutes the press proper, and for forming the drive in matrices it is supplemented by what is herein termed a sub-press containing the die and punches for giving final form to the matrices, together with the devices by which the blanks are delivered one at a time to the die and removed therefrom after being subjected to the action of the plungers. This sub-press includes a substantial frame 86 removably attached to the bed plate 3, as by bolts 87, and adapted to be inserted between plungers 13, 16, said frame being provided with alined vertical bearings 88, 89, with a lateral opening or way between their proximate ends for the passage of the blank carrier.

The die 90 consists of a solid block of metal, preferably steel, shaped exteriorly to accurately fit within bearing 89 and provided with a central vertical die cavity or opening 91, the latter accurately dimensioned and shaped to correspond with the cross-section of the matrix block to be produced. Said die block is detachably secured to the end of a sleeve 92, the latter accurately fitted to bearing 89 and provided with a flange or collar 93 for determining the longitudinal position of the die. The die and attached sleeve are inserted from the lower end of bearing 89 and the frame of the sub-press is recessed below said bearing to receive clamping ring 94 between which and the lower end of sleeve 92 is interposed a plate or block 95 centrally perforated to form a bearing 96.

A key 97 or equivalent means are provided to prevent rotation of the die block and sleeve within the bearing in the frame of the sub-press. Guided in bearing 96 and held from rotation therein by a key 98 is a plunger 99 whose lower end is provided with a T-head 100 adapted to enter the socket 17 in plunger 16^a, while its oppo-

site end is equipped with a chuck 101 in which is secured the lower plunger or punch 102, the latter accurately fitting the die opening 91 and serving to give form to one end of the matrix block. In the illustration the end of this punch or plunger 102 is equipped with a conical projection 103 for forming a conical recess or centering cavity in the end of the matrix opposite that containing the type cavity. Chuck 101 is of a well known type and comprises collar 104 threaded upon the end of plunger 99 and provided with a tapering opening in which the clamping jaws 105 are located; and to still further guard against lateral displacement of the operating punch 102, or the accidental release of the latter, collar 104 is fitted to slide in contact with the inner wall of sleeve 92 and the latter is provided with a key 106 engaging a seat in the collar, to prevent rotation of the latter upon plunger 102.

The upper bearing 88 is relatively longer than 89 and within it is accurately fitted a plunger 107 the latter held against rotation, as by a key 108, and provided at one end with a T-head 109 adapted to enter the socket 15 of the press plunger 13, while its opposite or lower end is equipped with a justifying or gaging punch holder 109^a, such for example as that illustrated in Figs. 6 and 11, comprising a removable hardened plate 110 seated in a cavity or recess in the end of plunger 107, and a block 111 fitted to said recess and containing a central orifice 112 of angular section, two adjacent walls whereof are accurately formed at a known angle and in predetermined relation to the axis of plunger 107 and die cavity 91, so that a punch 113 when properly formed and clamped into the angle between said gaging walls will accurately register with the die-cavity 91. The punch is removably held in this position by a block 114 seated in a radial opening in block 111 and engaged by a screw 115 threaded into plunger 107 and accessible from the exterior thereof.

Punch 113 is of the proper cross-section to accurately fit die cavity 91, the end extending but a short distance beyond its holder 109^a and being properly shaped to give form to the end of the matrix blank. In the present embodiment the punch has a projecting portion or end section shaped to correspond with the character to be impressed upon or in the end of the matrix block.

The lower or coning punch 102 is at all times supported against lateral displacement by die 90 within which it reciprocates to eject the finished matrix, while punch 113 is wholly withdrawn from the die for the insertion of the blank and removal of the finished matrix, hence the necessity for great accuracy in guiding said punch, to insure registry between the punch and die at the moment the one enters the other. The sub-press is also equipped with a blank carrier attached to a vertical shaft 120, the latter journaled in frame 86 immediately above and in line with shaft 76 to which it is coupled by means of a head 121 (Figs. 12 and 14) the latter grooved transversely, as at 122, in a line intersecting the axis of said shaft and adapted to receive the rib 85 on shaft 76. Below the groove the head is provided with shoulders 123 spaced to permit a limited degree of rotation of shaft 120 relative to shaft 76 when rib 85 is withdrawn from groove 122 into the plane of shoulders 123. The blank carrier is equipped with two radial arms 124, 125, of which the first operates to transfer the blanks, one at a time, from a receptacle or galley 126, (Fig. 7) to the die 90, and the other to transfer the completed matrices from said die to a receiving receptacle or galley, as will now be explained.

