

(No Model.)

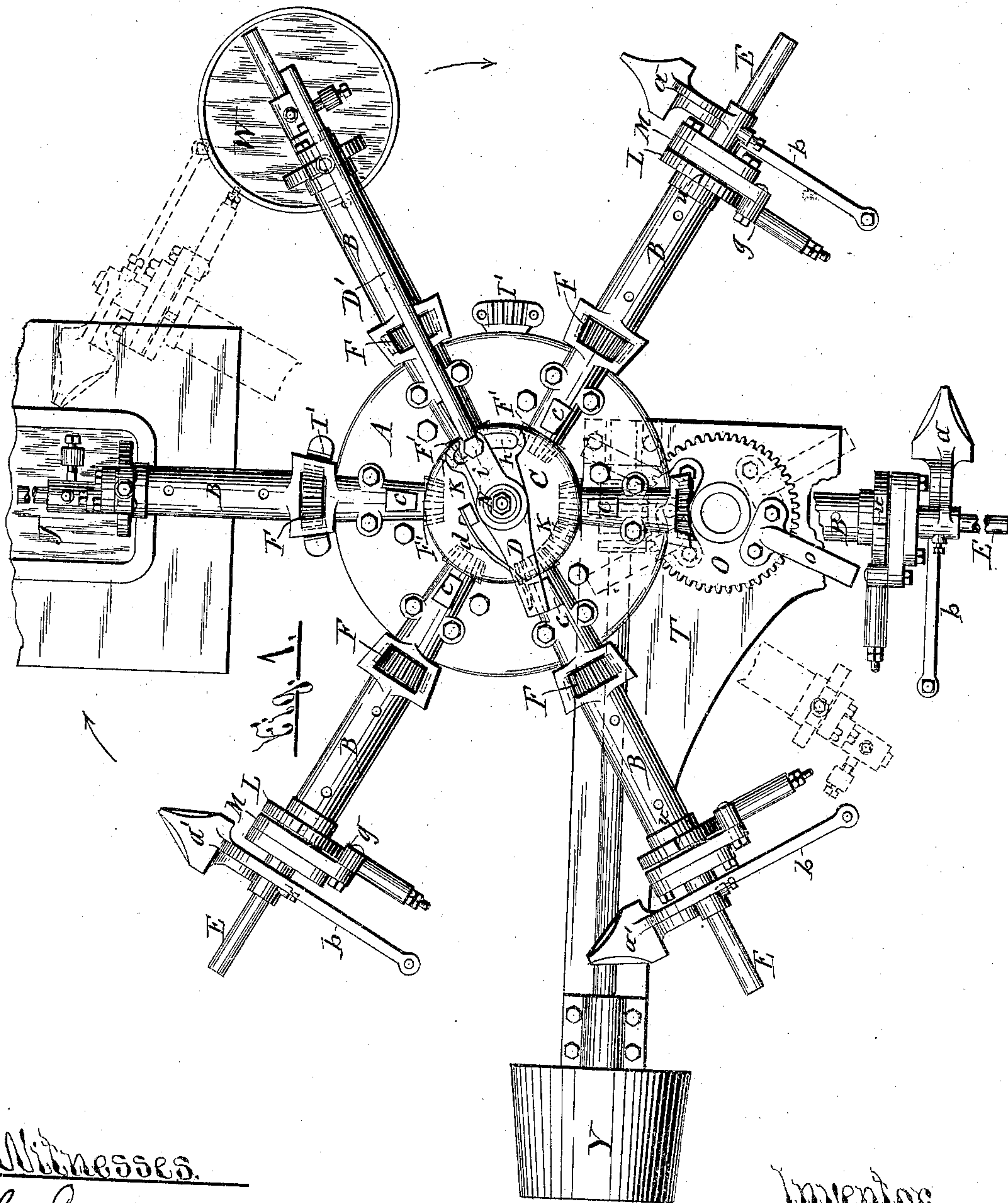
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H. WHITE.

MACHINE FOR HEATING AND HARDENING METAL ARTICLES.

No. 383,030.

Patented May 15, 1888.



Witnesses.

C. Burdison

N. M. Seamans

Inventor.

