No. 766,149. PATENTED JULY 26, 1904.

O. KRAUS.

STAY TIPPING MACHINE.

APPLICATION FILED JUNE 21, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

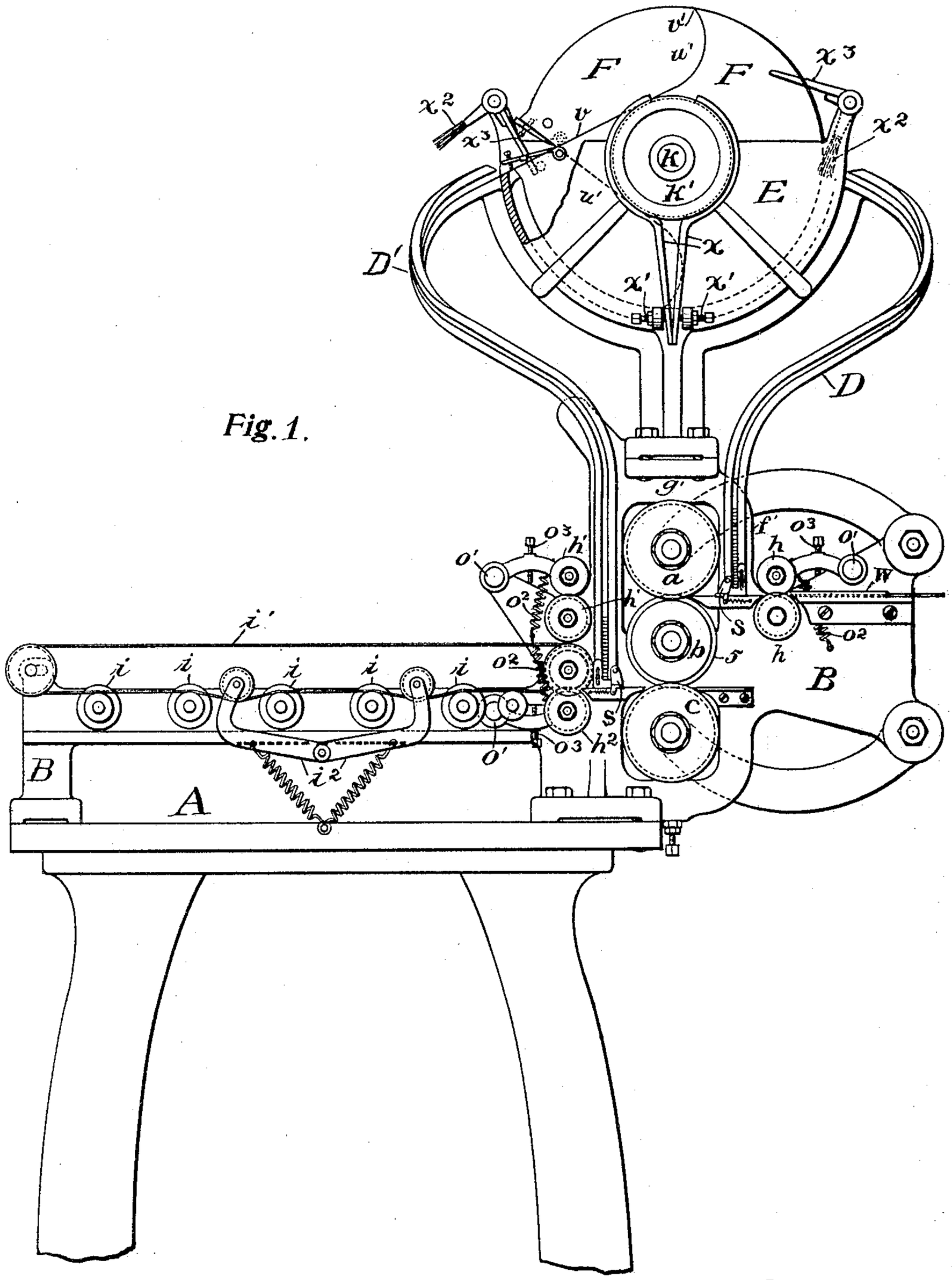

Fig. 1.

