

No. 751,791.

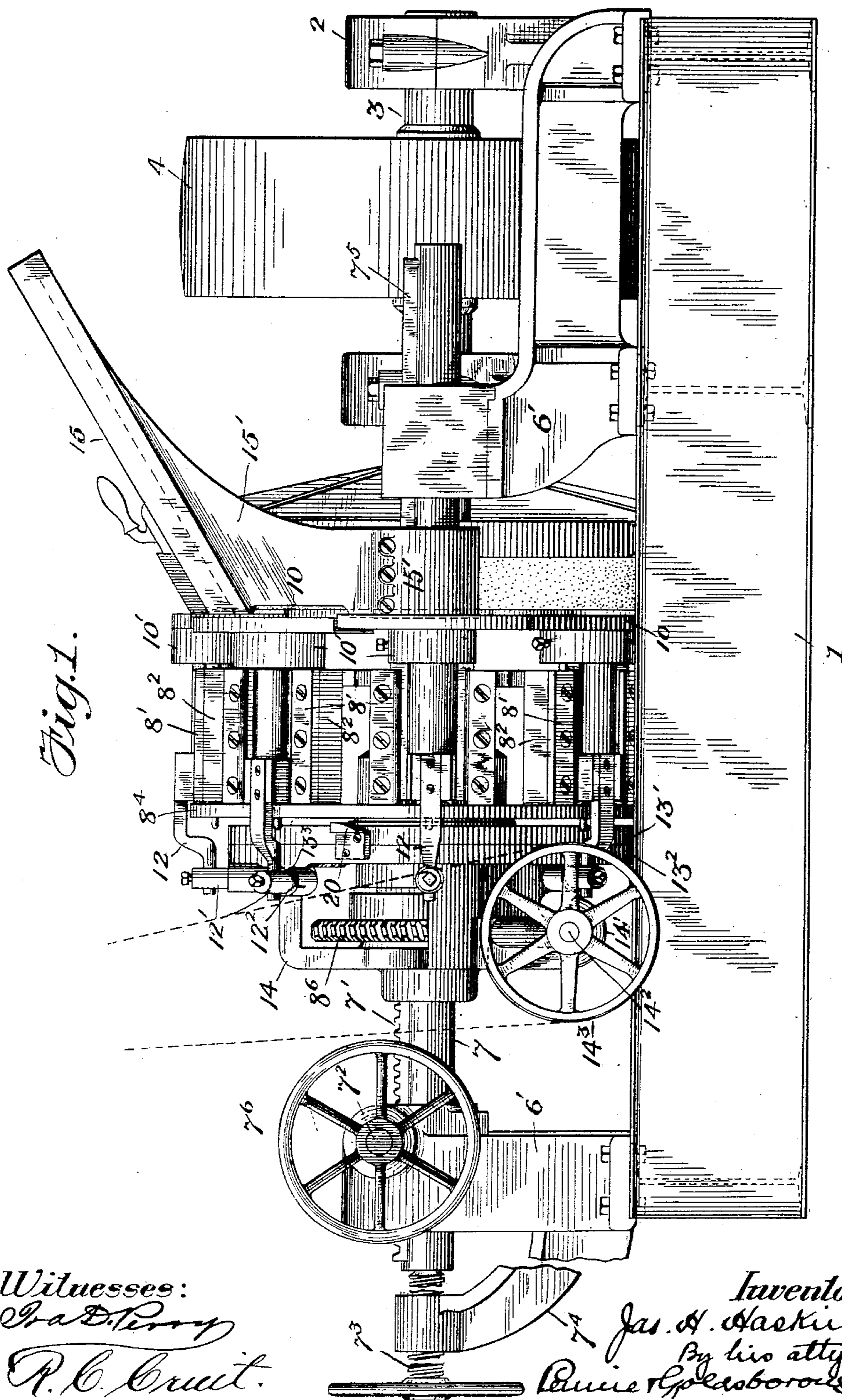
PATENTED FEB. 9, 1904.

J. H. HASKINS.
MACHINE FOR GRINDING METAL SURFACES.

APPLICATION FILED FEB. 16, 1903.

NO MODEL.

