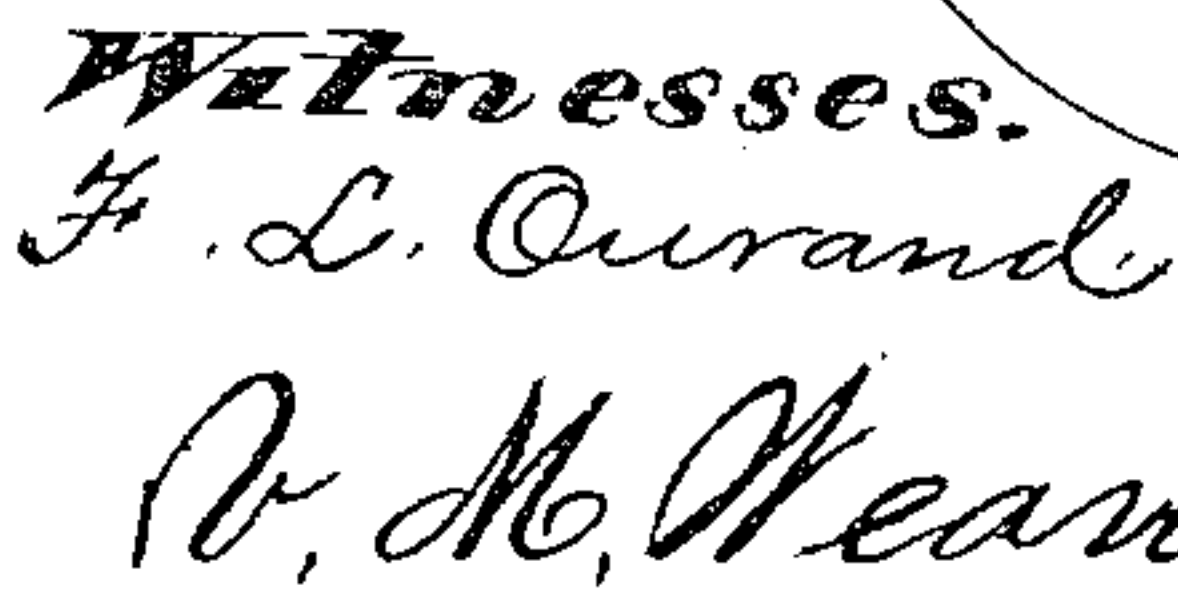


3 Sheets—Sheet 1.

FEED CUTTER.

Patented June 14, 1887.



Inventors:
Martin L. Metzger,
Albert Cooper:
Attorney.