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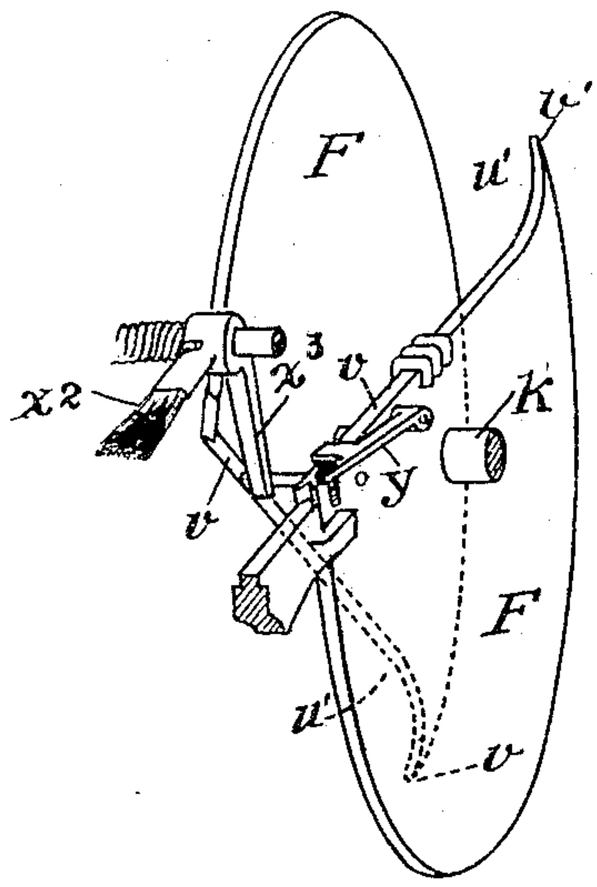
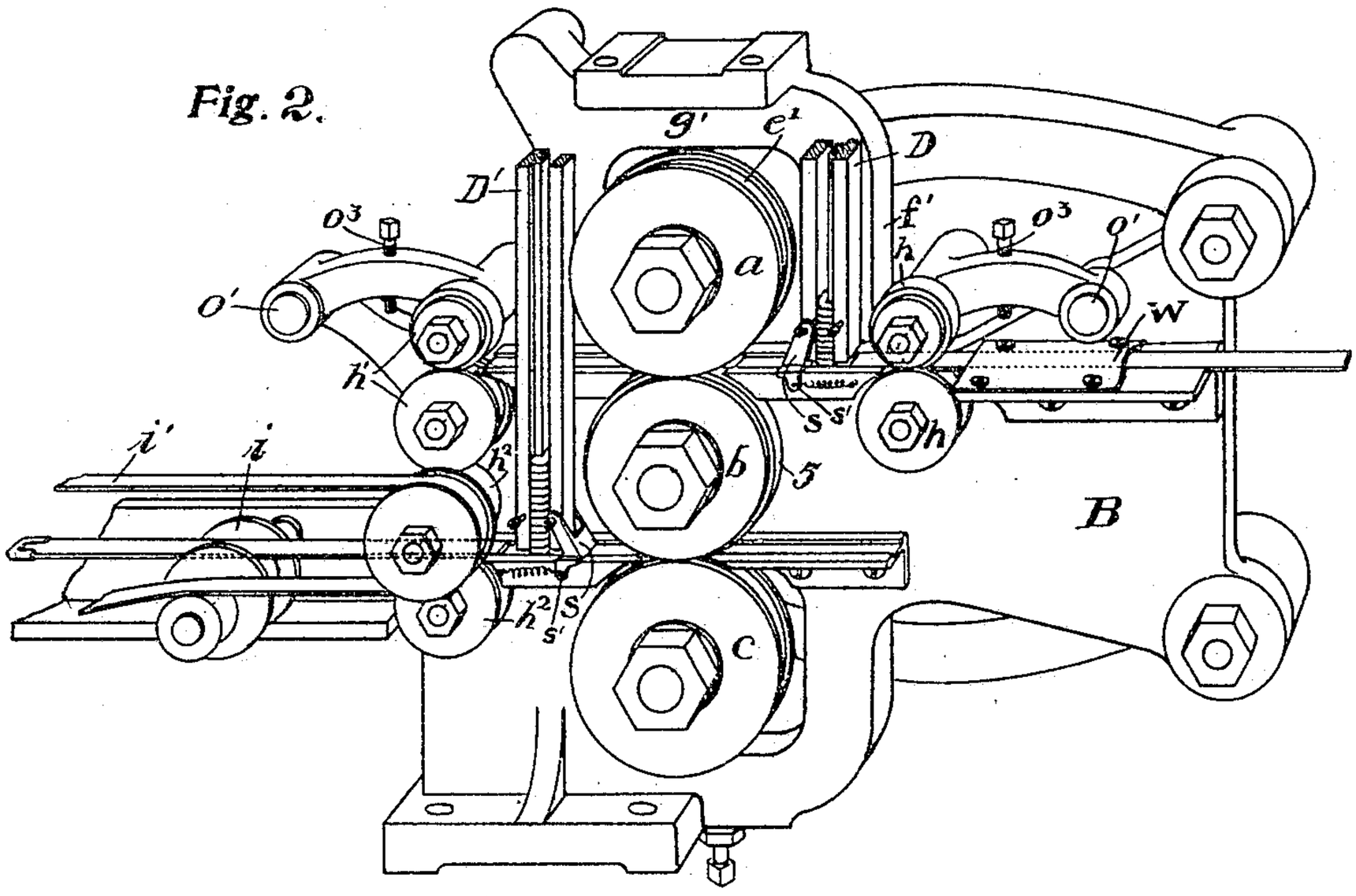


Fig. 3.