7 SHEETS—SHEET 1.



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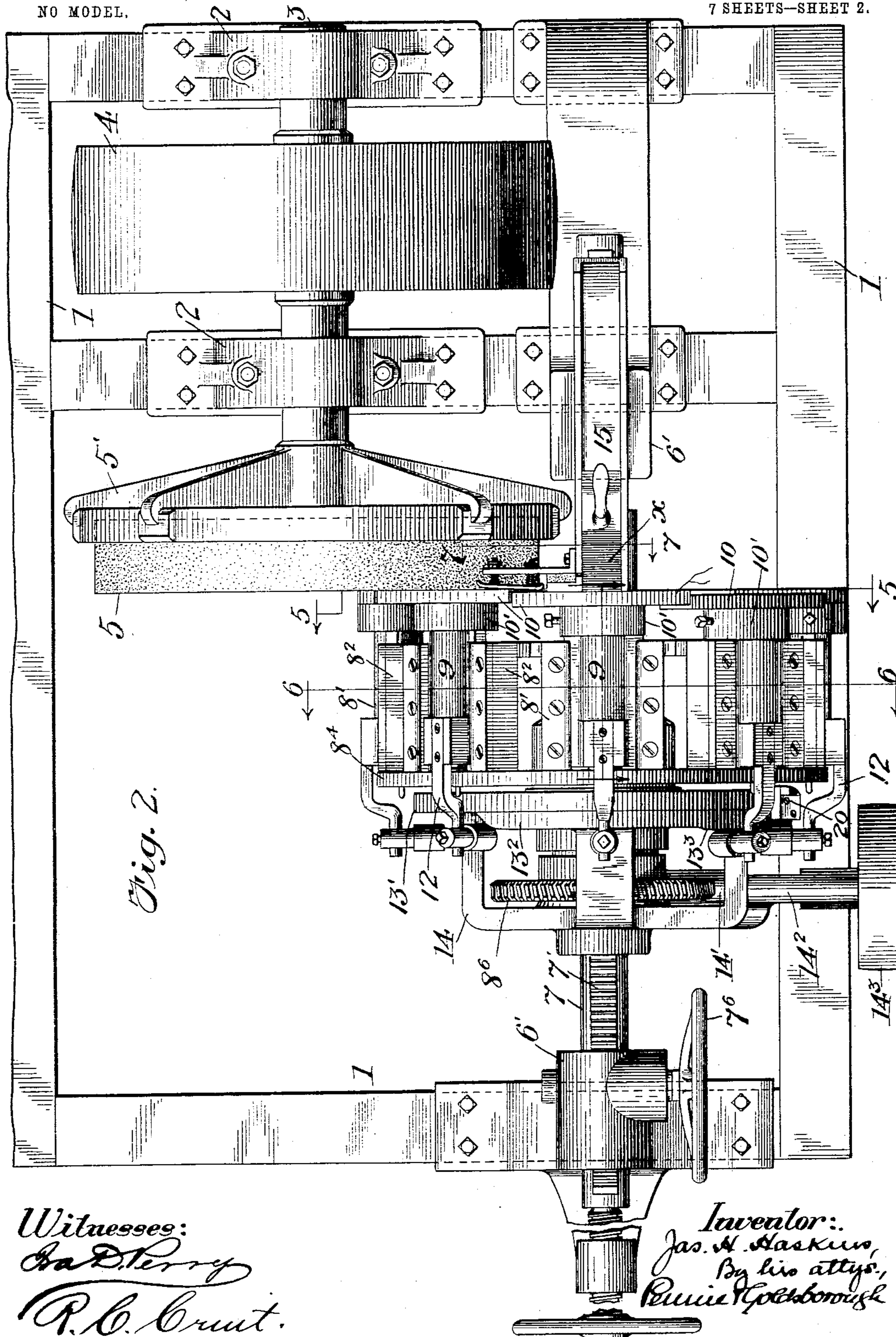
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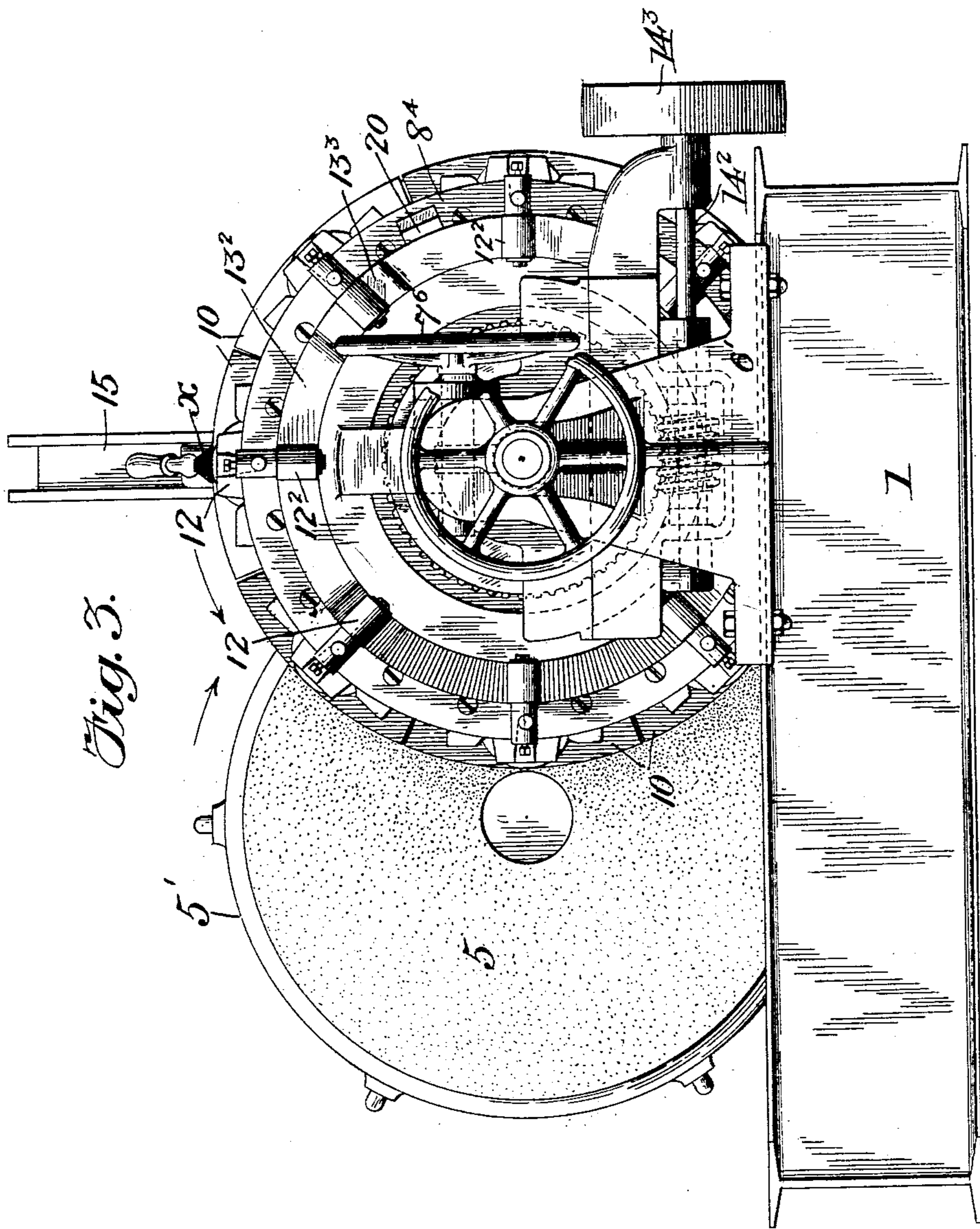
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7 SHEETS—SHEET 3.



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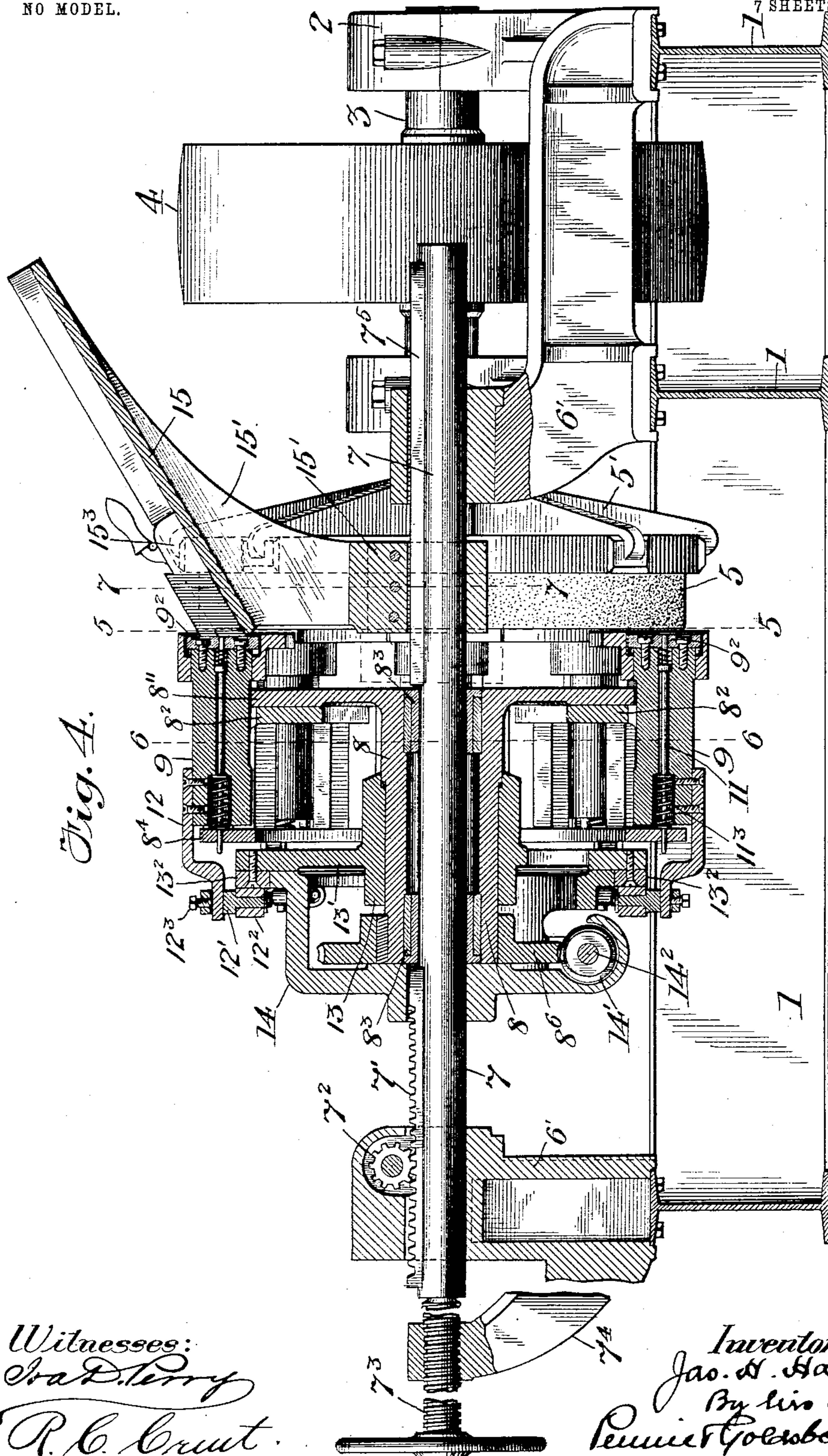