Harvey White.

per Hull, Lasso & Hull.

Atty.

(No Model.)

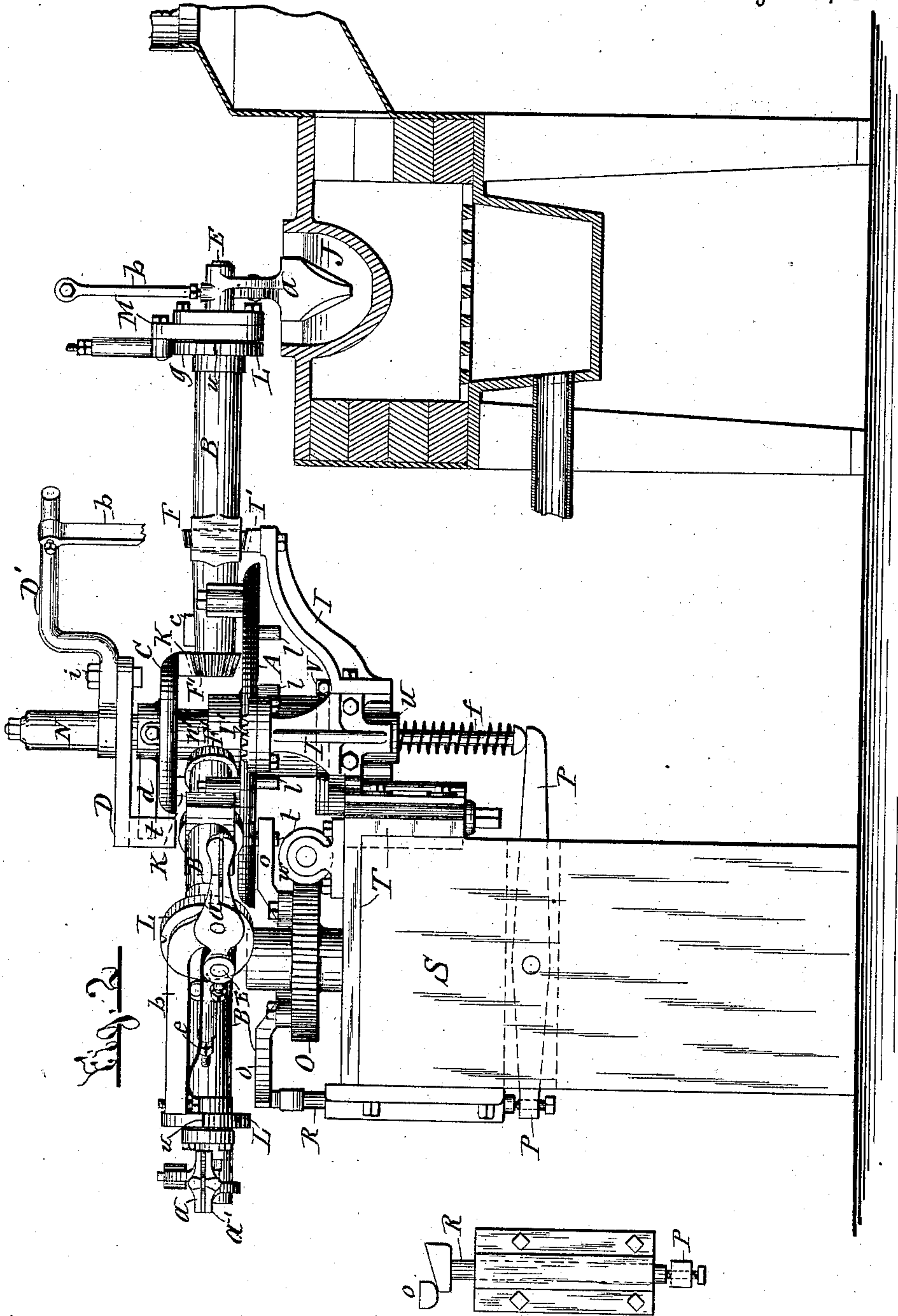
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Witnesses.

C. Bendigor

W. M. Seamans.

Fig. 14

Inventor.