Fig. 2.



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NO MODEL. 4 SHEETS—SHEET 3.

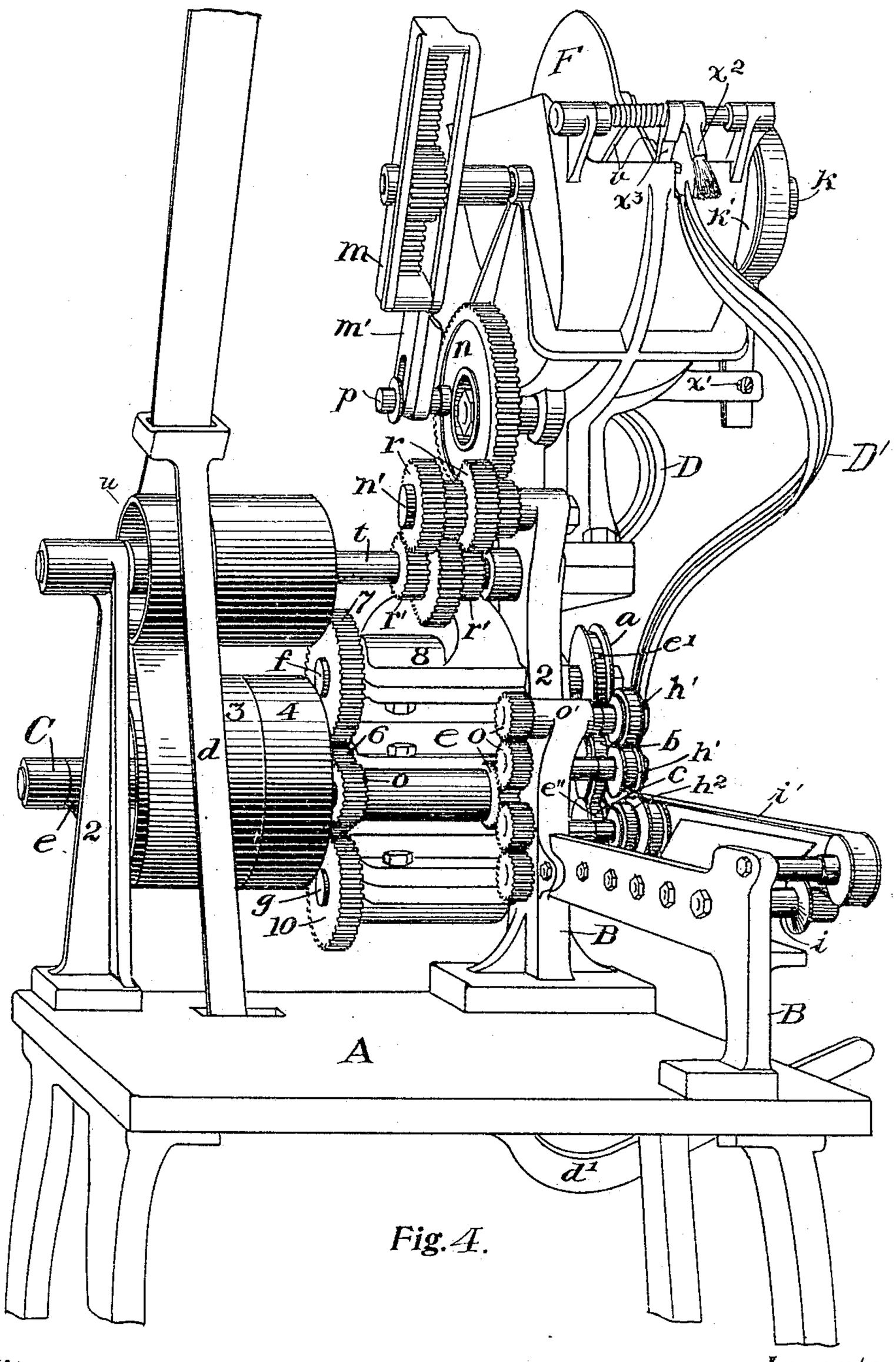

Fig. 4.

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Fig. 6.

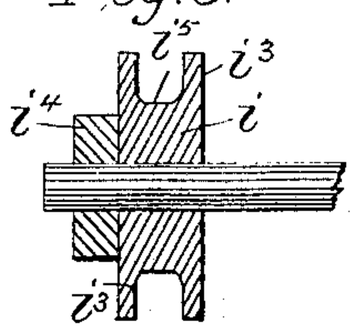


Fig. 7.