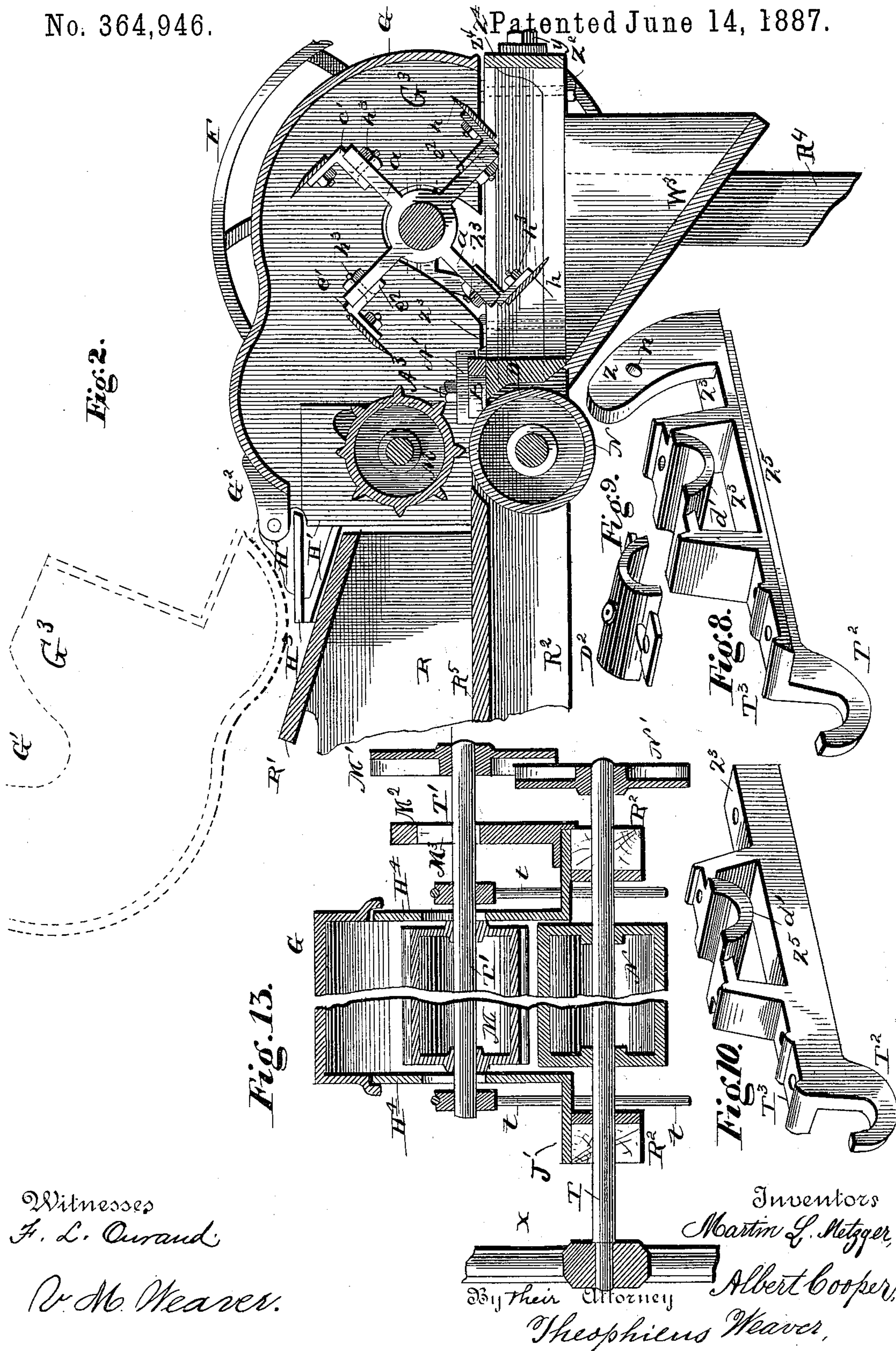
(No Model.)

3 Sheets—Sheet 2.

M. L. METZGER & A. COOPER.
FEED CUTTER.

No. 364,946.

Patented June 14, 1887.



Witnesses
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(No Model.)

3 Sheets—Sheet 3.

M. L. METZGER & A. COOPER.
FEED CUTTER.

No. 364,946.

Patented June 14, 1887.