Fig. 4.

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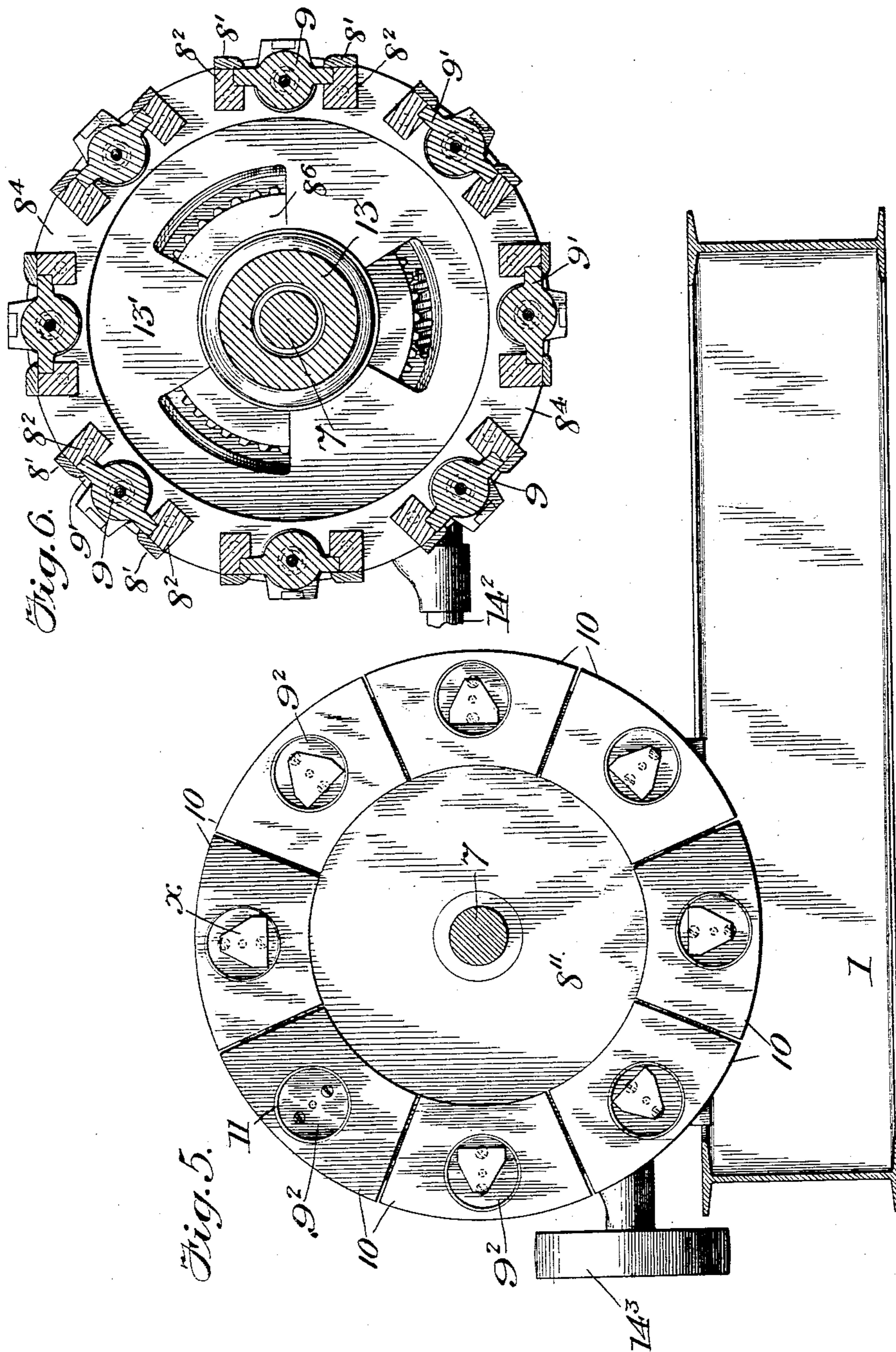
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7 SHEETS—SHEET 5.



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7 SHEETS—SHEET 6.

Fig. 7.