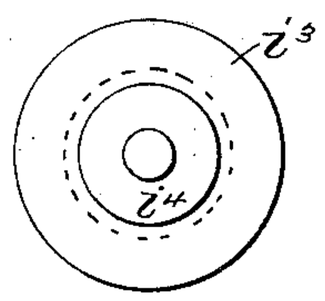
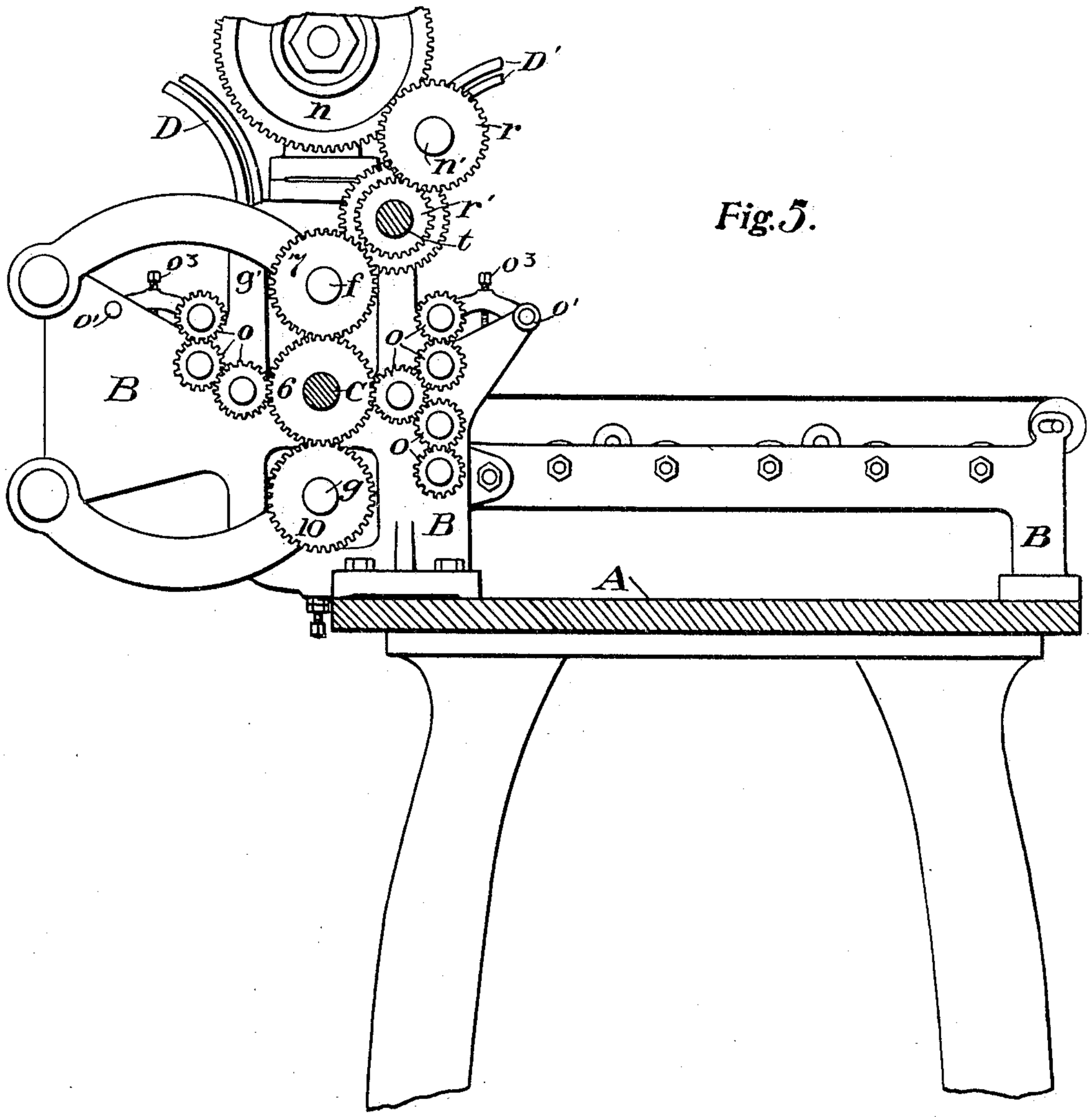


Fig. 5.



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No. 766,149. Patented July 26, 1904.

UNITED STATES PATENT OFFICE.

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STAY-TIPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 766,149, dated July 26, 1904.

Application filed June 21, 1902. Serial No. 112,632. (No model.)

To all whom it may concern:

Be it known that I, OTTO KRAUS, of the city and county of New York, in the State of New York, have made certain new and useful improvements in what are known as "tipping-machines," which are used for compressing sheet-metal tips on the ends of corset and dress stays and for other analogous purposes; and I hereby declare that the following is a full, clear, concise, and exact description of my invention and of the manner in which it may be put into practice.

My improvements relate generally to simple and economically operated means for automatically feeding the blanks which are to be tipped through the mechanism, for picking up the tips from the hopper and carrying them to the respective ends of the blanks, and for effecting the compression of the tips upon the blanks by an arrangement of compression-rolls and of devices combined with them by which I am enabled to produce the intended result more quickly, cheaply, and easily and with less expenditure of power than has heretofore been possible.