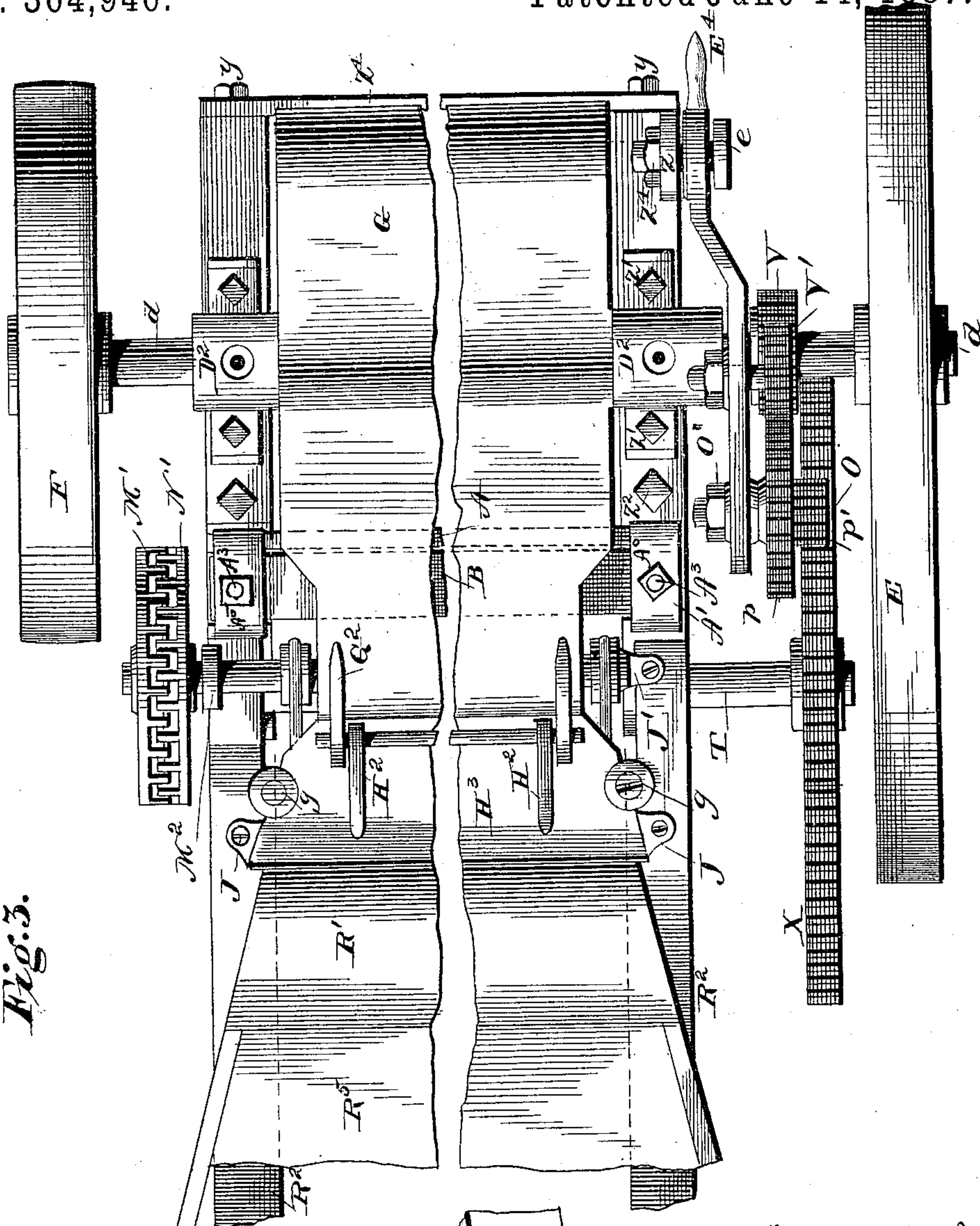


Fig. 3.