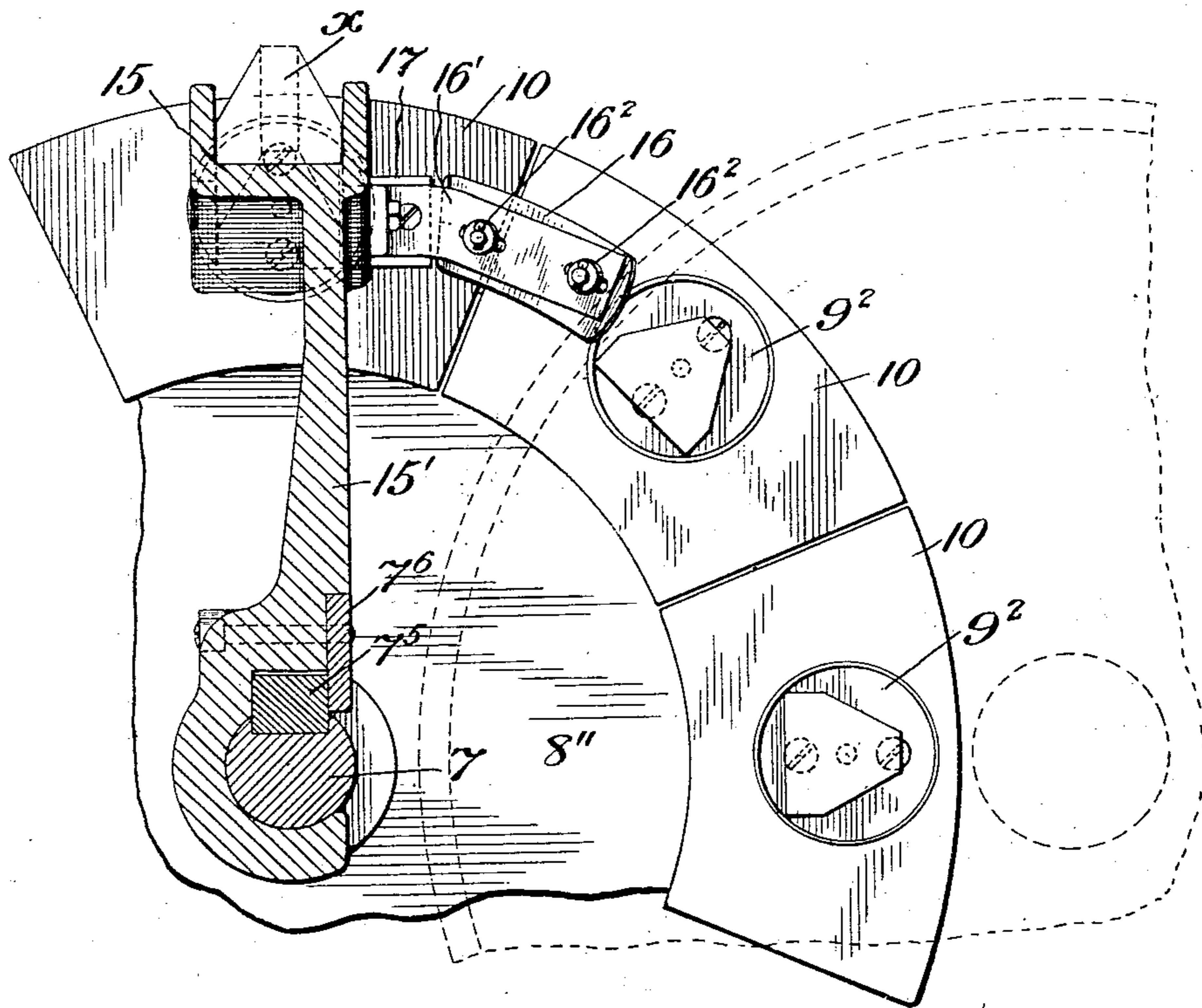
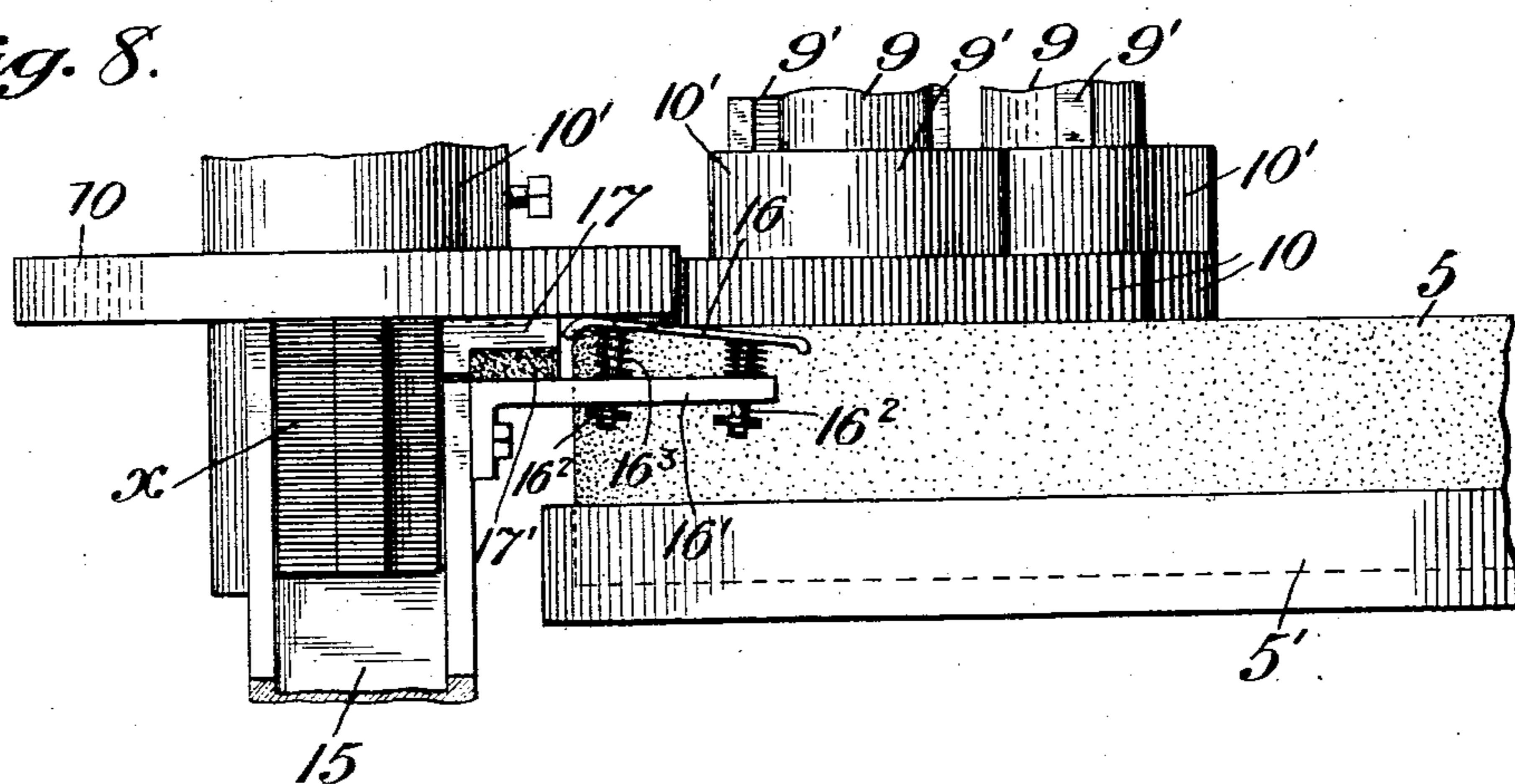


Fig. 8.



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7 SHEETS—SHEET 7.

Fig. 9.

