B. J. LINDGREN.

MACHINE FOR PUNCHING DISKS, RINGS, &c.

APPLICATION FILED FEB. 6, 1908.

912,007.

Patented Feb. 9, 1909.

4 SHEETS—SHEET 1.

Fig. 1.

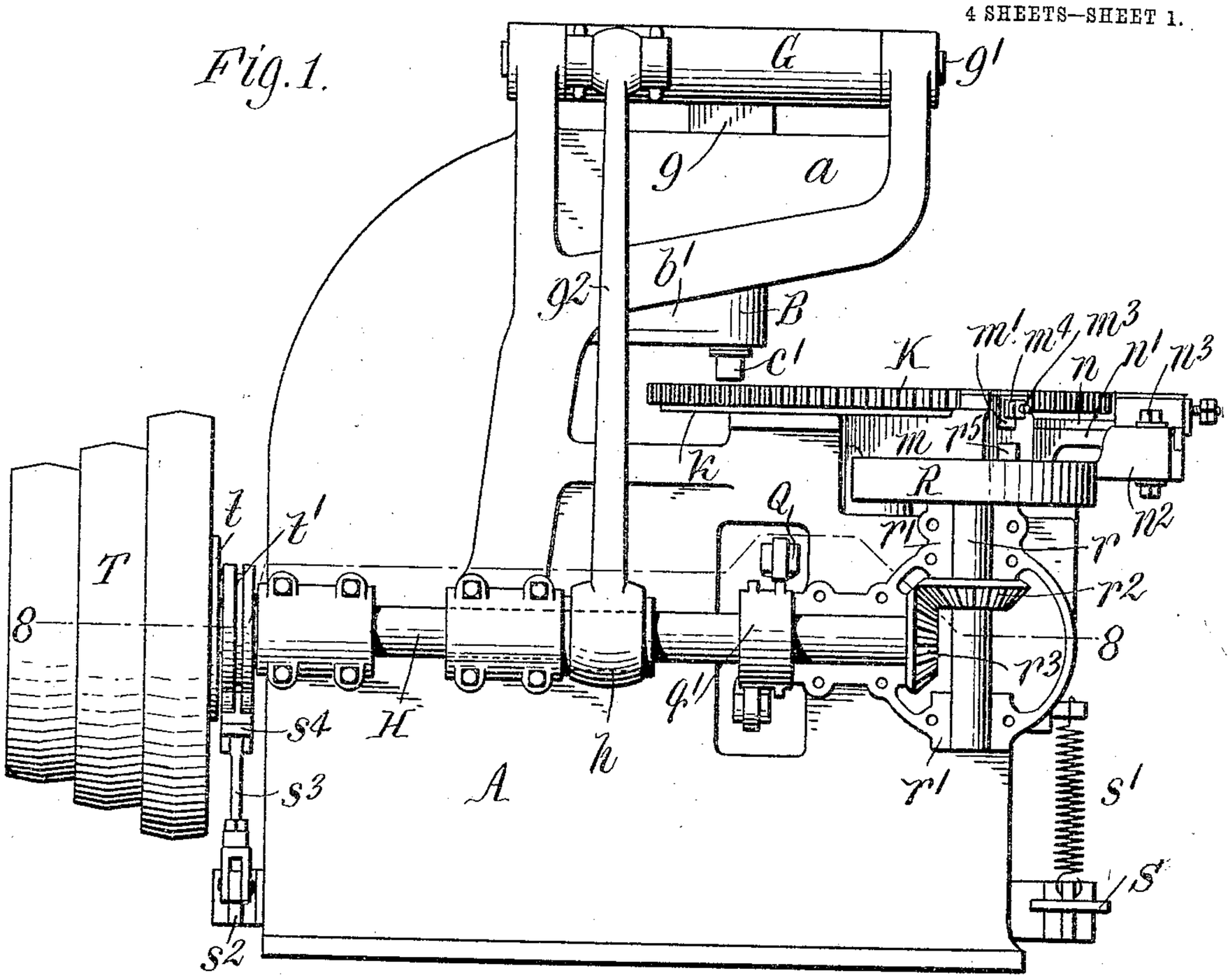
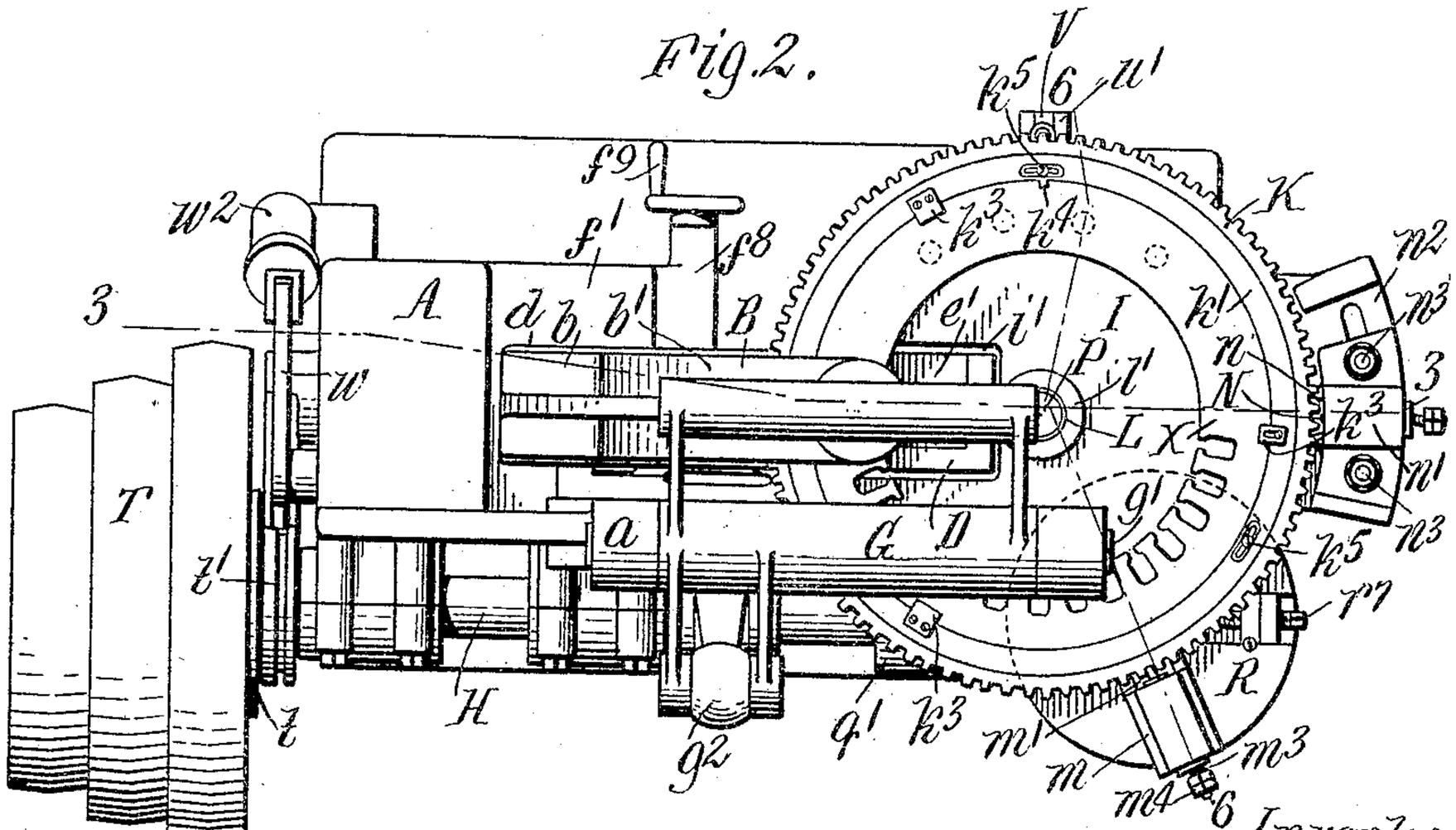