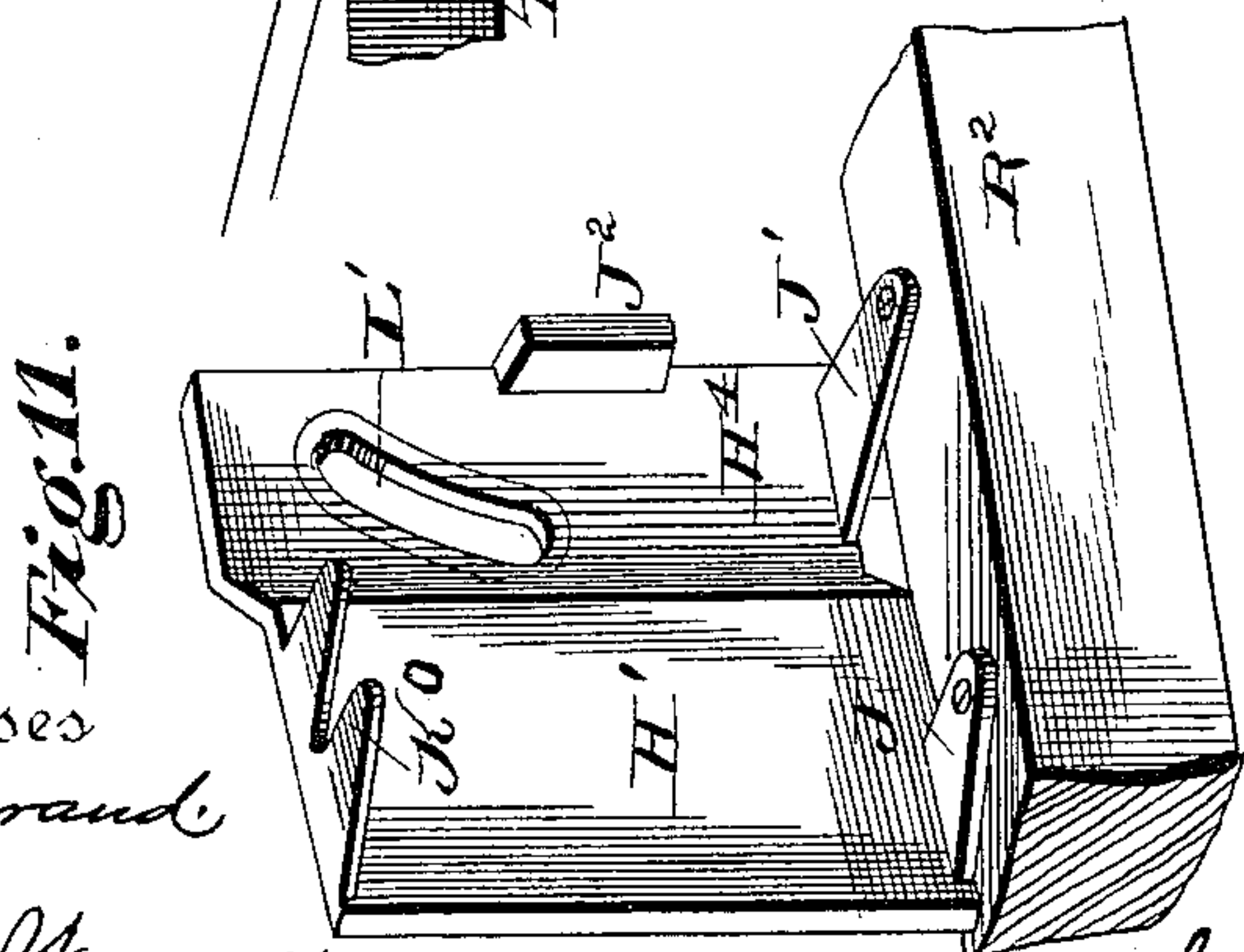


Fig. 11.