My improvements further relate in detail to special combinations of parts which are fully specified in the claims hereinafter set forth.

In the accompanying drawings, Figure 1 is a side elevation of the machine, showing an end view of the compression-rolls. Fig. 2 is an enlarged side elevation of a portion of the machine with a part of it at the left of the drawing omitted in order to illustrate more clearly the manner in which the steels after being tipped on one end are fed to the rolls to be tipped on the other end. Fig. 3 is a detail perspective view of the feeding-disks which are set and operated within the hopper. Fig. 4 is a perspective view of the machine as seen from what may be termed the "second-feed" end of the mechanism. Fig. 5 is a side elevation showing some of the gearing of the machine not seen or not fully seen in the other figures; and Figs. 6 and 7 are respectively a vertical section and an end view, each enlarged, of one of the "carrier" feed-rolls.

The fundamental feature of my invention is the employment of an arrangement of three compression-rolls for compressing the tips, whereby the rolls are mounted one above the other, so as to be what is termed "three-high." With this feature are combined simple, efficient, and economically-operated devices for feeding the tips to the ends of the steels, fixing them there in proper position before they are compressed, and feeding the steels thus made ready to the compression-rolls.

To enable others to make and use my improved machine, I will proceed to describe it in detail.

A is a solid table or base, preferably of cast-iron, to which are secured the requisite standards and framework B B to support the operative parts of the machine. The three-high compression-rolls are shown at *a*, *b*, and *c*. They are mounted one above the other, as seen, and may be set in any suitable housing or frame. I prefer that the upper and lower rolls of the set should have in their peripheries a suitable groove or recess and the middle roll a corresponding rib or shoulder adapted to the width and thickness of the particular blanks which are to be tipped, and it will be understood that when blanks of different widths or thicknesses are to be operated upon different compression-rolls having different recesses and ribs must be employed.

C is the main driving-shaft journaled at *e e* on the uprights 2 2 of the framework. On this shaft is the main driving-pulley 3, which may when desired be thrown out of action by means of the adjacent loose pulley 4 and the belt-shifter *d*, operated by a hand-lever *d'*, located just beneath the table A. Keyed or otherwise made fast on this same shaft is the middle compression-roll *b*, provided on its periphery with the square-cornered rib 5. Between this roll and the loose pulley 4 on the shaft C is a gear 6, which meshes with a gear 7, located just over it and secured on a short shaft *f*, journaled in the box 8, carried by an auxiliary arm of the framework. On the outer end of this shaft *f* is fastened the upper compression-roll *a*, with the square-

sided recess e' on its periphery, into which the rib 5 of the middle roll works to compress the tips. The gear 6 on the shaft C also meshes with another gear 10, secured immediately below it on another short shaft g, journaled in a box carried on another auxiliary arm of the framework, and on the outer end of this shaft g is secured the lower compression-roll c, having a square-sided recess e'' on its periphery similar to the recess e' on the upper roll. Thus mounted and arranged these three compression-rolls a, b, and c constitute the three-high roll system which forms the foundation of my invention.

Further meshing with the gear 6 on the main driving-shaft C is a small gear o, placed on a short shaft on one side of and parallel with the main shaft and journaled in a column f' of the arch-shaped side extension g' of the framework. This gear sets in motion a small train of gears, which drive what may be termed the "first" pair of feed-rolls h h, which feed the steels to the upper pair of compression-rolls. These gears are plainly shown in Fig. 5 at the left of the gear 6, and for convenience each is also marked o. A duplicate small train of gears, comprising the three upper ones, also marked o o o, which are seen at the right of gear 6 in Fig. 5, is mounted on the other side of the main shaft and is actuated from the same gear 6 and drives a pair of gripping-rolls h' h', which in the example of the construction of the machine illustrated in the drawings grip the partly-tipped steels as they come from the upper pair of compression-rolls and throw them out, so that they may fall down into position to be conveyed to the second feed—that is to say, the feed which after the steels have been tipped on one end carries them to the lower compression-rolls—to be tipped on the other end.