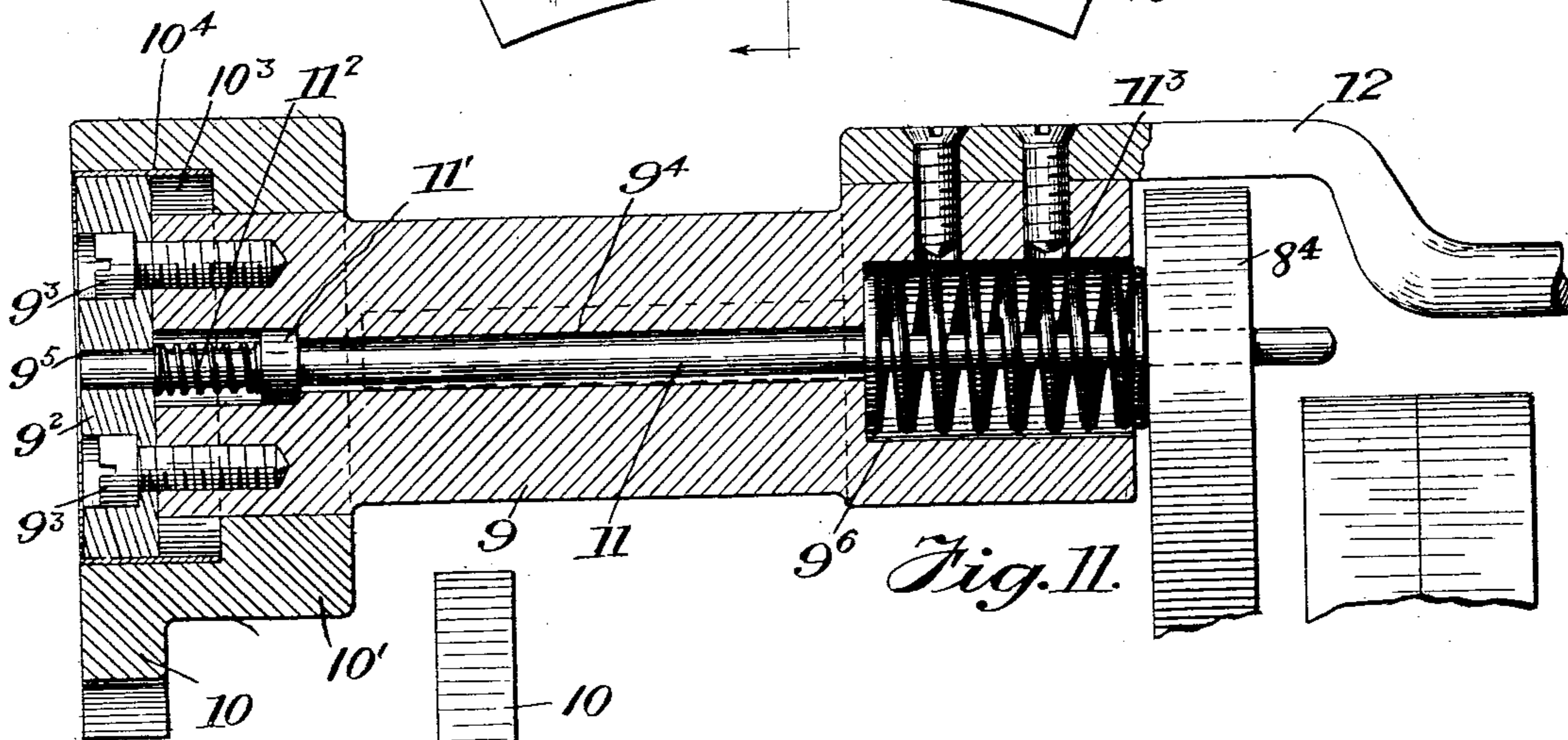
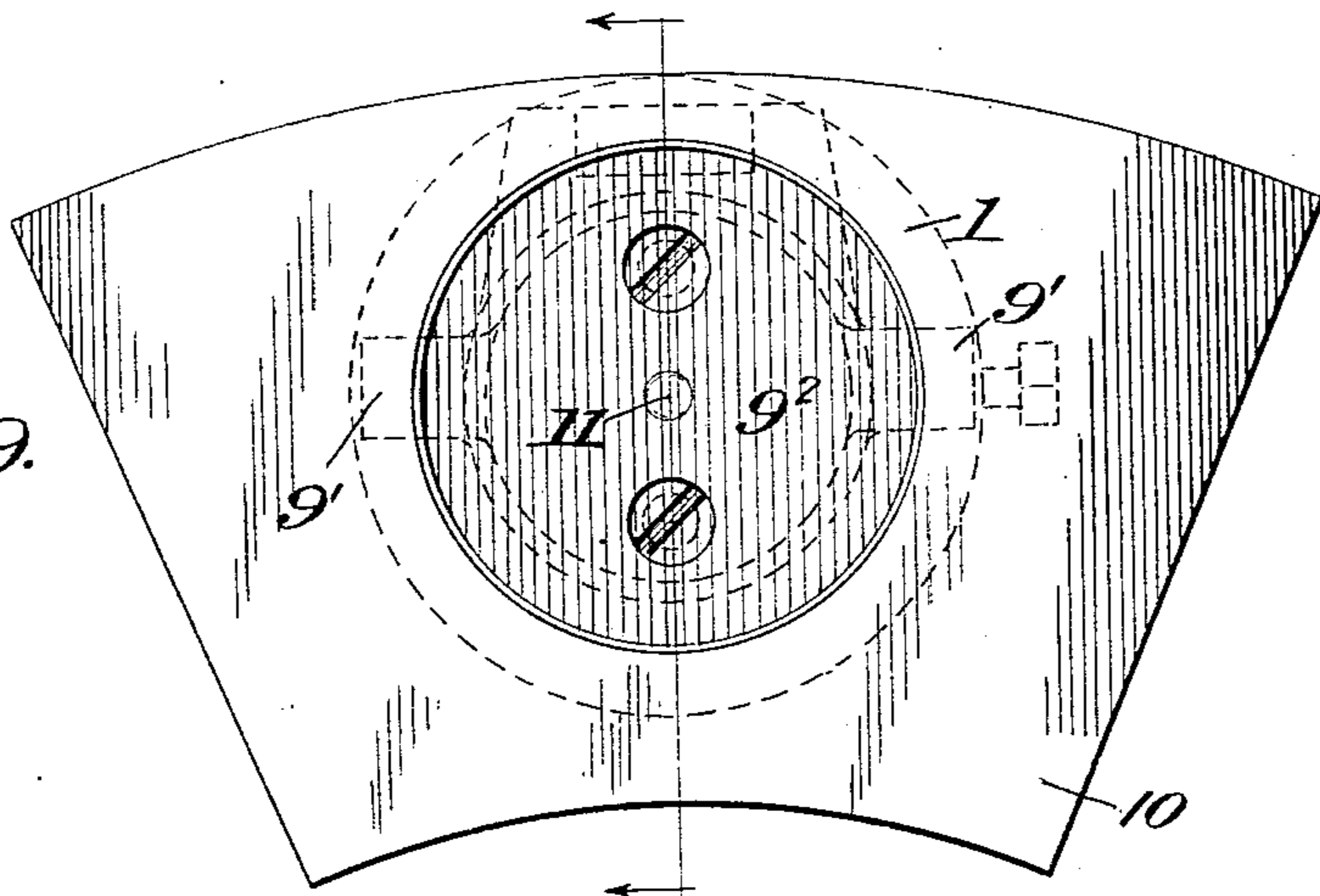
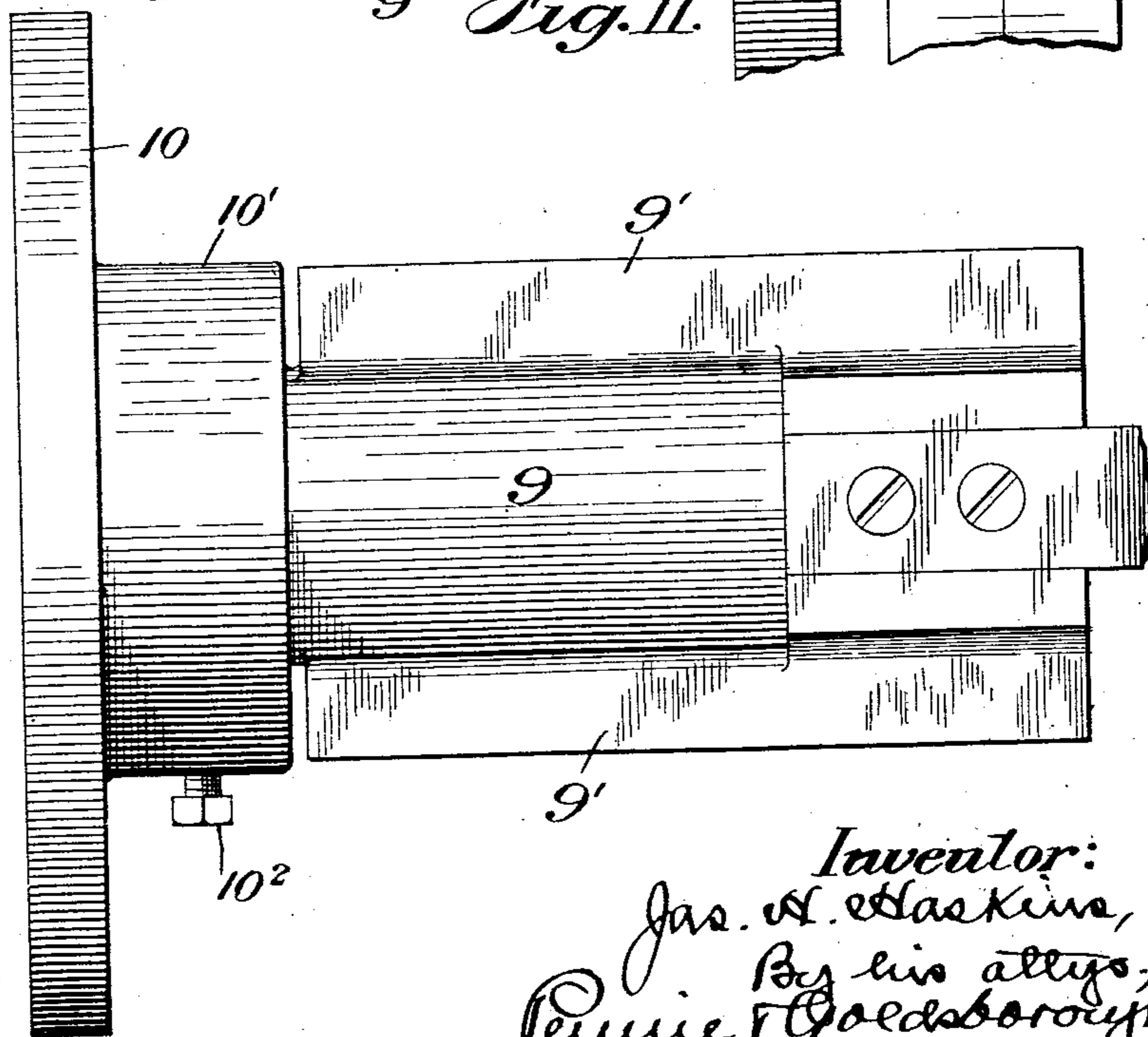