Harvey White

per Hull, Laess & Hull

Atty



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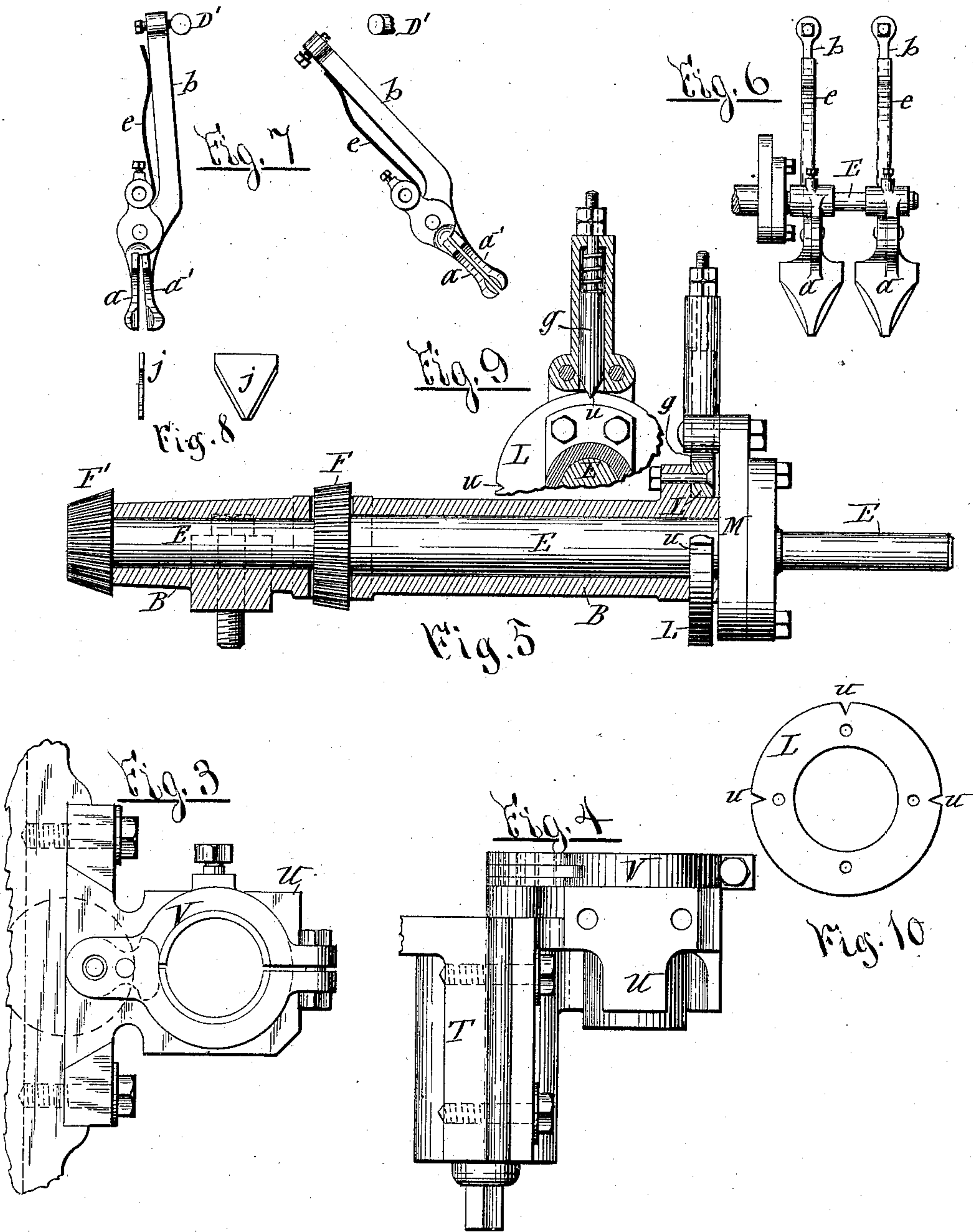
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Witnesses.

C. Burdison.  
W. M. Seaman.

Inventor.

Harvey White.

per. Hull, Lucas & Hull.  
his Atty.

(No Model.)