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 3.

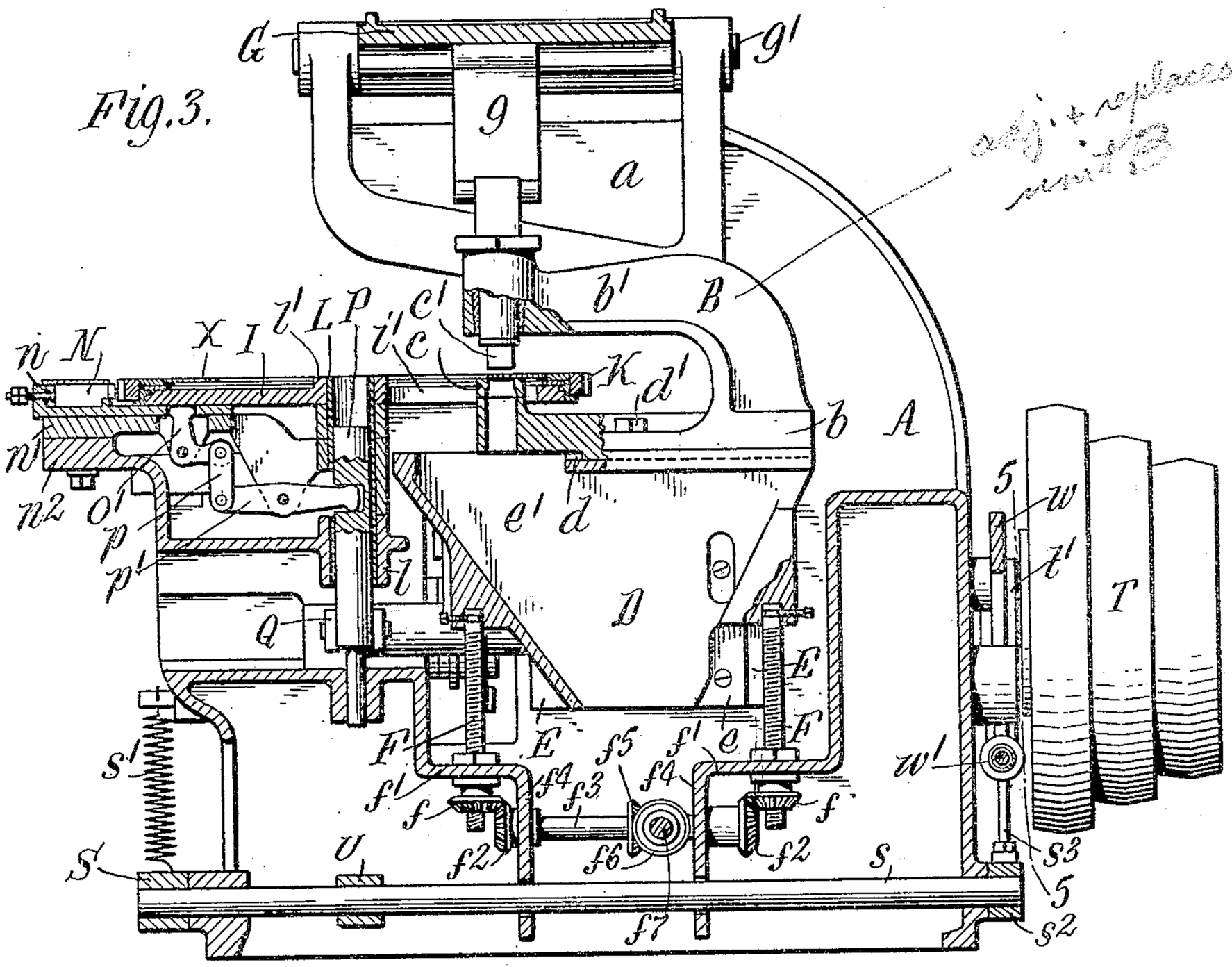


Fig. 4.