Preferably the lower one of each of the pairs of feed-rolls h h and h^2 h^2, as well as the lower one of the pair of gripping-rolls h' h', being constructed in the same manner, should have a square-sided recess in its periphery, into which works the edge of the upper roll, which latter may be made of only sufficient thickness to admit of its easily entering the recess of the lower roll. The shafts of these upper rolls are journaled in arms, which are pivoted at o' o' o', so that they admit of a slight upward and downward movement of the rolls, and attached to the arms are somewhat light springs o^2 o^2 o^2, which tend to draw the edges of the upper rolls down into contact with the bottoms of the recesses in the lower rolls; but as the steels advance between the rolls the springs yield sufficiently to allow the upper rolls to move upward slightly, so as to permit the passage of the steels between them while still maintaining contact with them to carry them forward under the chutes to the compression-rolls in the case of the feed-rolls h h and h^2 h^2 and in the case of the gripping-rolls h' h' to enable the steels to be drawn onward and thrown out. It is necessary, however, that the feed-rolls and also the rolls h' h' should bear with considerable pressure upon the steels in order that they may grip them firmly enough to carry them along. It also frequently happens that steels of different thicknesses require to be tipped. For the purpose therefore of securing the requisite pressure in all cases I provide the arms that carry the upper rolls of these respective pairs of rolls with set-screws o^3 o^3 o^3, Figs. 1 and 2, so that by this means the extent to which the springs o^2 shall draw the arms downward may be regulated, and consequently by adjusting the set-screws according to the varying thickness of the steels the pressure of the rolls upon them may always be kept sufficient and uniform. Lock-nuts (not shown in the figures) may be used on the set-screws to hold the arms in place after the adjustments have been made.

The gearing which actuates the gripping-rolls h' h' and feed-rolls h^2 h^2 is plainly seen in Figs. 4 and 5 and is all driven from the main shaft by the gear 6. The upper half of it which drives the gripping-wheels h' h' is, as has been stated, a duplicate of the gearing on the other side of the main shaft which drives the feed-wheels h h, and although the travel of the steels toward the compression-rolls to receive the second tip is in the reverse direction from their travel through these first feed-wheels h h it is obvious that this system of gearing will give them this forward and reversed movement and will effect it in as direct and simple a manner as would be possible.

In addition to the feed-rolls h h and h^2 h^2 I provide the small auxiliary feeding rolls or carriers i i i, Figs. 1, 2, 6, and 7, which are made with deep flanges i^3 i^3 on their peripheries and are caused to so revolve as to convey the partly-tipped steels in the reverse direction from that in which they passed through the feed-rolls h h and the upper compression-rolls. They are driven by the short belt i', which is kept in working contact with small pulleys i^4 i^4, Figs. 6 and 7, on their shafts by the spring-frame i^2, and one of their functions is to receive between their flanges the steels as the latter are thrown out by the gripping-wheels h' h' and drop by gravity to the lower plane on which these auxiliary rolls are placed, and carry them in the reverse direction on to the feed-wheels h^2 h^2 to be fed to the second chute and into the compression-rolls on this lower plane to receive the second tip. The number of these carriers shown in the drawings forms a series long enough to carry the longest steel usually required to be tipped; but there may be any desirable number of them. It is to be observed that another of the functions of these carrier-rolls i i i is of much importance in my machine, because

the arrangement of them in the plane corresponding to that of the lower feed-rolls h^2 h^2 and lower compression-rolls enables the partly-tipped steels after they have dropped below the plane of the upper compression-rolls to the peripheries of the carriers to be thereby in position to be engaged by the lower compression-rolls. In the production of this result the action of gravity in carrying the steels down is to be considered an element, as also is the ejecting action of the upper rolls, which throw out the partly-tipped steels.

The chute by which the tips are first delivered to the ends of the stays after the latter are fed into the machine and as they approach the compression-rolls is shown at D. It does not differ materially in construction from chutes for analogous purposes which are found in machines of this general class and does not require special description. Its lower end is located immediately in front of the upper compression-roll a, and the lowermost one of the column of tips which are fed through it to the path of the steels will always lie in this path directly before the forward end of the advancing steel, so that the said end may enter the tip just previous to reaching the rolls. After it has so entered the tip and before it actually arrives at the rolls it is important to make sure that the tip is in proper position straight and even on the end of the steel, and to effect this I employ a device which in view of its operation and the result produced by it I term a "setter-bar." This setter-bar is shown at s in Figs. 1 and 2. It consists of a light iron bar swinging at its upper end on a pin screwed into one side of the chute, and having a wing or flange at its back side extending down to the bottom of it and wide enough to reach across the steel and tip. It is also provided with an ear or projection s', to which is fastened one end of a light spring, the other end of which is attached to the framework and the tendency of which is to draw the bar down into contact with the advancing steels. As each one of the latter, with a tip just taken from the chute on its end, reaches the bar it strikes against the wing at the back of the bar, and thereby the tip is forced into proper position on the end of the steel and set evenly thereon. Then as the steel continues to advance, pushing against the bar, the spring yields sufficiently to permit the bar to swing back far enough to allow the steel to pass under it, the bottom of the bar meanwhile resting on the steel until the latter has got by, when the spring draws the bar back into position ready for the next steel.