Each arm 124, 125, is furnished with a blank holding clamp in the form of an angular seat 127, or 127^x, and a coöperating pivoted jaw 128, or 128^x, and each arm is also provided with a shoulder 129 in position to engage a stop 130 (Figs. 1 and 8) detachably secured to frame 86, and operating to limit the oscillations of the blank carrier in opposite directions, so that when either arm is brought opposite the die its carrier will be in register with the die cavity 91 and the other arm in register with its galley. Above the blank holder on arm 124 is arranged a guide 132 containing a vertically movable pusher 131 the latter adapted to perform the double function of expelling a blank from the holder and inserting it in the die and of expelling a punch deposited in guide 132 above the pusher, into the punch holder 109^a of plunger 107. Pusher 131 receives motion from a hand lever 133 fast on a shaft 134 extending through a bearing in arm 124, said shaft carrying a toothed segment 135 meshing with a pinion 136 the latter engaging rack teeth on said pusher. When employed for ejecting blanks into the die, pusher 131 occupies the upper portion of guide 132 and is confined thereto by a removable or retractable pin 137 carried by lever 132 and playing between shoulders 138 on arm 124, a spring 139 serving to hold the hand lever to elevated position; but when a punch is to be removed from or inserted in holder 109^a, pin 137 is withdrawn from between shoulders 138, and the hand lever is manipulated to lower the pusher and permit the punch to be entered above it.

Mounted upon a frame 140 detachably secured to the press frame 2 and to the right of the sub-press is the supply reservoir for the blanks. It includes a plate or bar 141 pivotally supported at its rear end, as at 142

Fig. 3, and held under the elastic pressure of a push pin 143 (Fig. 21) against a stop 144, said push pin operating to swing the plate 141 laterally upon its pivot toward said stop. The inner end of plate 141 engages a guide 145 and carries on its upper surface two blocks 146 spaced to form a channel for the passage of one end of a column of blanks confined in an open sided galley 147. This galley is removably supported upon plate 141 between stops 148 and blocks 146 with its open end in alinement with the channel between said blocks, the columns of blanks being advanced by a pusher 149 guided upon a rod 150 and connected to a weight 151 by a cord 152 passing over pulley 153.

The discharge end of the channel between blocks 146 is normally closed by a gate 154 pivotally attached, as at 155, and held against a stop 156 under elastic pressure, as by push pin 157, the off-set end of said cut-off extending across said channel. The arrangement is such that when the blank carrier is swung to bring the blank holder of arm 124 opposite the discharge end of the channel, arm 124 will engage and retract the gate 154, and holding jaw 128 will engage the nearer block 146 and be retracted thereby against the resistance of its spring 128^a, thus permitting the blank at the end of the column to enter the holder. As the arm 124 swings away the gate closes and holding jaw 128 advances to clamp the blank.

The object of rendering plate 141 yielding in the plane of movement of the blank holding clamp is to insure registry between the discharge channel and said clamp, which is accomplished by furnishing said plate with a gaging shoulder or stop 158 against which arm 124 impinges as the clamp is brought to position to receive a blank.

On the left side of the sub-press is erected the matrix receiver, consisting of a plate 159 provided with blocks 160 and a guide 161 for sustaining a removable galley 162. The guide 161 on the open side of the galley is provided with a spring 162^x (Figs. 18 and 19) for contacting with and sustaining the matrices as delivered. Arm 125 of the blank carrier is also provided with a pusher 163 (Fig. 22) provided with rack teeth gearing with a segment 164 pivoted upon arm 125 and coupled with shaft 134 of hand lever 133 through bevel gear segments 165.