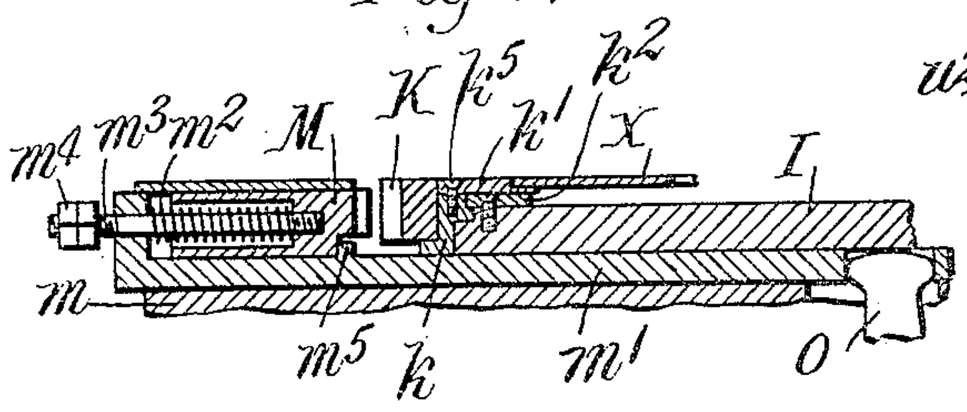
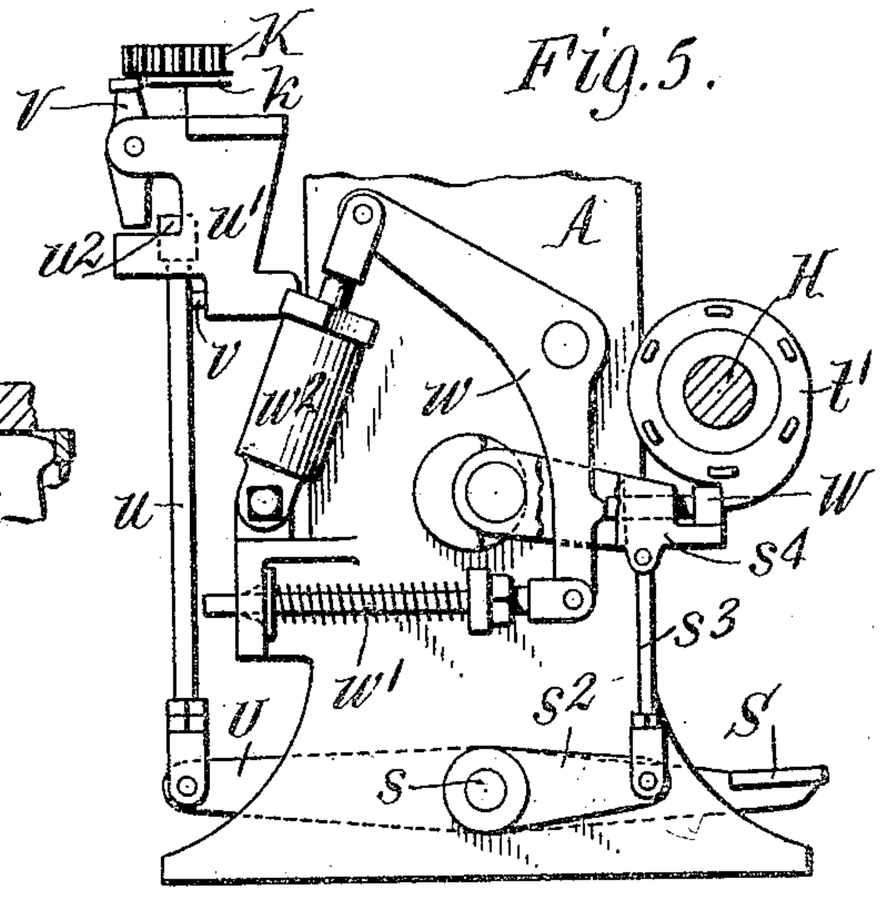


Fig. 5.



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4 SHEETS—SHEET 3.

Fig. 6.

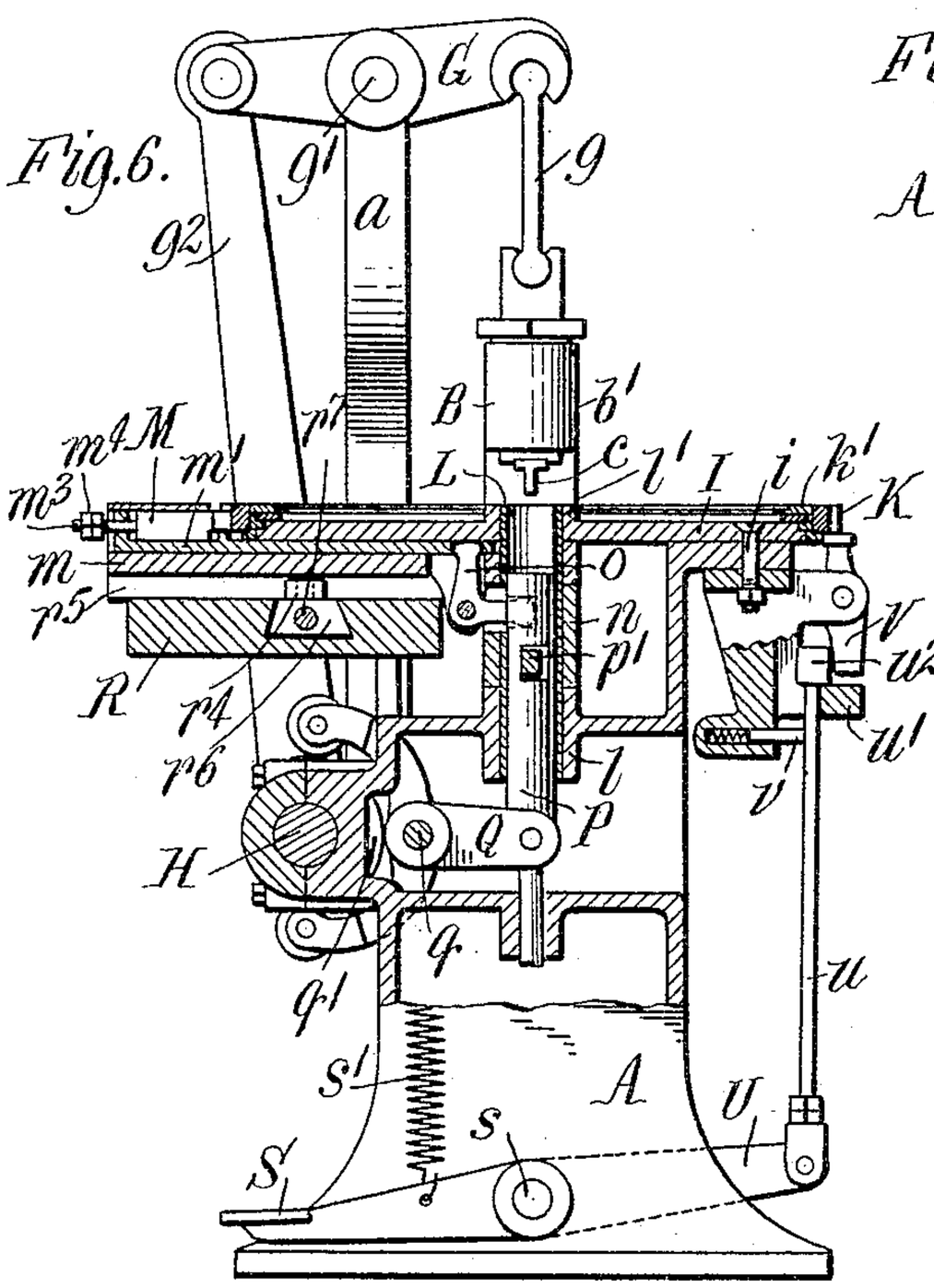


Fig. 7.