Fig. 10.



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UNITED STATES PATENT OFFICE.

JAMES H. HASKINS, OF SAN DIEGO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO INTERNATIONAL HARVESTER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

MACHINE FOR GRINDING METAL SURFACES.

SPECIFICATION forming part of Letters Patent No. 751,791, dated February 9, 1904.

Application filed February 16, 1903. Serial No. 143,602. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. HASKINS, a citizen of the United States, residing at No. 2341 Second street, San Diego, county of San Diego, State of California, have invented certain new and useful Improvements in Machines for Grinding Metal Surfaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to metal grinding or facing machines, and more particularly to machines for grinding or facing the surfaces of metallic plates, blanks, and the like.

The invention has been especially designed for grinding the plane surfaces of knife-sections for the cutter-bars of mowers, reapers, and other machines. The grinding-surface employed is a rotary stone mounted in a manner common to machines for doing this class of work. In order to properly present the blanks to the stone, a power-driven rotating carrier provided with a plurality of blank-holders is mounted with its axis parallel to the axis of the stone, so that the faces of the holders on one side of the axis are contiguous with the face of the grindstone. A magazine for the sections is provided and so located that the sections are delivered to the holders as they pass successively in front of it. Means are provided for retaining the sections or blanks in the recesses of the holders while they are being carried from the magazine to the grindstone. As each holder passes in front of the face of the grindstone it is advanced until the blank carried by it is pressed against the stone with an even, uniform, but yielding force for the purpose of grinding the face of the blank. To insure the sections or blanks leaving the recesses in the holders when said blanks have been ground, means are provided for ejecting them at the delivery side of the machine. The independent movement of the holders in the carrier automatically compensates for a small amount of wear on the stone; but means are provided for ad-

justing the carrier bodily to compensate for excessive wear of the grinding-surface.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the entire machine. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation. Fig. 4 is a vertical longitudinal sectional elevation taken on a plane passing through the axis of the revolving carrier. Fig. 5 is a sectional elevation taken on a plane indicated by the line 5 5 of Figs. 2 and 4, showing the face of the revolving carrier. Fig. 6 is a sectional elevation taken on the line 6 6 of Figs. 2 and 4. Fig. 7 is a fragmentary sectional elevation taken on the line 7 7 of Figs. 2 and 4, showing the means for holding the sections in their recesses in the holders while being carried from the magazine to the grindstone. Fig. 8 is a fragmentary plan view of the parts shown in Fig. 7. Fig. 9 is an end elevation of one of the segmental holders. Fig. 10 is a plan view of the same. Fig. 11 is a longitudinal sectional elevation of the holder, showing the means for pressing it against the grindstone and also the means for ejecting the section from its recess.

The working parts of the machine are mounted on a base or bed, which, as herein shown, is formed of I-beams 1. At one end of this bed, near its medial line, the grindstone 5 is mounted in a spider-frame 5' upon a shaft 3, supported in pillow-blocks 2 2 in the usual manner. Rotary motion is imparted to the shaft and stone in any desired manner, and in the present instance an ordinary belt-pulley 4, mounted upon the shaft 3, is employed for this purpose.