Jaw 128^x of the blank holding clamp of arm 125 engages and is retracted by galley 162, to open the blank holder as the latter approaches the open end of said galley and at the conclusion of said movement (which coincides with the bringing of the blank holder of arm 124 into registry with the die cavity 91) pusher 163 is advanced to discharge the matrix into the galley, the actuating devices being so arranged that the movement of lever 133 for ejecting the blank into the die 91 advances pusher 163 to discharge the finished matrix into the galley 162.

It will be noticed that when the blank holder of arm 124 is opposite the blank delivery channel that of arm 125 is above the die cavity 91, and when the blank holder of arm 124 is swung to bring its holder above the die cavity that of arm 125 is opposite the receiving end of the matrix galley; and further, that accurate registry between the holders, die and galleys is secured by the alternate engagement of arms 124 and 125 with stop 130, and that by removing the latter the carrier can be swung to any position required.

Operation: When the clutch is open and the press at rest shaft 76 occupies its elevated position with rib 85 seated in groove 122 in shaft 120 of the blank carrier, and the latter stands with its arms 124, 125, on opposite sides of the die 90 at points intermediate said die and the supply and receiving galleys respectively. In this position pawl 67 is at the forward end of its stroke and out of engagement with shoulder 68, lever 61 being in engagement with clutch arm 61 and holding the clutch open. Assuming the punch last used is in plunger 107 and that the next matrix or series of matrices calls for the substitution of a different punch. As a result of the last previous operation the blank holding clamp of arm 124 was charged with a blank and that of arm 125 with a finished matrix, and as before stated said arms occupy positions on either side of die 90, with rib 85 of shaft 76 seated in groove 122 of the blank carrier shaft 120. The first operation performed is to deposit the blank in the die, the finished matrix in the receiving galley and remove the punch from plunger 107, to accomplish which the operator depresses the treadle, thereby withdrawing rib 85 from groove 122 and releasing the blank carrier so that it is free to swing to the extent permitted by limiting shoulders 123. Grasping the hand lever 133 the operator swings the carrier until arm 124 contacts with stop 130, thus bringing the blank holder of arm 124 in register with die 90 and that of arm 125 in register with the receiving galley with its jaw 128^x retracted. By a downward pressure upon lever 133, pusher 131 is advanced to force the blank into the die and simultaneously therewith plunger 163 is advanced to discharge the finished matrix of the previous operation into the receiving galley. Retaining lever 133 in depressed position the operator loosens screw 115 and the punch falls or is displaced into guide 132 above pusher 131 whereupon the blank carrier is swung laterally from beneath plunger 107, another punch is substituted for that

now contained in guide 132 and the carrier swung back until said guide again registers with die 90 and plunger 107. The hand lever is permitted to rise and pin 137 is retracted, thereby permitting pusher 131 to rise sufficiently above its normal position to seat the punch in the clutch of plunger 107 when it is confined by a turn of screw 115. During these operations, and so long as rib 85 remains out of registry with groove 122, shaft 76 is automatically locked in its lower position, thus preventing the advance of pawl 67 and retaining the clutch open should the operator relax pressure upon the treadle. The punch being secured in position, lever 133 is slightly depressed to permit the return of limiting pin 137, and the blank carrier is swung back to normal position with rib 85 registering with groove 122 thus permitting shaft 76 to rise and advance pawl 67, the latter actuating lever 61 to release clutch arm 51 whereupon sleeve 50 advances under pressure of its spring to close the clutch and start driving shaft 26 in motion, the latter starting off at the same speed as pulley 25.

The driving shaft exercises maximum power in starting the driven shaft 24 and connected mechanism into motion, gradually increasing the speed of the latter until it reaches the maximum, which is maintained at the time pressure is exerted upon the blank within die cavity 91. In the normal or stopped position of the machine the cross-head 8 carrying the upper plunger 13 is arrested and held at its highest or most elevated position, and during the descent of said cross-head punch 113 enters the die cavity 91 and compresses the blank upon the lower punch 102, the latter either held stationary or, if need be, slightly advanced to insure the entry of its conical projection into the blank.