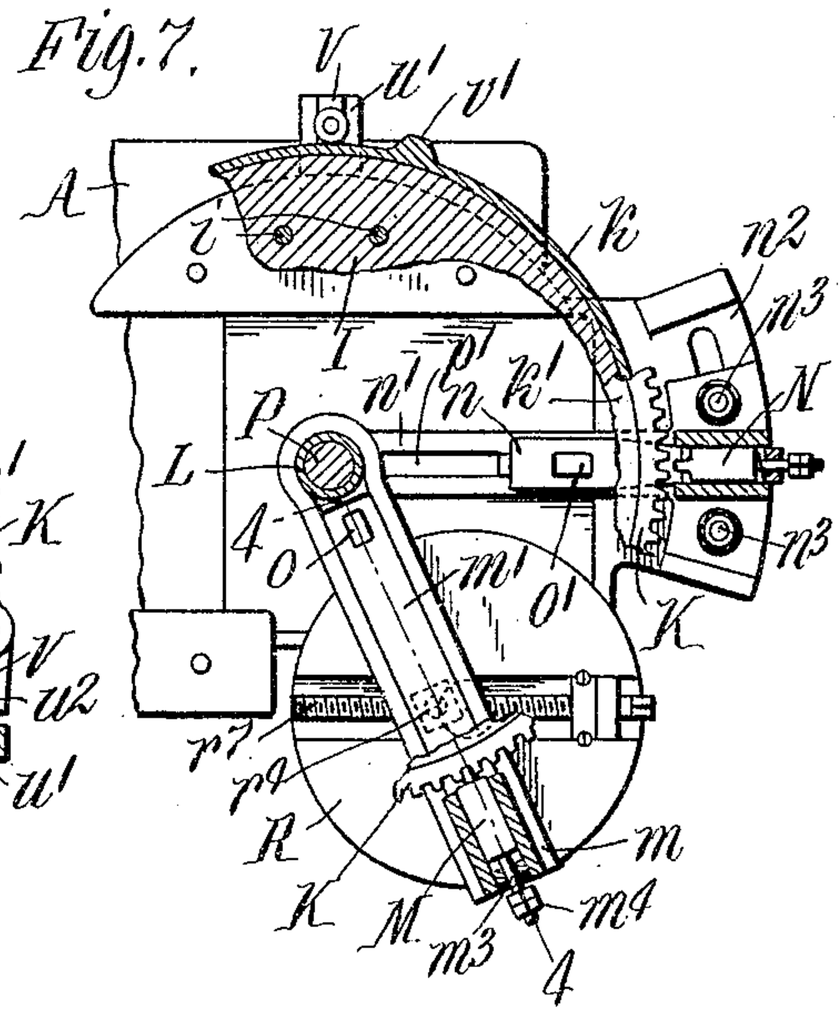
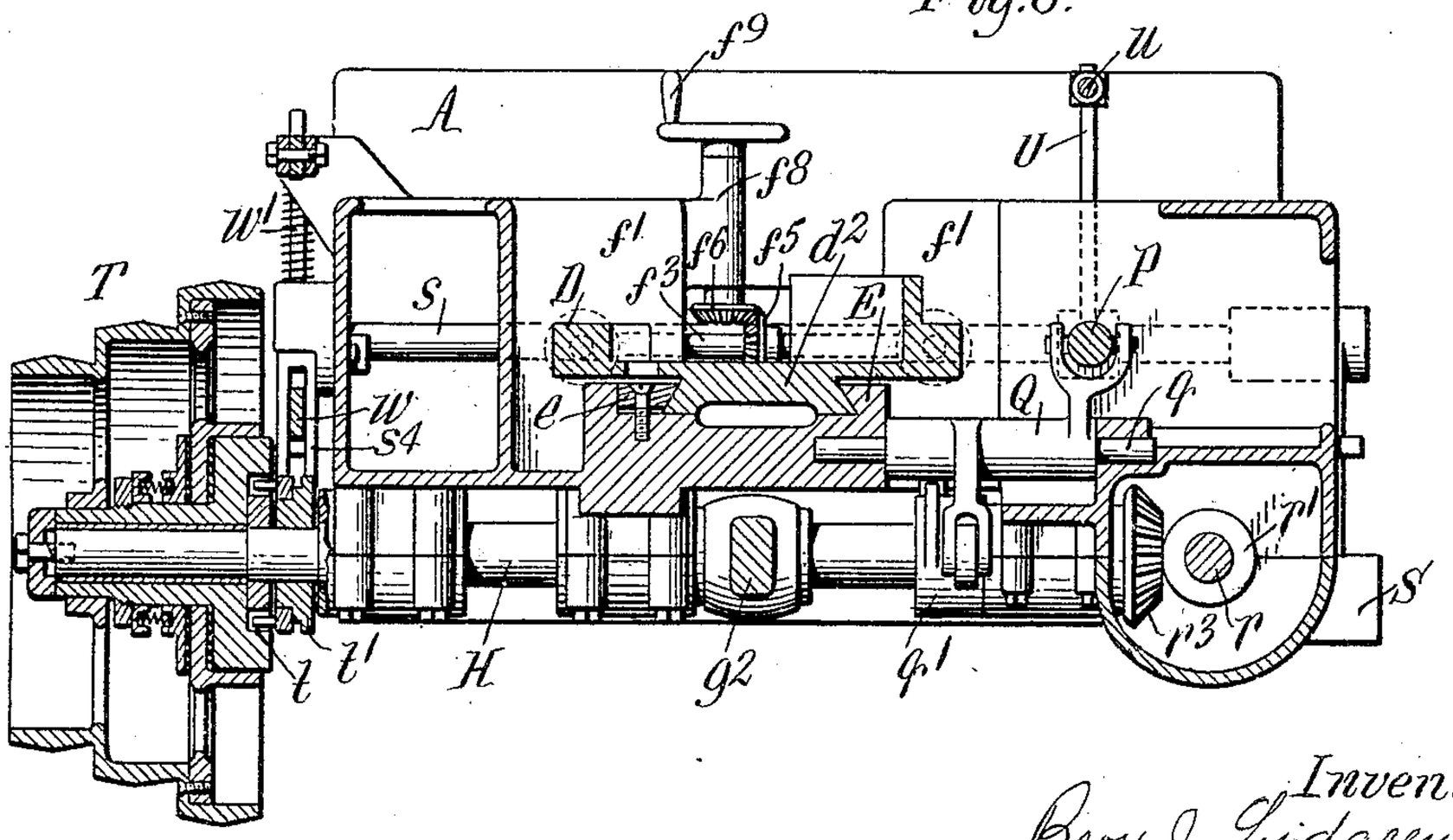


Fig. 8.