The upper ends of the chutes D D′ communicate with the hopper E, which carries the supply of tips for use. Within this hopper are arranged one or more thin disks of metal F F, secured upon the shaft k. At the outer end of this shaft k is a link m, working on the shaft and connected by its stem m' to a gear-wheel n through a stud p, which stud is placed at one side of the center of the gear, and thereby converts the latter into a crank. This gear need not, however, be always as heavy as in the particular machine shown in the drawings, as, if desired, it may be considerably lighter and thinner, and, in fact, I have made it so in some machines. Its teeth mesh with a small gear on a short shaft n', and as this shaft has also upon it the other gears r r, which respectively mesh with the gears r' r', immediately below them on an auxiliary driving-shaft t, it will be obvious that when power is applied to the shaft n' through the pulley u on the outer end of shaft t, which may be driven by the main belt, as shown, the crank-gear n will be so actuated as to impart through the link m a rocking or oscillating movement back and forth to the disks within the hopper. These disks have a portion of their periphery cut away, as seen at u' u', leaving the straight bottom v of the cut and the upwardly-curving part of it which terminates in the point v'. The disks are duplicates of each other, and their office is to keep the mass of tips in the hopper in agitation as they rock back and forth and to pick them up by the points v' v' as they come into position therefor and deliver them to the respective chutes, one disk carrying tips to the chute D for the first feed and the other disk carrying them to the chute D′ for the second feed. It will be found also that the use of two rocking disks placed, as they respectively are, on one side of the middle of the hopper will prevent the tips from banking up at the sides of the hopper and keep them level much better than a single rotating feed wheel or plate can do it.

To prevent the tips from clogging as they are delivered to the chutes by the disks, I employ brushes x^2 x^2 such as are common in machines of this class. These brushes are actuated by studs on the faces of the disks, which as the latter rock strike the tailpieces x^3 of the brush-shafts and force the brushes outward to clear the chutes. As the disks rock back the studs are carried away from the tailpieces, and the brushes are retracted by suitable springs.

It will be observed that, as shown in Fig. 3, the disks are so set on the shaft k as to be reversed with respect to each other—that is to say, during one rocking movement the cut-out portion and point v' of one is at the top while the corresponding parts of the other are at the bottom, and at the reverse movement these parts of the first are at the bottom while those of the second are at the top. It is necessary as these rocking movements take place that at the instant when the points v' successively arrive at the tops of the chutes and are ready to deliver a tip thereto the motion of the disks should be arrested while the tip is sliding off into the chute. At this instant the link m and its actuating-gear cease

to rock the shaft *k*, and thereby permit the disks to pause; but as their momentum would carry them somewhat past the chutes I provide a brake *x*, Fig. 1, the pressure of which is regulated by the set-screws *x'* and is constant upon the shaft *k* through its bearing on the drum *k'*, which is fast on the shaft, so that at the instant when the points *v'* reach the chutes and the disks cease to be actuated the pressure of the brake takes effect and stops the disks and the tip slides off. The next instant the link again begins to rock the shaft the pressure of the brake is overcome and the movement of the disks recommences. This method of producing the necessary intermittent action of the disks will be found to be very simple, practical, and efficient, and the brake is therefore an important part of the equipment of the hopper.

There will be a liability just before the instant when either disk is brought to rest to deliver a tip to the top of one of the chutes that the momentum of the tips or other cause as the tips slide down the portion *v* of the disk will force one or more of them to fall off, and so fail to enter the chute. To prevent this, I employ on each disk a spring-gate *y*, Fig. 3, having a short flange at its upper end. This flange rests on the part *v* of the disk during nearly all of its rocking movement and prevents any tips from falling; but at the instant when the disk comes to rest to deliver a tip to the chute the downwardly-projecting stem of the gate strikes a projection on the inside surface of the hopper, (not represented in the drawings,) which forces the gate upward just enough to permit a tip or tips to slide off into the chute. Then as soon as the disk commences to rock back again the spring draws the flange down onto the top of the disk, where it remains until the next instant that the disk comes to a rest.

The operation of my machine is as follows: When power is applied to the main shaft, the disks in the hopper are rocked or oscillated by the link *m* and begin to pick up the tips by the points or fingers *v'*. As the disks rock the tips slide down the straight bottoms *v* of the cut-away peripheries of the disks, as seen in Fig. 3, and are delivered to the tops of the chutes, down which they are carried by gravity till the lowermost one of the column they form rests on the path of the steels to the rolls. The steels are fed in under the plate, and each in turn as it reaches the first pair of feed-rolls *h h* is gripped by them and carried onto the first chute, where its forward end enters the tip at the bottom of the column and goes on until the tip strikes the back of the setter-bar. There, as previously explained, the tip is set in position on the steel, and the latter is carried in between the upper and middle compression-rolls and the tip compressed. The steel then passes on to the gripping-rolls *h' h'*, which grip it and throw it out and down to the plane below, where it falls by gravity onto the flanged peripheries *i*⁵ of the small auxiliary carrier-rolls and is taken by them into the second pair of feed-rolls *h*² *h*², which in turn grip it and pass it on under the second chute. Here its untipped end enters the lowest tip in that chute and with it goes to the second setter-bar, which sets the tip in position, as was done with the first tip by the first setter-bar. The steel and tip then pass in between the middle and lower compression-rolls, which compress the tip and throw the finished steel out of the machine into the receiving-box, thus completing the operation.