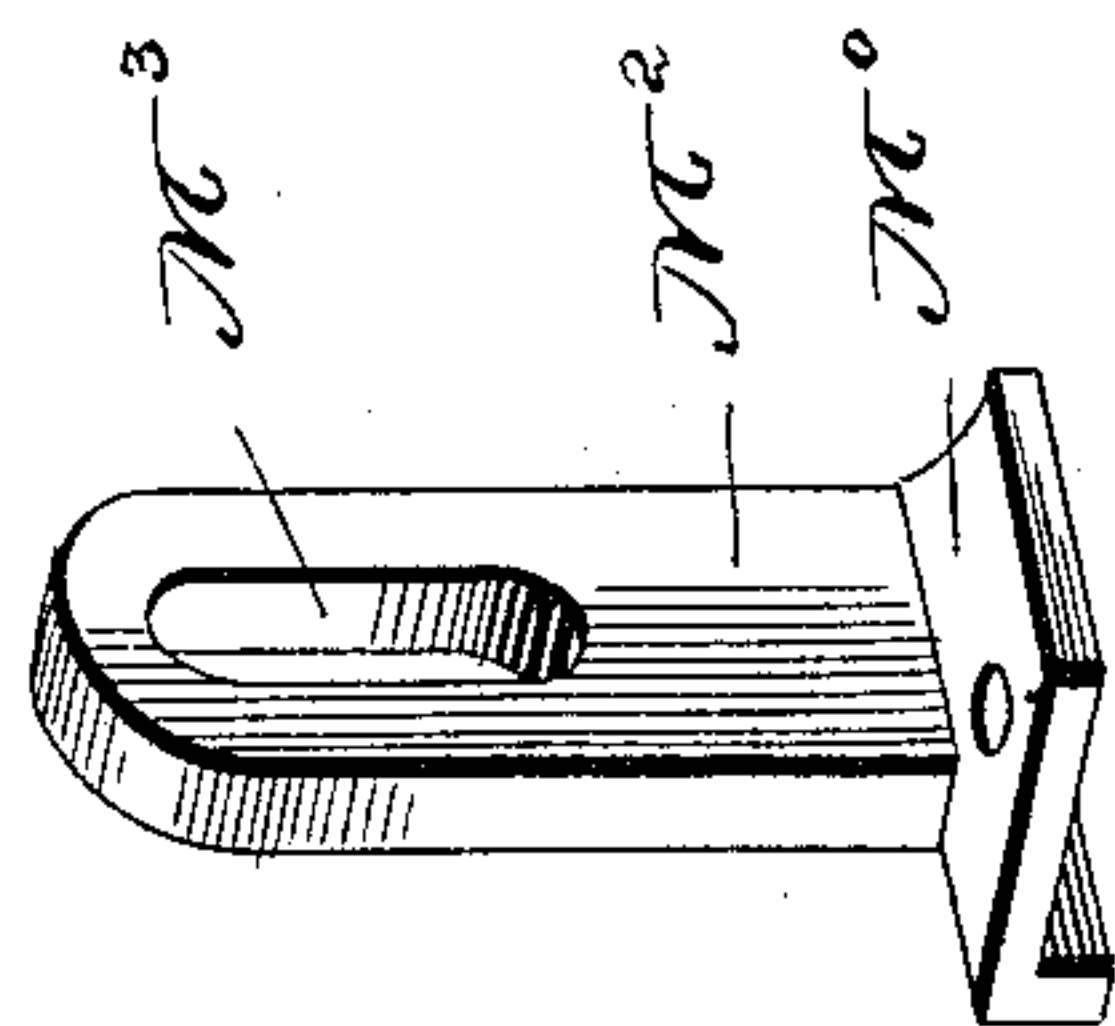


Fig. 12.

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UNITED STATES PATENT OFFICE.

MARTIN L. METZGER AND ALBERT COOPER, OF HARRISBURG, PENNSYLVANIA, ASSIGNORS TO THE W. O. HICKOK MANUFACTURING COMPANY, OF SAME PLACE.

FEED-CUTTER.

SPECIFICATION forming part of Letters Patent No. 364,946, dated June 14, 1887.

Application filed September 15, 1885. Serial No. 177,219. (No model.)

To all whom it may concern:

Be it known that we, MARTIN L. METZGER and ALBERT COOPER, citizens of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented a new and useful Feed-Cutter, of which the following is a specification.

The object of our said invention is to produce a rotary feed-cutter adapted to be readily adjusted to change the speed of the feed-rolls in relation to that of the cutters, so that the cut fodder or straw may be of greater or less length, as desired, with little delay.

The principal features of our improvement are, first, the casing-sections in which the cutter-shaft and the feed-roll shafts are supported, made distinct from other sections of the casing which shelter the cutters and said rolls, that they may be removed without tearing down the whole casing; second, the lid of the casing having its hinge-axis situated rearward from the axes of the feed-rolls, and having thereon the skirtings which form the sides of the casing also at the front of the same, so that when open all the works shall be accessible for adjusting them, both for setting up the cutters and for adjusting the cutting-bar; third, the cutting-bar formed of bar-steel and secured so that all its edges may be used; fourth, a means for limiting the rise of the upper feed-roll shaft; fifth, the cutter-shaft, the lower feed-roll shaft, and the pivoted shifting-lever, all provided with like toothed gears, all trained together so that one of the train of gears may be reversed for changing the speed of the feed-rolls relative to that of the cutter-shaft; sixth, the combination of the shifting-lever provided with a fixed gear, meshing with a gear on the cutter-shaft, and with a reversible interchangeable gear or member of a series of change-speed gears, of a fixed gear on the lower feed-roll shaft, propelled by said interchangeable gear, and of means for securing said lever in adjusted position.