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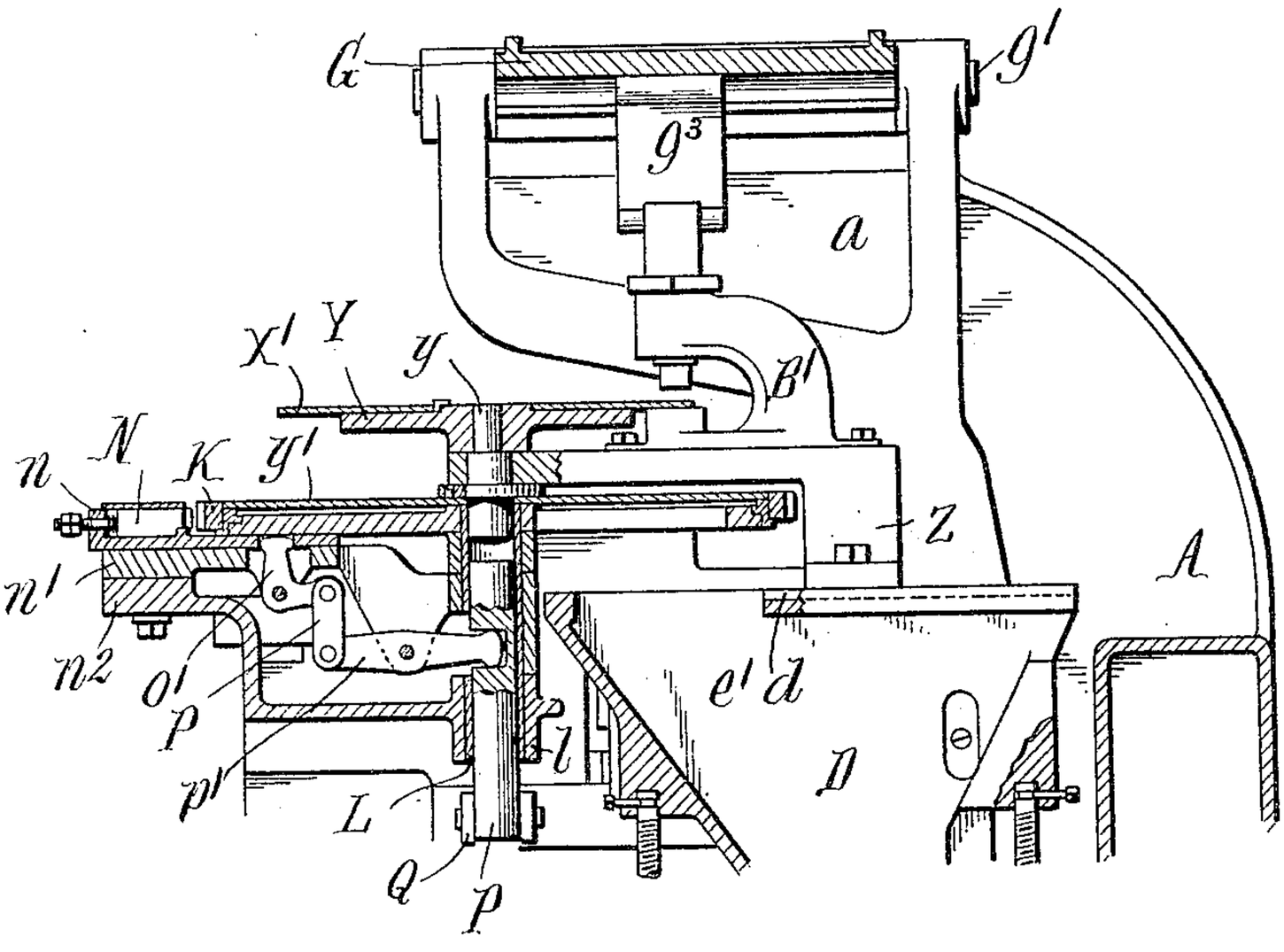
4 SHEETS—SHEET 4.

Fig. 9.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR PUNCHING DISKS, RINGS, &c.

No. 912,007. Specification of Letters Patent. Patented Feb. 9, 1909.

Application filed February 6, 1908. Serial No. 414,480.

To all whom it may concern:

Be it known that I, BROR J. LINDGREN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Machines for Punching Disks, Rings, &c., of which the following is a specification.

This invention relates more particularly to improvements in machines for punching the wire-receiving slots in sheet metal disks and rings which are used to make laminated armatures and field magnets of dynamo electric machines. The improvements are not, however, restricted in application to machines for this particular purpose, but are desirable in machines for punching a number of slots or holes in a circular series at predetermined distances apart in a plate, disk, ring, or the like, and for analogous operations.

The principal object of the invention is to produce an efficient and desirable machine which can be operated with great rapidity and will punch the holes or slots with exactness and regularity of spacing, and which can be readily prepared for punching slots either in the outer edges of disks or the inner edges of rings.

Other objects of the invention are to provide a feed mechanism for the work holder which can be rapidly operated and will positively move the work holder intermittently predetermined distances and rigidly hold the same stationary between the movements with the work in proper relation to the punch; also to make the feed mechanism readily adjustable for placing the slots or holes at different distances apart in the work, and provide means for quickly adjusting the punch and die, as a unit in the machine, radially of the work holder for punching either disks or rings of different diameters without disturbing the registration of the punch and die, so that after the punch and die have been once properly set by the die maker, the necessary adjustments of the machine for producing different work can be made by the ordinary operative; also to provide a feed mechanism for the work holder which is so arranged with reference to the work holder as to occupy the minimum space and produce a strong and desirable construction; and also to improve machines of this type in the respects hereinafter described and set forth in the claims.

In the accompanying drawings, consisting of four sheets: Figure 1 is a side elevation of a punching machine or press embodying the invention, adjusted for slotting the inner edges of rings. Fig. 2 is a plan view thereof. Fig. 3 is a sectional elevation in line 3—3, Fig. 2, viewed from the side opposite to that shown in Fig. 1. Fig. 4 is a sectional elevation, on an enlarged scale, of the feed pawl for the work holder and associated parts, in line 4—4, Fig. 7. Fig. 5 is a rear elevation, partly in section in line 5—5, Fig. 3, of the stop mechanism for the machine. Fig. 6 is a transverse sectional elevation of the machine in line 6—6, Fig. 2. Fig. 7 is a plan view, partly broken away and partly in section, of the feed mechanism for the work holder. Fig. 8 is a sectional plan view of the lower portion of the machine, in line 8—8, Fig. 1. Fig. 9 is a fragmentary sectional elevation similar to Fig. 3, showing the machine equipped for slotting the outer edges of disks.

Like letters of reference refer to like parts in the several figures.

Briefly stated, the machine is organized and operates as follows:

An annular toothed work holder is provided which is turned intermittently, or step by step, by an oscillating feed dog or pawl. A dog is provided for holding the work holder stationary with the work in proper relation to the punch. For slotting the inner edges of rings, the ring is secured in the work holder, but for slotting the outer edges of disks, a disk holder is mounted on the annular holder and the disk secured thereon. Both the feed and holding dogs are positively moved simultaneously in opposite directions so that one is engaged with the teeth of the work holder before the other is disengaged from the teeth, whereby the work holder will always be either positively moved or positively held stationary by one dog, which will prevent an under or over movement of the work holder or the rebounding thereof when rapidly operated. The feed dog is oscillated by a crank wheel which is arranged below the work holder parallel therewith, and the crank pin is adjustable radially to produce different desired movements of the work holder for differently spacing the notches or holes in the work. A subpress equipped with a die and movable punch is mounted in the machine so that it can be readily adjusted radially of the work

holder for puching disks or rings of different diameters, or removed from the machine as a unit with the die and punch intact, and replaced by another subpress for producing different kinds of work without the aid of a skilled die-maker. Different subpresses are provided for external and internal slotting, and when the former is used it is supported on a bridge over the work holder. The machine is set in operation by the depression of a treadle which controls a clutch, and the work holder is moved intermittently and the punch reciprocated during the rest periods of the work holder until the latter has made one complete revolution, when an automatic trip or stop mechanism releases the clutch and stops the machine, which comes to rest with the work holder in position for cutting the first notch or hole in the next disk or ring.