It will be observed that the direct downward pressure of the punch 113 is not borne by the press frame or frame of the sub-press, but by the lower punch 102 and its actuating devices, thereby avoiding in a great measure the liability of distortion and wear such as results from the springing of those parts under the very considerable pressure required to effect the drive. Cams 20 and 73 are so shaped and related that after the drive has been completed punch 113 will be withdrawn clear of the die as lever 71 is operated to trip pawl 67 and oscillate shaft 76, the latter through the engagement of rib 85 in groove 122 swinging the blank carrier until its arm 125 contacts with and is arrested by stop 130. This brings the blank holder of arm 125 in register with the die and that of arm 124 in register with the blank supply channel from which it receives a blank. While the blank carrier retains this position punch 102 is elevated to force the matrix from the die into the holder of arm 125, and as the said punch descends, lever 71 rides from the higher to the lower section of cam 73, and the blank carrier is swung back to its intermediate or normal position, arm 51 encounters the clutch opening lever 61 and the cycle of operation is completed by the application of the brake and consequent arrest of the driving shaft and connected mechanism. If more matrices are required from the same punch, the operator proceeds as before, omitting, however, the operations incident to the insertion of the punch in plunger 107.

When, for any reason, it becomes necessary or desirable to obtain access to the die or other parts of the sub-press, for purposes of inspection or repair, it is only required that the fastening bolts be released when the sub-press can be readily withdrawn from the press proper, and another fully equipped sub-press substituted, thus avoiding the loss of time which would otherwise be suffered. It will also be observed that the manipulation of the blank carrier in presenting the blanks to the die and in discharging the finished matrices from the holder are all effected by a single hand lever.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. A driving press for type matrices and the like including the following elements, in combination, to wit; opposing plungers and actuating mechanism therefor affording longitudinal support for said plungers independently of the press frame; a driving mechanism for said actuating mechanism including driving and driven shafts with intermediate variable speed transmission gearing; a motor, and a one revolution clutch intermediate said motor and driving shaft; and a brake controlled from the driving shaft and automatically applied during a predetermined portion of the rotation of said shaft.

2. A driving press for type matrices and the like including the following elements, in combination, to wit; actuating devices for the compressing members including a driven shaft; a driving mechanism including a motor, a driving shaft and a one revolution clutch; variable speed transmitting gearing connecting said driving and driven shafts; and a braking mechanism actuated from and reacting upon the driving shaft at a point in the revolution of said shaft corresponding with the opening of the clutch.

3. A driving press for type matrices and the like including, in combination, the following elements, to wit; compressing members; actuating devices for the movable compressing member or members, including a driven shaft; a motor; a driving shaft; a one revolution clutch intermediate said motor and driving shaft; variable speed transmitting gearing connecting said driv-

ing and driven shafts; a brake; and means for automatically applying said brake at a predetermined point in the revolution of the driving shaft.

4. A driving press for type matrices and the like including the following elements, in combination, to wit; compressing devices; actuating mechanism for the compression member including a driven shaft; a motor; a driving shaft coupled with the motor through a one revolution clutch; and variable speed transmitting gearing intermediate said driving and driven shafts.

5. A driving press for type machines and the like including, in combination, the following elements, to wit; opposed compressing members; actuating devices for the movable compressing member including a driven shaft; motor and driving shafts with an intermediate one revolution clutch; a brake; and means for automatically applying the brake at a predetermined point in the rotation of the driving shaft.

6. A driving press for type matrices and the like including the following elements, in combination, to wit; opposing longitudinally movable plungers; actuating devices coupled with and supporting said plungers; a driving shaft coupled with the motor through a one revolution clutch; and variable speed transmission gearing intermediate said driving shaft and a driven shaft, the latter coupled with the plunger actuating devices.