The particular construction and arrangement of said devices will be hereinafter described, and pointed out by the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of our machine; 50 Fig. 2, a longitudinal vertical section of the same; Fig. 3, a top view of the same, a middle portion being removed; Figs. 4, 5, and 6, edge views of the interchangeable gears; Fig. 7, a cross-sectional view of the shifting-lever, taken 55 through the axis of the interchangeable gear supported thereon; Fig. 8, a perspective view of the right-hand bed-piece; Fig. 9, a similar view of the journal-cap for the same; Fig. 10, a similar view of the left-hand bed-piece; Fig. 60 11, a similar view of one of the corresponding side pieces; Fig. 12, a similar view of the guide and stop for the feed-roll; Fig. 13, a vertical cross-sectional view of the casing, taken through the feed-roll axes; Fig. 14, a plan of the shifting-lever and casing; Fig. 15, a similar view of the top plate of the casing. 65

The same letters denote like parts in all the views.

The wood-work of our machine-frame has 70 the parallel sills R^2 as a foundation, on which is built the feed-trough, consisting of the floor R^3 , the sides R , and the head-board R' , embracing the sides above at their front ends. The front end of said trough is fitted into the 75 rear end of the casing, which is also secured upon said sills. The sills are supported on the uprights R^3 R^4 and on the cross-piece K^0 , joining together the uprights R^3 . Said uprights are framed together in the usual manner, the chute W^3 being embraced between the uprights R^4 .

The casing consisting of the bed-pieces Z^3 , the side plates, H' , the top plate, H^3 , and the lid G , hinged to the latter, are all constructed 85 as shown. The corresponding bed-pieces Z^3 are formed with the bearings d' thereon for the cutter-shaft d , the cap-plates D^2 fitting thereon, as shown. Said bed-pieces at their rear ends have the hook-form extensions T^2 , said extensions being parts of the flanges Z^5 , formed as 90 the inner edges of the bed-pieces, they being adapted to come inside of the sills to protect them against wear. Said bed-pieces are secured on top of said sills by screw-bolts $Z'Z^2$, 95 inserted through them, as shown. Said bed-pieces have also formed on them seats T^3 , whereon the ends of the liner $B D$ are sup-

ported, it being a bridge reaching from side to side of the machine, and being strengthened by the brace D, for the purpose hereinafter set forth. The side plates, H', formed with the basal lugs J' J², are thereby supported on said sills, to which they are secured by wood-screws. They are arranged to be rearward from the said bed-pieces. They are formed with the curved slots L' therein, in which the upper roll's shaft T' accommodates itself to the thickness of the layer of the straw or fodder while it is passing between the rolls. The upper ends of said plates have on them the lugs K, laterally projected and slotted to admit into them the bolts g, but not permitting the nuts g' on the bolts to pass through the slots, the bolt-heads being retained in the holes g³ in the ends of the top plate, H³. By this means said side plates are detachably connected with said top plate, from which they can be removed by first undoing said bolts and withdrawing the wood-screws which secure the basal lugs of the side plates to the sills. Said side plates are step-form or offset laterally at the middle thereof, thus presenting the portion H⁴ farther inward than the portion H', that the inner sides of the portions H⁴ may come even interiorly with the inner faces of the sides R of the feed-trough, thus guiding the straw properly to the opening between the rolls M N.