A revolving blank-carrier is mounted at one side of the grindstone in suitable pedestals 6' 6', secured to the base 1. The carrier is journaled upon a shaft 7, which is mounted in the pedestals 6' 6' and adapted to slide endwise, but held from turning therein by means of two keys or feathers 7' and 7^a, the former of which is made in the form of a rack. A pinion 7², meshing with this rack, is secured to a shaft

journaled in the outer pedestal 6', which shaft is provided with a hand-wheel 7⁶, by means of which the carrier-shaft may be moved longitudinally. A set-screw 7³, mounted in a bracket
 5 7⁴, extending from the pedestal 6', provides an adjustable end-thrust bearing to prevent the shaft 7 moving backward when the machine is in operation. The revolving carrier consists of a hub 8, provided at one end with a circular
 10 head or disk 8'', to which are secured around its edge a series of angular brackets, each having a pair of arms 8² extending rearwardly. The arms of each pair are parallel with each other and the shaft 7 of the blank-carrier and
 15 their inner adjacent faces are grooved, as best shown in Fig. 6, so as to form guides or ways in which the blank - holders hereinafter described are adapted to reciprocate. The hub of the carrier is provided with removable boxes
 20 or brasses 8³ at either end, which are journaled upon the main shaft 7. At the opposite end of the hub from the disk 8'' is secured a worm-gear 8⁶, which is actuated by a worm 14', mounted upon a shaft 14², which in turned is jour-
 25 naled in a frame 14, rigidly keyed to the main shaft by means of the rack-key 7'. To this worm-shaft is secured a pulley 14³, by means of which the carrier is revolved.

The bracket-arms 8², which form the ways
 30 for the blank-holders, are secured to the head or disk of the carrier, as above referred to, and are likewise secured together at their outer ends by means of a ring 8⁴, the several parts thus united constituting a skeleton drum or
 35 cylinder revolving upon the shaft 7. Slidably mounted in the longitudinal ways or guides formed by the arms 8² are the blank-holders, each of which comprises a cylindrical body
 40 portion or slide 9, having lateral wings 9' 9', coöperating with the ways in the arms 8², and a disk or circular face-plate 9², secured to the end of the cylindrical portion. A segmental
 45 plate 10, provided with a hub 10', is fitted over the inner end of each holder-body 9 and is adjustably secured thereto by means of a set-screw 10². The face of this segmental plate is bored out, so as to form a circular recess 10³ of
 50 such a size as to receive the blanks to be operated upon as they pass from a magazine to be presently described. In case the segmental plate is made of cast-iron or other brittle substance it is desirable to line the recess or cham-
 55 ber 10³ with a steel ring or bushing 10⁴ to prevent the edges from being chipped out.

In a recess 9⁶ in the opposite end of each holder-body is inserted a coil-spring 11³, which is adapted to react between the ring 8⁴, which supports the outer ends of the bracket-arms 8² and the blank - holders, and thereby ad-
 60 vances the holders toward the grindstone. Each holder is pierced with a longitudinal bore 9⁴, through which works an ejector-rod 11, the front end of which lies immediately behind the blank to be operated upon when
 65 in its normal position. At the proper time

the rear end of the ejector 11, which projects through the ring 8⁴, as shown in Fig. 11, co-acts with a cam-surface hereinafter described and is pushed forward for the purpose of
 70 ejecting the section or blank the grinding of which has just been completed. To insure the return of the ejector 11, a coil-spring 11² is provided, which reacts between a collar 11', secured to the ejector-rod and the rear of the
 75 face-plate 9². To the rear of the body 9 of each holder is secured an operating-arm 12, which carries at its end a pintle 12', supporting an antifriction-roller 12², which engages a cam-surface to be more particularly de-
 80 scribed.

Between the worm-gear 8⁶ and the ring 8⁴ of the blank-carrier is located the blank-holder-operating cam, which consists of a centrally-located sleeve 13, within which the
 85 hub 8 of the blank-carrier revolves. The sleeve 13 has radial webs 13', supporting an annular rim provided with a lateral elevation 13², constituting the cam proper. In order to prevent the cam 13² and its support from
 90 revolving with the blank-carrier, the rim of the cam is rigidly secured to the frame 14, which, as before described, is keyed to the shaft 7. The antifriction-rollers 12², secured to the holder-operating arms, are so disposed
 95 as to engage the cam 13² as the carrier re-

volves. A magazine or chute 15 is mounted on the shaft 7, with its delivery end adjacent to the inner face of the blank-carrier, so that the
 100 blanks may be delivered directly from the magazine into the recesses of the segmental plates on the front end of the blank-holders as the latter successively pass the open end of the chute. The magazine is removably and ad-
 105 justably secured to the shaft 7 and its key 7⁵ by means of a bracket 15', partly surrounding said shaft, and a clamping-plate 7⁶, secured to the brackets and engaging the lat-
 110 eral face of the key 7⁵. The chute proper is set at an incline, so that the blanks of their own weight freely slide down toward its mouth; but to insure a proper feed of the
 115 blanks a hand-weight 15² or other follower may be supplied to the magazine to force the blanks forward.

In order to retain the blanks in the holders as the latter pass from in front of the chute 15 to the face of the grindstone, there is se-
 120 cured to the side of the magazine nearest the grindstone a spring-detent, which engages the segmental plate 10, moving in front of the chute, and holds the blanks therein. This de-
 125 tent comprises a plate 16, supported in substantially parallel relation to the face of the blank-carrier by a bracket 16', to which it is secured by two loose pins 16², surrounded by
 130 springs 16³, which serve to hold said plate against the segmental plates 10, so as temporarily close the recesses 10³ and with sufficient to retain the blanks in the recesses. At the

same side of the magazine and immediately preceding the spring-plate 16 is a second yielding member, which consists of a metal plate 17, mounted upon and held in position by a buffer of rubber 17' or similar resilient material. The function of this plate is to provide a yielding section at the delivery side of the magazine which will allow for variations in the thickness of the blanks and still be sufficiently rigid to prevent more than one section being taken at a time from the magazine. The inner edge of plate 17 is preferably slightly rounded to prevent the blanks from catching on the edges of the plate as they pass from the magazine.

On the lateral face of the ring of the cam which operates the blank-holders is a cam 20, which engages the projecting ends of ejector-rods 11 after the holders have traversed the face of the stone, and thereby forces the ground blanks from the holders just before the latter come again opposite the chute. At a point opposite and a little in advance of the chute 15 there is provided on the surface of cam 13² an additional short cam 13³, which serves still further to retract the blank-holders as they pass in front of the magazine, so that the edges of the segments 10 and end of the chute 15 may not collide.

The operation of the machine is substantially as follows: The magazine or chute 15 is supplied with blanks and the machine is started. The blanks are fed into the recesses of the holders one at a time as the holders are presented to the chute. As the carrier rotates each blank is carried in turn from the chute 15 past the yielding plates 17 and 16 to a position in front of the grindstone. When the blanks reach this position, the rollers 12², operating on arms 12 of the holders, pass out of engagement with cam 13², permitting the holders to be thrust forward by springs 11³ until the blanks are pressed firmly against the surface of the grindstone. These springs continue to press the holders against the stone until the respective holders have traversed the face of the stone and have reached the point where they are about to leave the stone, when the antifriction-rollers 12² again engage the cam 13² and withdraw the holders after the blanks have been surfaced. As the holders continue their revolution each in turn passes ejector-cam 20, which engages rods 11, forces the latter forward against spring 11², and ejects the individual blanks from the holders. The holders are each then still further retracted by cam 13³ just before passing in front of the chute or magazine 15 to prevent the segmental plates 10 of the holders from catching on the edge of the magazine. As soon as the advance edge of the segmental plate 10 has safely passed the edge of the magazine the holder is permitted to advance until plate 10 is in contact with the chute and also in position to receive a blank.