Referring first to Figs. 1—8, which show the machine equipped for internal slotting, A represents the main frame of the machine, which may be of any suitable construction. The frame shown consists of a casting having a hollow or box-like body or main portion and an upwardly projecting horn or extension *a*. B represents a press, or, more properly, a sub-press which is arranged at one side of the upward extension *a* of the main frame, and is provided with a base *b* and an overhanging arm *b'*, see Fig. 3. A female or stationary die *c* is secured in any suitable manner on the base of the sub-press, and a movable die or punch *c'* slides vertically in the arm *b'* thereof. The sub-press is adjustable horizontally fore and aft of the machine in a suitable way *d*, Fig. 3, on an adjustable support D, and is secured in adjusted positions on said support by suitable bolts *d'*, one of which is shown in Fig. 3. The support D is adjustable vertically in the main frame, for which purpose it is provided at one side with a vertical dove-tailed projection d^2, Fig. 8, which is slidable in a correspondingly shaped guide-way E in an adjacent portion of the main frame. An adjustable gib *e* is secured by screws in one side of the guide-way to prevent looseness of the guide projections in the guide-way. The sub-press support has an opening *e'*, Fig. 3, through which the punchings are discharged from the machine. It is supported and adjusted vertically by upright screws F, Fig. 3, which are suitably swiveled to the support at their upper ends and depend through the internally screw-threaded hubs of bevel gear wheels *f* suitably journaled and supported in holes in horizontal portions *f'* of the main frame. These wheels mesh with bevel gear wheels f^2 secured to a horizontal shaft f^3 which is journaled in bearing holes in suitable vertical portions f^4 of the main frame and is geared by beveled wheels f^5 and f^6 to a horizontal shaft f^7, Figs. 3 and 8, which is journaled in a suitable bearing f^8 on the frame and extends to one side of the machine, being provided at its outer end with a hand wheel or crank f^9 by turning which the support D can be raised or lowered to place the sub-press at the required height. After the sub-press is adjusted it is firmly held by tightening up the screws of the gib *e*. The sub-press can be removably mounted and adjusted horizontally and vertically in any other suitable manner. The punch *c'* is preferably connected by a link *g*, Figs. 3 and 6, with one end of a lever or frame G which is fulcrumed on a shaft *g'* supported in bearings on the upper extension of the main frame, and is connected at its other end by a pitman g^2 to an eccentric *h* on a horizontal operating shaft H, Fig. 1, journaled in suitable bearings on the main frame. In the machine shown this shaft constitutes the main drive shaft. The link *g* preferably has cylindrical bosses at its ends slidably engaging respectively in segmental cylindrical sockets in the punch and operating lever G. This construction permits the link to be readily attached to and detached from the punch to facilitate placing the sub-press in and removing it from the machine, and also enables the sub-press to be adjusted horizontally on its support D, the link *g* sliding in the socket of the lever G when the sub-press is thus adjusted. The punch is preferably operated by the mechanism just described, but it could be operated by any other suitable mechanism permitting the ready adjustment and removal of the sub-press.

The rotatable work holder in the machine illustrated is mounted and constructed as follows: I represents a horizontal circular table which is secured by bolts *i*, Figs. 6 and 7, on the top of the body portion of the main frame. This table extends between the base and overhanging arm of the sub-press and is provided with an opening *i'* through which the punch reciprocates in the operation of the machine. The work holder is of annular shape and, as shown in Fig. 4, consists of an outer exteriorly toothed ring K, an inner ring *k* rigidly attached thereto, and an adjustable ring *k'*. The inner ring *k* has an inwardly-extending rib which is seated in a peripheral rabbet in the table I, and is confined therein by a retaining ring k^2 secured to table I. The adjustable ring *k'* is provided with an inner peripheral seat or groove in which the ring X to be punched rests, with fingers k^3 beneath which the work is engaged, and with a key or tooth k^4, Fig. 2, which engages in a notch in the edge of the work to hold the same in proper position in and cause it to turn with the work holder. The adjustable seat ring is adjustably secured to the work holder by screws k^5, Fig. 2, screwed into the work holder through elongated slots in the supporting ring. The adjustable seat ring can thus be adjusted circumferentially to a limited extent for hold-

ing the work in the proper position on the work holder. The work holder is made large enough in diameter to receive the largest sized ring to be punched, and when a ring of small diameter is to be punched, the seat ring k' is removed and replaced by another ring of the proper diameter to suit the ring to be punched. Thus the holder is adapted, by the mere interchange of the seat ring, to hold rings to be punched of various different diameters. The construction of the work holder and manner of mounting the same could be different, without affecting the operation of the machine.

The feed mechanism for intermittently turning the work holder is preferably constructed as follows: L represents a hollow vertical shaft or sleeve which is arranged concentrically with the work holder and is supported at its ends in suitable bearings l l' on the main frame and the table I, see Figs. 3 and 6. M is a feed pawl or dog mounted at the outer end of an oscillating arm or carrier m which is arranged horizontally below the work holder and table I and is pivoted at its inner end on the hollow shaft L so as to oscillate about the same as an axis. The feed pawl has a wedge-shaped tooth at its inner end adapted to engage between the correspondingly shaped teeth of the work holder for turning it. The feed pawl is carried by a slide m' which is movable longitudinally of the pawl carrier in a suitable guide-way thereon. As shown in Fig. 4, the feed pawl is slidably mounted in a pocket in the slide m' and is pressed inwardly or toward the teeth of the work holder by a spring m^2 located in a cavity in the pawl around the stem m^3 which is screwed into the pawl and extends outwardly through a hole in the end of the slide m', and is provided at its outer end with stop nuts m^4. The spring m^2 bears at opposite ends against the pawl and the end of the slide and holds the pawl normally against a lug or shoulder m^5 on the slide. When the slide is moved outwardly on the pawl carrier, the lug m^5 bearing against the inner end of the pawl moves the pawl with the slide, and when the slide is moved inwardly the pawl is moved therewith through the medium of the spring m^2, which enables the dog to yield to prevent possible injury to the feed mechanism in the event that the tooth of the pawl should strike the outer face of one of the teeth of the work holder instead of entering the space between two teeth, or should, from any cause, be arrested before the slide reaches the end of its inward movement on the pawl carrier.