The lid G of the casing is formed, as shown, of proper curvature on top to come clear over the cutter-head and step onto the transverse plate Z⁴, attached to the front ends of the sills R² by the lag-screws y. Said lid is provided with the rearwardly-extended lugs G², which are pivoted or hinged to the corresponding lugs, H², on the top plate, H³. The axis of said hinges is rearward from the vertical plane which passes through the axes of the feed-rolls, so that when said lid is thrown back, as shown, the rolls M N, the cutting-bar A, and the cutters h shall be exposed to view and be accessible.

The sides G³, attached to or formed on the lid G, constitute the front side walls of the casing when the lid is closed. They are therefore out of the way when the lid is open, thus permitting the cutters and the cutting-bar to be approached unobstructedly for adjusting the former up to the latter in full view, thus overcoming difficulties before experienced. Said sides have in them the cuts G' for clearing the cutter-shaft d when the lid is being closed. The lid and said top plate, to which it is hinged, can be unitedly removed from the side plates by undoing the bolts g. Upon one of the said sills, exterior to the side plate and in rear of the bed-piece, is secured by lag screws the post M², which is set out laterally to come near the gears M' N', which intergear the feed-rolls, as hereinafter set forth. The liner B D is simply a transverse bar formed on top with a seat along its front edge adapted to receive thereon the angular cutting-bar A, as shown. The ends of the liner rest in the seats T³ of the

bed-pieces, and the plates A' are secured thereon by the bolts A³ in manner to clamp fast the ends of the cutting-bar, and also to hold the liner in place. Each of the bolts A³ is inserted upward through the bed-piece Z³, through the liner B D, and the plate A', and has driven thereon the nut A⁰, which bears on said plate, for securing thereby the cutting-bar A in position on the liner by bearing both on it and on the bench at top of the liner. The cutting-bar is a section of square bar-steel, and is so secured by said means in position that it may be turned or adjusted to present any one of its edges to be the tangential edge next the circle described by the cutters h. Said cutters are secured upon the arms a of the cutter-head by means of the angle-irons e², and by screw-bolts joining said parts, as shown. Each angle-iron is formed with the peculiar lug c' thereon, projected exteriorly for bearing against the end of the arm a, to assist the attaching-bolt h³ to hold the iron rigidly on said arm, to resist slipping away from the cutting-bar or the circle in which cutters encounter the work. The feed-rolls M N have the finger-gears M' N' on their respective shafts T', by which they are in constant communication with each other by the aid of the post M², formed with the slot M³ therein, in which the shaft T' of the upper roll is inserted, and by which its throw is limited to prevent disengaging of said gears, the same shaft being held down by the spring-bars Q, coupled with said shaft by the rods t, applied as shown. The shaft T of the lower feed-roll, N, is provided with the large spur-gear X, keyed on it, by which the intergeared rolls M N are driven by way of a train of gears communicating with the pinion V, keyed on the cutter-shaft d, as follows: Upon said shaft, interior to said pinion thereon, and between the pinion and the cap-plate D², is fulcrumed the shifting-lever E³, formed as shown in Fig. 14, and applied as shown in Fig. 3. The lever has secured thereon by the fixed stud m the reversing-gear V', which is in constant communication with the driver-pinion V. Upon the slotted arm E⁵ of said lever is attached, by the journal-stud O and nut O', a reversible double spur-gear, p, adapted to communicate by one of its sets of teeth with the wheel X, and by the other set of teeth with the gear V', which latter is interchangeable also with either of the gears q r. (Shown in Figs. 4 and 5.) The members of the series of gears p q r are each countersunk on both faces, to admit therein the head of the stud O, as shown in Fig. 7, and they are formed with the same kind of teeth as are also the other wheels and pinions of the train of which they are a part, or may be. When one of the double gears p q r is reversed, the stud O is adjusted in the slot Q² in said arm to bring the one set of teeth of the gear to mesh with the teeth of the gear V', and the lever E³ is then adjusted to bring the other set of teeth to mesh with the teeth of the wheel X. The end E⁴ of the lever is then

secured in place as follows: Upon the bed-piece is formed the standard Z, having the hole *n* therein, and said lever has formed in it the slot E², concentric with the lever's bearing E. When therefore said lever is properly shifted, by raising the handle E³ or by lowering it, the bolt *e*, inserted through said slot and the hole *n* in said standard and provided with the nut Z¹ upon its inner end, draws taut and clamps the lever rigidly against said standard.