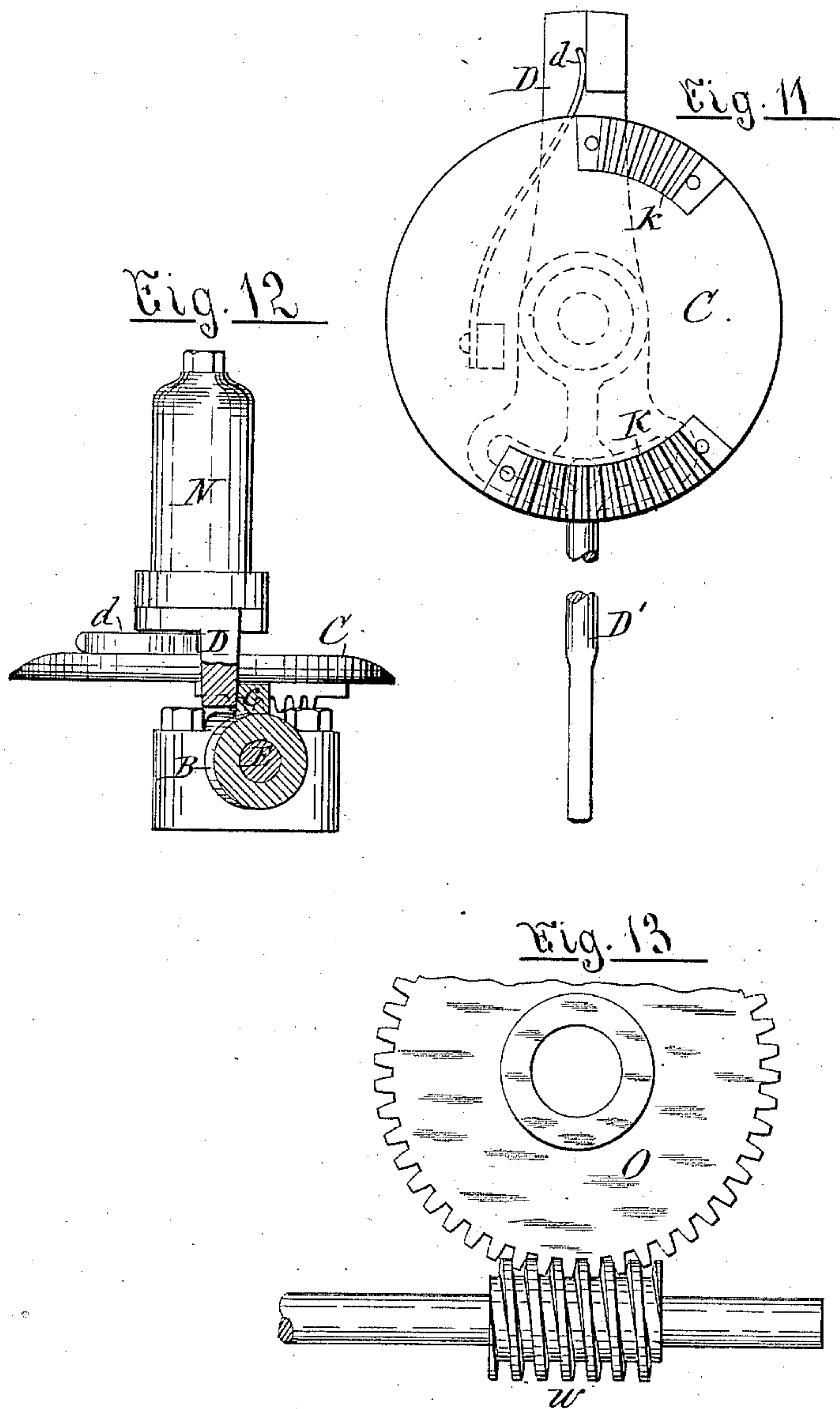
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Witnesses,

C. Bardixon,

N. M. Seamans,

Inventor,

Harvey White.

By his Attorneys Hull, Loomis & Hull

(No Model.)