N represents a holding dog or pawl for engaging the teeth of the work holder to hold the same positively from movement in its rest positions. This pawl or dog N is mounted like the feed pawl, on a slide n which is movable longitudinally in a guide-way in a carrier arm n', also pivoted at its inner end on the hollow shaft L, beneath the pivot end of the feed pawl carrier. The carrier n' for the holding dog does not oscillate but is preferably adjustable circumferentially relative to the work holder so as to locate the holding dog in proper position for holding the work holder in correct relation to the punch. For this purpose the outer end of the carrier n' rests upon a horizontal segmental portion n^2 of the main frame and is adjustably secured thereto by bolts n^3 passing through side lugs on the dog carrier and through slots in the supporting bracket n^2 or by other means. Bell-crank levers O and O' are fulcrumed respectively to lugs depending from the carriers for the feed and holding dogs or pawls, and each lever has an arm which extends through a slot in the carrier on which it is fulcrumed into a hole in the pawl slide on said carrier. The lever O has another arm which extends through a slot in the hollow shaft L into a socket in a pin P adapted to reciprocate vertically in said hollow shaft, see Fig. 6. The other arm of the other bell-crank lever O' is connected by a link p to a lever p' Fig. 3, which is suitably fulcrumed on the holding dog carrier with its outer end passing through a hole in the hollow shaft L and engaging in a socket in the vertically movable pin P. Thus when the pin P is raised the feed pawl and holding dog will be moved simultaneously respectively into and out of engagement with the teeth of the work holder, and when the pin is lowered the feed pawl and holding dog will be oppositely moved simultaneously. Both pawls or dogs are positively moved in each direction and are not mere spring-operated devices which are liable to rebound and release the work holder when rapidly operated. The pin P is reciprocated by a lever Q, Fig. 6, which is suitably fulcrumed at q on the main frame and is connected at one end to the pin P and is provided with branch arms provided at their outer ends with anti-friction rollers which bear upon two peripheral ribs on a cam q', Fig. 1, secured to the main drive shaft H. The pin P is thus positively raised and lowered once for each revolution of the drive shaft.

The mechanism just described for positively reciprocating the feed pawl and holding dog simultaneously in opposite directions is simple and reliable, but manifestly mechanism of other construction could be employed for effecting the same result.

The carrier m of the feed pawl is oscillated by suitable means, preferably by a crank wheel R, Figs. 1, 2, 6 and 7, which is located below the pawl carrier and work holder and is fixed to the upper end of a vertical shaft r which is journaled in suitable bearings r' on the main frame and is suitably geared to the drive shaft, for instance, by bevel gear

wheels r^2 and r^3 secured to the crank and main shafts. The crank pin r^4 extends upwardly from the crank wheel into a slide head which reciprocates in a guide-way r^5, Fig. 6, in the underside of the pawl carrier m, so that the carrier is oscillated once forwardly and backwardly for each revolution of the crank wheel shaft and main drive shaft. The crank pin is secured to a dove-tailed block r^6 fitted in a correspondingly shaped diametrical guide-way in the crank wheel, and is adjusted radially toward and from the center of the crank wheel for changing the throw of the pawl carrier, by a screw r^7, Fig. 7, which is journaled in a bearing on the crank wheel and works in a screw-threaded hole in the dove-tailed pin block. Any other adjustable throw crank could be used.

The cam q' for reciprocating the feed pawl and holding dog into and out of engagement with the work holder is so timed relative to the operation of the crank which oscillates the feed pawl carrier that the pawl and dog are shifted when the crank pin is passing the dead center positions at the opposite ends of the throw of the carrier, which at such times is practically stationary momentarily. The feed pawl and holding dog are, furthermore, so adjusted and timed relative to each other that one enters between two teeth of the work holder before the other fully clears the teeth, so that the work holder is always under the control of one pawl or dog and is never disengaged from both at the same time, whereby the over-movement or rebounding of the work holder is positively prevented. As the teeth of the holding dog is wedge-shaped and the work holder teeth are similarly shaped, the dog in entering between two teeth of the work holder serves to accurately position the work relative to the punch and the slots or holes are therefore spaced with great precision. Inasmuch as the throw of the feed pawl carrier can be lengthened or shortened by adjusting the crank pin from or toward the axis of the crank wheel R, it is possible to advance the work holder a distance between a greater or less number of teeth of the work holder. The work holder is therefore preferably furnished with teeth to a number having numerous divisors, as thereby the possible number of different spacings for the slots or holes is increased.

S represents a treadle for starting the machine. This treadle is secured to one end of a horizontal shaft s journaled in suitable bearings in the base portion of the frame and is normally held up and lifted after being depressed by suitable means, such as a spring s', Figs. 1 and 3, connecting the treadle to a suitable part of the main frame. An arm s^2 secured to the opposite end of the treadle shaft is connected by a link s^3 to a clutch-controlling lever s^4, Fig. 5, which is suitably pivoted on the main frame adjacent to the driving pulley T for the drive shaft. This pulley is continuously driven and a clutch t is provided for connecting the drive shaft to and disconnecting it from the pulley for starting and stopping the machine. The construction of the clutch t forms no part of this invention and any suitable device for the purpose could be employed. It is sufficient to state that the clutch is provided with a stop member t' which coöperates with the clutch lever s^4. Normally a part on the clutch lever engages the stop member t' of the clutch, whereby the clutch is operated to release the pulley from the shaft. When the treadle is depressed, the clutch lever is lowered out of engagement with the stop member t' and the clutch is thus permitted to act to couple the pulley to the drive shaft for turning the latter.

U, Figs. 5 and 6, represents an arm secured to the treadle shaft and connected to the lower end of a latch rod u which projects up through a slot in a bracket u' on the main frame and is provided with a head or enlargement u^2 adapted, when raised by depressing the treadle S, to rest on a shoulder on the bracket u', as shown in Fig. 6, and hold the treadle down. The upper end of the latch rod u is pressed over toward the holding shoulder on the bracket u' and against the lower end of a trip lever V suitably fulcrumed between its ends on the bracket u', by a suitable spring-pressed plunger or the like v mounted in the bracket u'. The upper end of the trip lever V stands in the path of a trip projection v', Fig. 7, extending outwardly from the periphery of the work holder below the teeth thereof. When the treadle S is depressed, the latch rod u is raised and the spring plunger v presses its head over onto the shoulder on the bracket and the head of the rod moves the lower end of the trip lever V outwardly, and the upper end thereof inwardly against the smooth rim of the work holder. The machine continues in operation as long as the treadle is held down by the latch rod u. When the work holder has made one complete revolution, the trip lug v' engages the upper end of the trip lever, forcing it outwardly, which throws the lower end of the lever inwardly and disengages the head of the latch rod u from the shoulder on the bracket u'. This releases the treadle and the spring s' for the latter raises the treadle and lifts the clutch lever s^4 into the path of the stop member t' of the clutch, which, striking the same, releases the pulley from the drive shaft and stops the machine. The clutch lever is preferably provided with a sliding plunger W, Fig. 5, against which the member t' strikes. A lever w fulcrumed on the main frame has an arm which is pressed against the stop plunger by a spring-actuated

sliding rod w' connected to said arm of the lever w, and the other arm of the lever is connected to the piston of an ordinary dash-pot or damper w^2. By this construction the plunger W on the clutch lever is adapted to yield when struck by the clutch member t' and the blow is cushioned. The dash-pot prevents a sudden rebound of the plunger W and the clutch member which it arrests, so that there is no tendency for the drive shaft to rebound or turn backwardly and the machine will come to rest with the shaft always in the same position.