The object of making the double gears *p q r* reversible is to get two rates of speed for the intergeared feed-rolls from each of said gears; and the object of making the same interchangeable is to provide the gears in such size of hub and bearing that the same journal-stud O and the same lever E³ may be employed for mounting any one of said series of double gears, and thus greatly vary the length of the cut fodder or straw, for it will be correspondingly long or short, accordingly as a greater or less speed is given the feed-rolls for a given rate of speed of the cutter-shaft.

Upon the cutter-shaft *d* is shown the fly-wheel E at one end and the pulley F upon its opposite end; but they may exchange places or be arranged upon the same end, or either of them may be omitted.

We claim—

1. In a feed-cutter, the combination, with the sills having the feed-trough thereon, of the casing consisting of the bed-plates Z³, having each the bearing D' for the cutter-shaft, the hooked extension T², as a bearing for the lower feed-roll shaft, seat T³ for the end of the liner B D, supporting thereon the cutting-bar and the flange Z³, the cap-plates D², side plates, H', formed with the slot L' in the part H⁴, for the upper feed-roll shaft, and with the upper and lower attaching-lugs, the top plate, H³, provided with the lugs H² and bolted onto the side plates, and the lid G, hinged to the lugs of the top plate, substantially as described.

2. In a feed-cutter, the combination, with the machine-frame and feed-trough, of the casing consisting of the bed-plates and the side plates having the feed-rolls and the cutter-shaft journaled therein, the top plate provided with lugs, and the lid G, having sides G³, and the lugs G², hinged to the lugs of the top plate on a horizontal axis which is rearward from the axes of the feed-rolls, substantially as described.

3. In a feed-cutter, the combination, with the machine-frame and trough, of the bed-

plates, the cutter-shaft journaled therein and provided with the cutters *h*, the liner B D, provided with a seat and supported on the bed-plates, the angular cutting-bar A on said seat, and the plates A', secured upon said bar and liner by the bolts A³ and the nuts A⁰, substantially as described.

4. In a feed-cutter, the combination of the frame, the bed-pieces, the lower feed-roll shaft provided with the gear N', the upper feed-roll shaft provided with the gear M', the spring-bars Q, and rods *t*, for coupling said bars and the upper feed-roll shaft with the post M², provided with the slot M³, for holding said gears in contact, substantially as described.

5. In a feed-cutter, the combination, with the cutter-shaft *d*, having the driver-gear V keyed thereon, and with the shifting-lever E³, fulcrumed on said shaft interior to said gear and provided with the reversing-gear V' on the stud *m*, intergeared constantly with said driver, of one of the series of double invertible interchangeable gears *p q r*, supported on the stud O, which latter is adjustably supported in the slotted arm E⁵ of said lever for intergearing any one of the series of gears with said reversing-gear, the lower feed-roll shaft, T, provided with the gear N', meshing with the gear M' on the upper feed-roll shaft, and also provided with the gear X, in communication with the double gear, and the standard Z, having the slotted arm E⁴ of the lever secured thereto by the bolt *e*, provided with the nut Z⁰, substantially as described.

6. In a feed-cutter, the combination, with the lever E³, fulcrumed on the cutter-shaft *d* next the cap-plate D², and having its handle E⁴ adjustably secured by the bolt *e* against the rigid standard Z, of the pinion V, keyed on said shaft exterior to said lever as a keeper for retaining it in place thereon, of the reversing-gear V', attached to said lever by the fixed stud *m* and meshing with said pinion, of an invertible double gear attached to said lever by the adjustable stud O, secured in the slot Q² in said lever and communicating with the gear V, and of the gear X, attached to the lower shaft of the intergeared feed-rolls M N and driven by said double gear, substantially as described.

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Attest:

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