7. A driving press for type matrices and the like including the following elements in combination, to wit; a press frame supported upon a base; opposing plungers, the one guided in the press frame and the other carried by a cross-head attached to parallel rods, the latter guided in the press frame; and actuating devices for said plungers including three levers mounted upon a shaft supported on the base, one of said levers coupled with the plunger guided in the press frame and each of the others coupled with one of said rods; and two cam shafts mounted in the base and equipped with three sets or pairs of cams, the power end of each of said levers being located between and acted upon by the cams of one set or pair.

8. A driving press for type matrices and the like including the following elements, to wit; opposed plungers in axial alinement the one supported in bearings on the press frame and the other in a cross-head attached to parallel rods, the latter guided on said frame; a plurality of levers mounted on a shaft coupled to said rods and plunger taking its bearing in the frame; and actuating devices for said levers.

9. A driving press for type matrices and the like including, in combination, the following elements, to wit; a press provided with a bed plate, opposed plungers and actuating devices for the latter; and a sub-press removably applied to said bed plate the same including a frame, opposed plungers guided therein, and each provided with a punch holder or chuck a punch for each holder or chuck, a die located intermediate said last named plungers and containing a die cavity in which said punches are guided, and means for detachably coupling each sub-press plunger with one of the main press plungers.

10. In a driving press for type matrices, and the like, the combination of the following elements, to wit; a press provided with a bed plate and opposing plungers perpendicular to the face of said bed plate; and a sub-press comprising a frame carrying a die and opposing plungers, the latter equipped with punches fitted to opposite ends of the die, said sub-press being adapted to slide upon the bed plate to bring its plungers into alinement with the press plungers and the latter each provided with an open sided coupling to receive the interlocking coupling of the complemental sub-press plunger, as the sub-press is shifted to position between the press plungers.

11. In a driving press for type matrices and the like the combination of the following elements, to wit; a press provided with a bed plate and opposing plungers; a sub-press adapted to be interposed between said plungers and including a frame detachably secured to the bed plate, a die and opposing punch carrying plungers mounted in said frame; and means for detachably coupling each press plunger with the complemental sub-press plunger by a lateral movement of the sub-press.

12. In a driving press for type matrices and the like the combination of the following elements, to wit; a press provided with a bed plate and opposing plungers, the latter equipped with open sided coupling members; and a sub-press including a frame, opposing punch carrying plungers and an intermediate die, said sub-press being removably secured to the bed plate and its plungers provided with coupling members adapted to interlock with the complemental coupling members of the press plungers.

13. In a driving press for type matrices and the like the combination of the following elements, to wit; a press provided with a bed plate and opposing plungers; a sub-press including a frame detachably secured to the bed plate, opposing punch carrying plungers and an inclosing die in which the punches are guided; and means for detachably coupling each press plunger with the complemental sub-press plunger.

14. A driving press for type matrices and the like including the following elements in combination, to wit; a press frame equipped with opposing plungers and a bed plate; a detachable sub-press provided with opposing

punch carrying plungers, an intermediate die and a movable blank carrier, the latter coupled to a shaft supported in bearings on the sub-press; a shaft supported on the press frame in position to register with the blank-carrier shaft when the sub-press is in working position; and a separable coupling joint between said shafts.

15. A driving press for type matrices and the like including, in combination, the following elements, to wit; actuating mechanism for the compression plunger including a one revolution clutch with an engaging member movable into and out of the path of the clutch-opening and closing member; means for advancing said engaging member to open the clutch; and means for withdrawing said engaging member to close the clutch, the same including a motor and controllable means for coupling the same with said engaging member.

16. A driving press for type matrices and the like including, in combination, the following elements, to wit; plunger actuating devices including motor and a driving shaft connected through a one revolution clutch provided with a spring actuated member tending to close the clutch and a controllable engaging member movable into and out of the path of said closing member; an actuating bar for said engaging member provided with a spring; a reciprocatory arm carrying a pawl in position to engage a shoulder on said actuating bar when said arm is retracted; and a motor coupled with said arm to advance the latter.