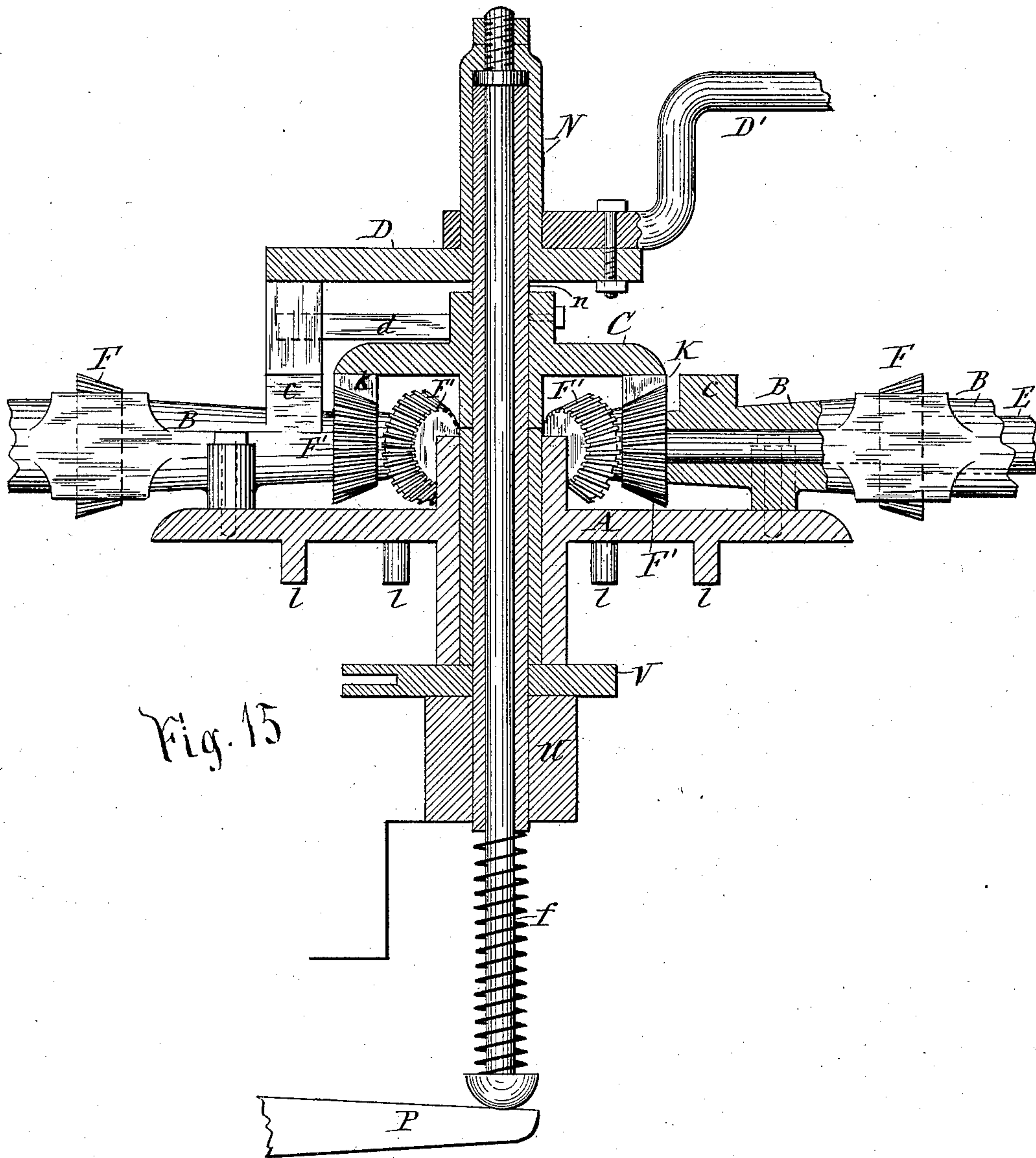
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WITNESSES:

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*N. M. Seamans.*

INVENTOR,

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ATTORNEYS.



# UNITED STATES PATENT OFFICE.

HARVEY WHITE, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE WHITMAN & BARNES MANUFACTURING COMPANY OF OHIO.

## MACHINE FOR HEATING AND HARDENING METAL ARTICLES.

SPECIFICATION forming part of Letters Patent No. 383,030, dated May 15, 1888.

Application filed June 6, 1887. Serial No. 240,402. (No model.)