It is not indispensable to the operation of the machine that the gripping-rolls *h' h'* should be employed, as the upper pair of compression-rolls will throw the partly-tipped steels out, so that they will be carried by gravity down to the carrier-rolls *i i i;* but in making use of the form of the machine shown in the drawings these gripping-rolls will be found convenient.

It will be seen that all the mechanism herein described is simple. In practice it is found to work very efficiently, and as it contains almost the smallest possible number of parts it is operated easily and with a very economical expenditure of power.

Having thus described my improvements, what I claim is—

1. In a tipping-machine, the combination of compression-rolls having their intake-faces on different planes, feed-rolls in the plane corresponding to that of the upper pair of compression-rolls for presenting steels with tips thereon to the intake-faces of said upper rolls, and means for effecting an engagement of the partially-tipped steels with other feed-rolls which are located in the plane corresponding to that of the lower pair of compression-rolls and which present the steels to said lower pair of rolls, substantially as shown.

2. In a stay-tipping machine, the combination of three-high compression-rolls, a roller-feed located in a plane corresponding to that of the upper pair of said rolls and feeding the steels to them, a second roller-feed located in a plane corresponding to that of the lower pair of compression-rolls for feeding the steels to the latter, and means for receiving the steels after they have passed through the upper compression-rolls and conveying them to said second roller-feed, substantially as and for the purpose described.

3. In a tipping-machine, the combination with three compression-rolls arranged one above the other so as to be three-high, of suitable feeding-rolls for feeding the steels to the upper pair of compression-rolls to be tipped on one end, and other suitable feeding-rolls on a lower plane for feeding the steels to the under pair of compression-rolls to be tipped on the other end, substantially as described.

4. In a tipping-machine, the combination with three compression-rolls arranged so as to be three-high, of suitable feeding-rolls for feeding the steels to the upper pair of compression-rolls, a chute for tips communicating with the path of the steels on one side of the compression-rolls, other suitable feeding-rolls on a lower plane for feeding the steels to the under pair of compression-rolls, and a second chute for tips on the other side of said compression-rolls communicating with the path of the steels in said latter plane, substantially as described.

5. In combination with three compression-rolls arranged one above the other, feeding-rolls on opposite sides of said three-high rolls which are located in different planes corresponding to the respective pairs of compression-rolls and which respectively present to the latter the ends of the steels, and tip-holders between the feeding-rolls and the intake-faces of the compression-rolls, for the purpose set forth.

6. In a tipping-machine, the combination of feed-rolls for taking steels successively from a source of supply and feeding them toward the compression-rolls in the plane of the upper pair of the latter, a chute to receive tips which is open in the path of the steels the chute being positioned adjacent to the intake-faces of said compression-rolls, other feed-rolls in the plane of the lower pair of compression-rolls and to which the steels with tips on one end are fed by the upper compression-rolls, and a chute for tips between said other feed-rolls and the intake-faces of the lower compression-rolls, the compression-rolls being three-high, substantially as shown and for the purpose set forth.

7. In a tipping-machine, the combination with feeding-rolls which present to the three-high compression-rolls one end of the steels, of a chute for tips between the feed-rolls and compression-rolls, other feeding-rolls below the plane of the first ones which present to the compression-rolls the other end of the steels, a second chute for tips adjacent to said last-named feeding-rolls, and compression-rolls arranged three-high, substantially as shown and for the purpose set forth.

8. In a stay-tipping machine, the combination of three-high compression-rolls, feeding-rolls on opposite sides of said three-high rolls located in different planes corresponding to the respective pairs of compression-rolls, and means whereby the partly-tipped steels after they have passed in one direction through the upper rolls and are below their plane, may be put in position on the plane corresponding to that of the lower pair of compression-rolls to be engaged by said lower rolls.

9. In a tipping-machine, the combination of the feeding mechanism for the steels with a chute and a yielding setter-bar which engages with the tips to set and keep them in proper position on the ends of the steels after the latter pass the chute until they reach the compression-rolls, substantially as described.

10. In a tipping-machine, the combination with chutes for tips communicating at their lower ends with the paths of the steels to the rolls, of a hopper containing rocking or oscillating feeding-disks operating in the manner and for the purpose set forth.

11. In a stay-tipping or other analogous machine, the combination with a hopper and a feeding-disk working therein of a brake adapted to bring the disk to a momentary rest at the instant when its feeding-point reaches the chute and is ready to deliver a tip or other blank thereto, substantially as described.

12. In a stay-tipping or other analogous machine, the combination with a hopper and a feeding-disk working therein of a spring-gate operating to prevent the tips or other blanks from falling off the disk just before the instant that they are to be delivered to the chute but at that instant rising to permit them to pass to the chute, substantially as described.

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