17. In a driving press for type matrices the combination of the following elements, to wit; a plunger actuating mechanism provided with a one revolution clutch intermediate the driving shaft and motor and including a clutch stopping and starting member movable into and out of engagement, of the clutch for alternately opening and closing the latter; yielding means for advancing and holding said stopping and starting member in the path of the clutch opening member, an actuating member for said stopping and starting member provided with a shoulder; a reciprocatory member bearing a pawl in position to engage the shoulder on said actuating member; a motor and retracting means coupled with said pawl carrier; a cam coupled with the actuating mechanism; and a lever and link connection between said cam and pawl, for tripping the latter and permitting the advance of the stopping and starting member into the path of the clutch opening member.

18. A driving press for type matrices and the like equipped with plunger actuating devices including a driving shaft coupled with the motor through a one revolution clutch, the latter provided with a spring actuated clutch closing member and an engaging member movable into and away from the path of said closing member, and in combination therewith, an actuator for said engaging member, a spring actuated retractable member carrying a pawl, the latter adapted to engage a shoulder on the actuating bar, and means controlled by the plunger actuating devices for tripping said pawl at a predetermined point in the rotation of the driving shaft after the pawl has been engaged with said shoulder.

19. In a driving press for type matrices and the like provided with a one revolution clutch controlling the plunger actuating mechanism and in combination therewith a clutch actuating mechanism including the following elements, to wit; a controlling member movable relative to the path of the clutch opening and closing member; means for advancing said controlling member; a motor device; means under the control of the operator for coupling said motor device with said controlling member, to retract the latter; and means controlled by the plunger actuating mechanism for automatically disconnecting said motor device during the revolution of the clutch, to permit the advance of the controlling member into position to open the clutch at the completion of its revolution.

20. In a driving press for type matrices provided with a one revolution clutch, plunger actuating devices, and an oscillatory blank carrier and in combination therewith the following elements, to wit; a clutch controlling member; means for advancing said clutch controlling member into the path of the clutch to open the latter; a motor; means under the control of the operator for connecting said motor with the clutch controlling member, to withdraw or retract the latter; means for automatically disconnecting the motor and clutch controlling member during each revolution of the clutch; and means controlled by said disconnecting means and coupled with the blank carrier, to oscillate the latter.

21. In a driving press for type matrices provided with plunger actuating mechanism, a one revolution clutch, and an oscillatory blank carrier, and in combination therewith, the following elements, to wit; means under the control of the operator for closing the clutch; means controlled by the plunger actuating mechanism for automatically opening the clutch; and means coupled with the clutch opening means and operating upon the blank carrier to oscillate the latter.

22. In a driving press for matrix blanks provided with plunger actuating devices, a controlling clutch therefor and an oscillatory blank carrier, and in combination therewith, the following elements, to wit; a clutch actuating member normally holding the clutch in open position; means under the

control of the operator for engaging and moving said actuating member to close the clutch; a cam connected to the plunger actuating devices; means coupled with said cam for disconnecting the clutch actuating member from its actuating devices and a rack coupled with said disconnecting means and engaging a pinion, the latter coupled with the shaft of the blank carrier.

23. A driving press for type matrices and the like including, in combination, the following elements, to wit; a plunger actuating mechanism provided with a clutch; actuating devices for said clutch; a reciprocatory blank carrier; and actuating devices for said carrier coupled with and operated by the clutch actuating devices.

24. In a driving press for type matrices provided with plunger actuating mechanism, a clutch, actuating devices for effecting the opening and closing of said clutch, and a reciprocatory blank carrier, and in combination therewith actuating devices for said blank carrier coupled with the clutch actuating devices, the same including means for permitting independent movement of said blank carrier and for preventing the closing of the clutch when the carrier is so displaced.

25. In a driving press for type matrices and the like the combination of the following elements, to wit; plunger actuating mechanism including clutching devices and means for opening and closing the same; controllable actuating means for said clutching devices; a movable blank carrier, actuating devices for said carrier coupled with the actuating devices of the clutching means and including a separable connection permitting a displacement or movement of the carrier independently of said actuating devices; and means for preventing the closing of the clutching means while the carrier is so displaced.