The invention is not restricted to the starting and stopping mechanism described and other means for this purpose could be employed.

When a disk or plate is to be slotted externally, or in its outer periphery, it cannot be placed directly in the annular work holder K, and a disk holder Y, Fig. 9, is provided on which the disk X′ is secured. This holder is secured to the upper end of a stud axle y which is inserted in the upper end of the hollow shaft L. A plate y' is secured to the annular work holder K in place of the seat ring k' and is secured in any suitable way to the stud axle y to cause it and the disk holder Y to turn with the work holder. The sub-press B is removed and replaced by another sub-press B′ adjustably mounted on a removable bridge or support Z which, in the construction shown, is secured at one end in the way d of the adjustable support D, and rests at its other end on a flange on the stud axle y. The sub-press B′ is supported at a higher elevation in the machine than the other sub-press and a shorter link g^3 is employed for connecting it to the operating lever G. When the machine is equipped with the disk holder Y and sub-press B′ for slotting the outer edges of disks, it is operated in the same manner as explained for slotting the inner edges of rings.

I claim as my invention:

1. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising a feed pawl, means for oscillating the same, a holding dog, and actuated mechanism for positively moving said feed pawl and holding dog simultaneously one into and the other out of operative engagement with said work holder, substantially as set forth.

2. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising a feed pawl, a carrier on which said feed pawl reciprocates, means for oscillating said pawl carrier, a holding dog, and actuated mechanism for positively reciprocating said feed pawl and holding dog into and out of engagement with said work holder, substantially as set forth.

3. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising a feed pawl, a carrier on which said feed pawl is mounted and which is pivoted concentrically with said holder, means for oscillating said pawl carrier, a device arranged axially of said work holder and connected to said feed pawl, and means for reciprocating said device to positively move said feed pawl into and out of engagement with said work holder, substantially as set forth.

4. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising a feed pawl, a carrier on which said feed pawl is mounted and which is pivoted concentrically with said holder, means for oscillating said pawl carrier, a holding dog, a device arranged axially of said work holder and connected to said feed pawl and holding dog, and means for operating said device to positively reciprocate said feed pawl and holding dog toward and from said work holder, substantially as set forth.

5. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising a feed pawl, a carrier on which said feed pawl is mounted and which is pivoted concentrically with said holder, means for oscillating said pawl carrier, a holding dog, a device arranged axially of said work holder, means for reciprocating said device, and connections from said device to said feed pawl and holding dog for positively reciprocating the same in opposite directions, substantially as set forth.

6. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising carriers for a feed pawl and holding dog both pivoted concentrically with said work holder, a feed pawl and holding dog mounted on said respective carriers, means for oscillating said feed pawl carrier, means for adjustably securing said holding dog carrier, and means for positively reciprocating said pawl and dog into and out of engagement with said work holder, substantially as set forth.

7. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising a feed pawl carrier, means for oscillating the same, a slide movable on said carrier toward and from the work holder, a feed pawl yieldingly mounted on said slide, a pin which re-

ciprocates in the pivotal axis of said pawl carrier, and a lever mounted on said carrier and actuated by said pin for operating said pawl slide, substantially as set forth.

8. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising a crank or the like arranged adjacent to said work holder to turn in a plane parallel therewith but about a different axis, and a feed device for said work holder which is oscillated by said crank, substantially as set forth.

9. The combination of a punch or the like, and operating means therefor, a rotatable work holder, and mechanism for intermittently turning said work holder comprising a crank or the like arranged adjacent to said work holder to turn in a plane parallel therewith but about a different axis, a feed device for said work holder which is oscillated by said crank, and means for adjusting the throw of said crank to vary the movement of said feed device, substantially as set forth.

10. The combination of a main frame, a work holder mounted to rotate on said frame, a sub-press mounted on said main frame and adjustable radially of said work holder, a punch or the like carried by said sub-press, and operating means for said punch or the like mounted on said main frame and having an adjustable connection with said punch or the like, substantially as set forth.

11. The combination of a main frame, a work holder mounted to rotate on said frame, a sub-press equipped with a punch or the like and removably mounted on said main frame whereby the sub-press with the punch or the like can be removed from the machine as a unit, and operating means for said punch or the like mounted on said main frame and detachably connected to said punch, substantially as set forth.

12. The combination of a frame, a work holder mounted to rotate on said frame, a sub-press mounted on said frame and adjustable radially of said work holder, a punch or the like carried by said sub-press, an operating device for said punch mounted on said frame, and a link connecting said punch to said operating device and having an adjustable connection with said device, substantially as set forth.

13. The combination of a frame, a work holder mounted to rotate on said frame, means for intermittently rotating said work holder which are adjustable to vary the movements of the work holder, a sub-press mounted on said frame and adjustable radially of said work holder, a punch or the like carried by said sub-press, and operating means for said punch or the like mounted on said frame, substantially as set forth.

14. The combination of a punch or the like, drive mechanism therefor, a rotatable work holder, means operated by said drive mechanism for intermittently turning said work holder, a clutch for starting and stopping said drive mechanism, a starting treadle or the like controlling said clutch, and stop mechanism controlling said clutch including a trip device which is actuated by said work holder when the same has made a complete revolution, substantially as set forth.

15. The combination of a rotatable annular work holder, and mechanism for intermittently turning the same, a removable bridge for supporting a sub-press over said work holder, and a holder for a disk which is arranged over said bridge and is connected to and turned by said work holder, substantially as set forth.

16. The combination of a rotatable annular work holder for supporting and turning a ring to be punched, and mechanism for intermittently turning the same, a sub-press removably mounted in the machine for punching the ring, a bridge adapted to be mounted in the machine in place of said sub-press for supporting a different sub-press over said work holder, and a holder for a disk which is arranged over said bridge and is connected to and turned by said work holder, substantially as set forth.

Witness my hand, this 30th day of January, 1908.

BROR J. LINDGREN.

Witnesses:
MARTIN G. J. NAUTH,
GOTTFRIED ADOLPHSON.