The springs 11³ of the holders and the yielding plate of the magazine will permit of a moderate amount of wear of the grindstone without interfering with the operation of the machine; but when excessive wear occurs it is necessary to adjust the blank-carrier bodily to keep the blanks in grinding contact with the stone. This latter adjustment is accomplished by turning up set-screw 7³ and moving shaft 7 in pedestals 6' 6' in the direction of its length, thereby moving the blank-carrier and the magazine until they are properly adjusted with respect to the stone. Of course it is to be understood that the stone is supplied with water for keeping the blanks cool during the operation of grinding in the usual manner.

The construction and operation of the machine being as above described, it is to be noted that the blank-carrier revolves in a plane parallel to that of the stone, sweeping the blank-holders across the face of the stone while the latter revolves. The magazine is arranged by the side of the stone with its mouth projecting slightly beyond the grinding-surface. The blank-holders travel normally in a plane very close to that of the mouth of the magazine, and just before reaching the magazine they are withdrawn slightly, so as to prevent them from striking it, and after they pass beyond the magazine they are projected forward on the carrier, so as to present the blanks to the stone and hold them up against its face. As the blank-carrier revolves the holders pass one at a time in front of the magazine and each receives a single blank therefrom and moves on to the stone, and in order to hold the blank in the holder while it is passing from the magazine to the stone the spring-detent is provided, located and arranged as above described. While the blank-holders are traveling across the face of the stone they are held elastically against the stone, and when they have about completed their movement across the stone's face they are bodily withdrawn into the plane of travel of the face of the carrier. The carrier is adjustable toward the stone to compensate for excessive wear, but has no regular feeding motion in that direction to keep the blanks against the face of the stone. This is accomplished by moving the blank-holders forward on the carrier and holding them elastically in contact with the stone-face.

Having thus described my invention, what I claim is—

1. In a grinding-machine, the combination of a stone, a blank-carrier facing the stone and rotating so as to cause the blanks to travel across the stone, blank-holders mounted on the carrier, and means for moving the holders forward on the carrier when they reach the stone so as to present the blanks to the grinding-surface.

2. In a grinding-machine, the combination of a stone, a blank-carrier facing the stone and rotating so as to cause the blanks to travel

across the stone, blank-holders mounted on the carrier, means for keeping the holders withdrawn from the plane of the stone during part of the rotation of the carrier, and means for moving the holders forward on the carrier when they reach the stone so as to present the blanks to the grinding-surface.

3. In a grinding-machine, the combination of a stone, a blank-carrier facing the stone and rotating so as to cause the blanks to travel across the stone, blank-holders mounted on the carrier, means for moving the holders backward on the carrier after they have traversed the stone and holding them withdrawn, and means for moving the holders forward on the carrier when they reach the stone so as to present the blanks to the grinding-surface.

4. In a grinding-machine, the combination of a stone, a magazine at one side thereof, projecting beyond the face of the stone, a blank-carrier facing the stone and rotating in a plane parallel therewith past the magazine, blank-holders mounted on the carrier to receive blanks from the magazine, and means for moving the holders forward after receiving the blanks, so as to present the blanks to the stone.

5. In a grinding-machine, the combination of a stone, a magazine at one side thereof projecting beyond the face of the stone, a blank-carrier facing the stone and rotating in a plane parallel therewith past the magazine, blank-holders mounted on the carrier to receive blanks from the magazine, and means for moving the holders backward on the carrier just before they reach the magazine.

6. In a grinding-machine, the combination of a stone, a magazine at one side thereof projecting beyond the face of the stone, a blank-carrier facing the stone and rotating in a plane parallel therewith past the magazine, blank-holders mounted on the carrier to receive blanks from the magazine, means for moving the holders backward on the carrier just before they reach the magazine, and means for moving the holders forward on the carrier after they pass the magazine, so as to present the blanks to the grinding-surface.

7. In a grinding-machine, the combination of a stone, a magazine at one side thereof, a blank-carrier facing the stone and rotating in a plane parallel therewith past the magazine, holders mounted on the carrier to receive blanks from the magazine, and an elastic plate located between the magazine and the stone to retain the blanks in the holders as the latter move from the magazine to the stone.

8. In a grinding-machine, the combination of a stone, a magazine at one side thereof, a blank-carrier facing the stone and rotating in a plane parallel therewith and past the magazine, holders mounted on the carrier to receive blanks from the magazine, and a yielding plate at the side of the mouth of the magazine next

the stone to accommodate different thicknesses of blanks and prevent the feeding of more than one blank at a time.

9. In a grinding-machine, the combination of a stone, a blank-carrier facing the stone and revolved to cause the blanks to travel across its face, holders for blanks mounted to move bodily on the carrier toward and from the stone, means for holding the holders away from the stone except when traveling across its face, and means for moving the holders forward on the carrier to present the blanks to the grinding-surface when the holders pass across the face of the stone.

10. In a grinding-machine, the combination of a stone, a blank-carrier facing the stone and revolved to cause the blanks to travel across its face, holders for blanks mounted to slide in guides on the carrier toward and from the stone, springs reacting between the holders and the carrier to move the holders forward toward the stone, and a cam to withdraw the holders when they leave the stone and hold the springs out of action until the holders reach the stone again.

11. In a grinding-machine, the combination of a rotary carrier, blank-holders mounted to slide in guides on the carrier, springs reacting between the holders and carrier to project the holders forward, and an annular cam to engage the holders as the carrier rotates and withdraw them against the tension of the spring.

12. In a grinding-machine, the combination of a rotary carrier consisting of a hub 8 having a disk-like head 8' and an annular ring 8², blank-holders 9 having flanges 9' to slide in guides 8², 8², extending between the head and ring, springs 11³ inclosed in recesses 9⁶ and reacting against the ring 8⁴ to move the holders forward on the carrier, an annular cam 13², and arms 12 projecting from the holders and carrying rollers 12² running on the cam.

13. In a grinding-machine, the combination of a rotary carrier, blank-holders 9 mounted in the carrier and provided with recesses 9⁶ at their rear ends inclosing springs 11³ to project the holders, blank-ejectors 11 passing centrally through the holders, face-plates 9² secured to the front end of the holders, and springs to retract the ejectors reacting between the face-plates and collars on said ejectors.

14. In a grinding-machine, the combination with a blank-holder, of a recessed plate or block secured to the end of the holder to receive the blanks, and means for adjusting the plate on the holder so as to make the recess deeper or shallower to accommodate blanks varying in thickness.

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

JAMES H. HASKINS.

Witnesses:

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ERNEST C. FLEET.