26. In a driving press for type matrices the combination of the following elements, to wit; plunger actuating mechanism; a driving clutch for said actuating mechanism provided with controllable closing mechanism including a motor, a latching member and means under the control of the operator for energizing the motor and connecting the latching member with the clutch actuating member; a reciprocatory blank carrier; and means coupled with the plunger actuating mechanism for releasing said latching member and reciprocating the blank carrier.

27. In a driving press for type matrices, the combination of the following elements, to wit; plunger actuating mechanism; a driving clutch; controllable means for effecting the closing of said clutch including a motor and latching device; automatic unlatching means controlled by the plunger actuating mechanism; a reciprocatory blank carrier; and connections between the unlatching means and blank carrier for reciprocating the latter said connections including a separable coupling one member whereof is provided with a groove and limiting shoulders and the other with a rib adapted to interlock with said grooves or play between the limiting shoulders of the complemental member.

28. In a driving press for type matrices the combination of the following elements, to wit; plunger actuating mechanism; a blank carrier; an actuating shaft for said carrier provided at one end with a cross groove; a longitudinally movable driving shaft in axial alinement with said actuating shaft and provided with a rib; and means for rotating and reciprocating said driving shaft.

29. In a driving press for type matrices provided with plunger actuating mechanism and a reciprocatory blank carrier provided with an actuating shaft and in combination therewith the following elements, to wit; a driving shaft in axial alinement with said actuating shaft; means for detachably coupling the proximate ends of said shafts whereof one member is provided with a rib and the other with a groove and limiting shoulders; and means under the control of the operator for effecting relative longitudinal displacement of said shafts, to bring the rib of one member into the plane of the groove or of the limiting shoulders of the other member.

30. In a driving press for type matrices provided with plunger actuating mechanism, a driving clutch, means under the control of the operator for closing said clutch and a reciprocatory blank carrier and in combination therewith the following elements, to wit; automatic actuating devices for the blank carrier connected to the latter through separable coupling devices permitting lateral displacement of said carrier, and means for preventing the closing of the clutch while the carrier is thus displaced.

31. A driving press for type matrices provided with plunger actuating mechanism, a driving clutch, means for closing the clutch, and a reciprocatory blank carrier and in combination therewith actuating devices for the blank carrier, detachable coupling devices between said actuating devices and the carrier, permitting lateral displacement of the carrier, and a lock-out for the clutch closing means controlled by the carrier and operating to prevent the closing of the clutch when the carrier is displaced.

32. A driving press for type matrices provided with plunger actuating mechanism, a driving clutch, and a reciprocatory blank carrier and in combination therewith the following elements, to wit; a revoluble shaft coupled with the carrier; a driving

shaft in axial alinement with the carrier shaft and adapted to be coupled therewith by a longitudinal movement of said driving shaft through complemental registering and interlocking devices on proximate ends of the two shafts; and clutch closing devices coupled with said driving shaft and actuated to close the clutch by the movement of the driving shaft for effecting the engagement of said registering and interlocking devices, thereby preventing the closing of the clutch when said devices are out of registry.

33. In a driving press for type matrices the combination of the following elements, to wit; a press provided with a bed plate, opposing plunger, actuating mechanism for said plunger and a one revolution driving clutch; a sub-press removably applied to the bed plate and provided with opposing plunger, a die, and a blank carrier, the latter provided with a pivot shaft the lower end of which contains a cross groove or seat and is flush with the base of the sub-press; and a longitudinally movable driving shaft for said blank carrier supported in the press frame and provided with a cross rib adapted to enter the seat in the carrier shaft when in register therewith.

34. In a driving press for type matrices the combination of the following elements, to wit; a press provided with opposing plunger and actuating mechanism therefor; a removable sub-press provided with opposing punch carrying plungers, an interposed die and a blank carrier; and means for automatically reciprocating said blank carrier including a driving shaft supported on the press frame, a blank carrier shaft mounted upon the sub-press and a coupling separating on the parting line of the sub-press and press frames.