*To all whom it may concern:*

Be it known that I, HARVEY WHITE, of Syracuse, in the county of Onondaga and State of New York, have invented new and useful  
5 Improvements in Machines for Heating and Hardening Metal Articles, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 This invention consists in a novel construction of a machine designed to be used in connection with an apparatus for heating mower and reaper knives or other metallic articles preparatory to either hardening the same or  
15 working them while hot.

The invention is fully illustrated in the annexed drawings, in which—

Figure 1 is a top plan view of a machine embodying my invention in connection with  
20 an apparatus for hardening mower and reaper knives. Fig. 2 is a side elevation of the same. Figs. 3 and 4 are enlarged detached plan and side views, respectively, of the main supporting-frame of the machine. Fig. 5 is an enlarged longitudinal sectional view of one of  
25 the arms which carry the holders or tongs by which the knives or other metallic articles are carried to and from the heater. Fig. 6 is a front view of a set of the aforesaid holders or tongs. Fig. 7 presents side views of the said tongs in different operative positions. Fig. 8 presents edge and side views of one of the knives adapted to be carried by the aforesaid tongs. Fig. 9 is a transverse sectional view of the de-  
35 vices for sustaining the tongs in their different positions in relation to the axis of their carrier. Fig. 10 is a detached face view of the locking-plate of the tongs-carrying shaft. Fig. 11 is an inverted plan view of the stationary plate to which one of the sets of segmental racks is attached. Fig. 12 is a detached side view of said plate with the pivoted tripping-arm in engagement with the lug of the arm which carries the tongs. Fig. 13 is a detached  
40 plan view of the gears which transmit motion to the machine. Fig. 14 is a detached side view of the tripping arm lifter, and Fig. 15 is a vertical transverse section of the central portion of the machine.

50 Similar letters of reference indicate corresponding parts.

S, Fig. 2, represents a stout rigid upright standard or post, on which is rigidly mounted the main supporting-frame of the machine, said frame consisting, mainly, of a plate, T, 55 extending across the top and down on one side of the post S, and from the vertical portion of said plate projects the vertical sleeve U, through which the upright tubular shaft *n* passes. A clamp, V, connected with the sleeve 60 and embracing the aforesaid shaft, serves to prevent the same from rotating.

On the sleeve N is journaled the turn-table A, which constitutes the pivoted support of the carriers which carry to and from the heater 65 the articles to be heated. Said carriers may be of any suitable form, preferably of the shape of arms B B, rigidly secured to the turn-table, and extending radially therefrom and provided with upward-projecting lugs *c c* at their inner 70 ends, for the purpose hereinafter explained. Longitudinally in the said arms are journaled the shafts E E, to the inner end of each of which is affixed a bevel-pinion, F', and another pinion, F, is secured to each shaft out- 75 side of the periphery of the turn-table A.

To the outer or free end of each shaft E is secured one or more holders or tongs adapted to carry the knives *j*, or other articles to be heated. I prefer to employ for said purpose 80 a jaw, *a*, firmly secured to the shaft E, and a jaw, *a'*, hinged to the aforesaid fixed jaw and provided with an elongated shank, *b*, Fig. 7. A spring, *e*, pressing against the back of the shank *b*, holds the tongs or jaws *a a'* normally 85 closed.

From the sleeve U or main supporting-frame project brackets I, Fig. 2, which carry on their free ends segmental racks I', Figs. 1 and 2, adapted to engage the under sides of the 90 pinions F. Above the turn-table A is a plate, C, Fig. 2, which is rigidly secured to the shaft *n*, and thus secured stationary in its position, and from the under side of said plate project segmental racks K K, adapted to engage the 95 upper sides of the pinions F' F'.

The turn-table A receives intermittent rotary motion by means of cams *o o*, projecting from the worm-wheel O and engaging successively the projections or lugs *l l* on the under 100 side of the turn-table, as shown in Fig. 2 of the drawings. A worm, *w*, engaging the wheel



O, imparts rotary motion to said wheel. The lugs *l l* correspond to the arms B B in regard to number and relative positions.