35. In a driving press for type matrices provided with opposed punch carrying plungers and an interposed die and in combination therewith a blank carrier pivotally supported and provided with two blank holding arms or members in angular relation, and a gage or stop for arresting either arm with its holder in register with the die.

36. In a driving press for type matrices the combination of the following elements, to wit; a die and opposing punches working therein; a blank carrier provided with a plurality of arms supported in angular relation upon a pivot or shaft and each provided with a blank holder; supply and receiving galleys; and a removable stop or abutment located between and in the paths of the blank carrier arms and operating to gage the position of the holders relative to the galleys and the die.

37. In a driving press for type matrices and in combination therewith a removable sub-press provided with a die, opposing punch carrying plungers and a reciprocating blank carrier, the latter including a plurality of blank holders, a pusher associated with each of said holders, and an actuating lever coupled with both pushers and the blank carrier.

38. In a driving press for type matrices the combination of the following elements, to wit; a die and opposing punches working therein; a movable blank carrier provided with a plurality of blank holders and associated pushers, one of the latter working longitudinally and the other laterally of the blank seat in its holder; automatic actuating devices for the blank carrier connected therewith through a separable coupling; and an actuating lever mounted upon the blank carrier and coupled with the two pushers to simultaneously expel the blanks from both holders, said lever also serving to reciprocate the blank carrier when uncoupled from its automatic actuating devices.

39. In a driving press for type machines, the combination with a blank carrier pivotally supported upon a shaft and provided with a plurality of blank holders each equipped with a pusher; a stop or gage for arresting the carrier at opposite extremes of its motion to bring one or the other of the holders in register with the die; a pusher associated with each blank holder; and an actuating lever mounted upon the blank carrier and coupled with both of said pushers.

40. In a driving press for type matrices the combination of the following elements, towit; a reciprocatory carrier provided with a blank seat and clamping jaw; blank feeding devices provided with a discharge channel and gate the latter located in the path of the blank carrier and the former in the path of the clamping jaw for retracting the gate and clamping jaw; a support for said discharge channel pivoted to swing in a plane substantially parallel with the movement of the blank carrier; and means for yieldingly sustaining said support against the advance of the blank carrier when in contact therewith.

41. In a driving press for type matrices and the like provided with plunger actuating mechanism, a controlling clutch therefor, a reciprocatory blank carrier, and actuating devices for the latter controlled by said plunger actuating mechanism, and in combination therewith, actuating devices for said clutch controlled by the blank carrier actuating devices.

42. In a driving press for type matrices and the like the combination of the following elements, to wit, a plunger actuating mechanism provided with a one revolution clutch; a reciprocatory blank carrier controlled by said actuating mechanism; and controlling means for said clutch coupled with the blank carrier actuating devices.

43. In a driving press for type matrices and the like the combination of the following elements, to wit; opposed plungers; actuating devices for said plungers provided with a one revolution clutch; a reciprocatory blank carrier separably coupled with and controlled by said actuating devices; and controlling devices for said clutch coupled with the actuating devices of the blank carrier.

44. In a driving press for type matrices and the like the combination of the following elements, to wit; opposing plungers whereof one is guided on a stationary frame and the other attached to a cross head secured to rods guided on said frame; supporting and actuating levers coupled with said plungers and pivoted upon a shaft or fulcrum common to said levers; a pair of cam shafts equipped with a plurality of sets of opposed cams, one set for each actuating lever, the power ends of said levers being received between the opposing cams of its set; and actuating mechanism for said cam shafts.

45. In a driving press for type matrices and the like the combination of the following elements, to wit; opposed plungers guided on a stationary frame; supporting and actuating levers coupled with said plungers; a pair of cam shafts equipped with a plurality of sets of opposed cams, one set for each actuating lever; and an actuating mechanism for said cam shafts, the same including driving and driven members connected through variable speed transmission gearing, a one revolution clutch, a friction brake and means for applying said brake coincident with the opening of said clutch.

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