J represents the heater, which in this instance is represented in the form of a crucible containing melted lead, into which to immerse the knives to be heated; and W in Fig. 1 of the drawings denotes a water-tank, into which to precipitate the heated knives for the purpose of hardening the same. The said heater and tank are so situated as to bring the paths of the moving holders or tongs *a a' b* across the top thereof, and the segmental racks I' and K are arranged in such relative positions that on the approach of each arm B to the heater the rack I', engaging the pinion F, turns the shaft E so as to cause it to tilt the tongs *a a' b* into a vertical position, and thereby immerse in the melted lead of the heater the knife held by said tongs, as illustrated in Fig. 2 of the drawings. The motion of the machine is so timed as to produce the requisite intervals of motion to maintain the knife submerged the necessary length of time to heat the same to the required temperature. In the succeeding movement of the arm B the aforesaid rack and pinion impart another quarter-turn to the shaft E, and the tongs are carried, in the position indicated by dotted lines in Fig. 1 of the drawings, toward the tank W. In the movement of the arm B over the said tank the rack K, Figs. 2, 11, 15, engages the pinion F', and thereby turns the shaft E back a quarter-turn and thus brings the tongs again into a vertical position over the tank, into which the tongs are caused to automatically drop the heated knife by the following mechanism.

On one end of a lever, P, Figs. 2, 15, pivoted to the post S, rests a plunger, *f*, which is extended longitudinally through the tubular shaft *n*, on the upper end of which latter rides a sleeve, N, which is mounted loosely thereon. Said sleeve has rigidly attached to it or formed integral with it an arm, D, which terminates with a downward projection, *t*, adapted to engage with the lugs *c c* of the arms B B, and pressed toward the same by a spring, *d*, secured to the stationary plate C and pressing against the said arm D. From this arm is extended in opposite directions another arm, D', the free end of which reaches across the paths of the shanks *b b* of the tongs, Fig. 2. The engagement of the arm D with the lug *c* of one arm B prevents the arm D' from striking the shank *b* of the tongs on the diametrically-opposite arm B, and by lifting the arm D off from the lug *c* said arm is swung on its pivot by the force of the spring *d*, and in this movement the arm D' is caused to strike the shank *b* and thereby open the tongs and release the knife *j*, as represented at the left-hand portion of Fig. 7 of the drawings, and this is effected when the arm B is over the tank W. The arm D is lifted automatically over the lug *c* by the cams *o o*, passing over and depressing a push-bar, R, Fig. 2, which rides on the lever P at the end opposite to that which supports the plunger

*f*. The depression of the aforesaid push-bar R causes the lever P to push up the plunger *f*, and thereby lift the arm D, which is supported on the upper end of the plunger by means of the sleeve N, as hereinbefore described, Fig. 15.

In order to permit of properly adjusting the action of tongs-tripping arm D', I connect the same adjustably to the arm D by pivoting the former on the latter and providing the arm D with a segmental slot, *h*, for the reception of the bolt *i*, which passes through the arm D' and aforesaid slot and clamps the two arms together, Fig. 2.

To the free end of each arm B is firmly secured an annular plate, L, which is provided with notches *u u u* in its periphery, Fig. 2; and to the shaft E is rigidly attached a plate, M, to which is connected a suitable spring-actuated dog, *g*, adapted to engage the notches *u u u*, and thus partially lock the shaft E in its position, so as to enable it to resist the tendency of being turned by the pressure of the tripping-arm D' on the shank *b* of the tongs.

After the knife *j* has been dropped from the tongs into the tank W, the tongs are again turned into a horizontal position by the succeeding movement of the arm B, causing the rack I' to impart a quarter-turn to the pinion F. This brings the tongs into a convenient position to permit of inserting between the jaws *a a'* another knife to be hardened. In the next movement of the arm B the inner pinion, F', is caused to traverse a rack, K, Figs. 1 and 2, of sufficient length to impart a half-turn to the shaft E, and thus bring the tongs in proper position to enter the heater T by the subsequent engagement of the outer pinion, F, with the segment I'.

The machine is driven by a belt connecting a cone-pulley on the prime motor (not shown) with a cone-pulley, Y, on the shaft of the worm *w*, and by shifting said belt on the pulleys the motion of the machine can be regulated to the desired speed.

If desired, two or more holders or tongs may be connected with the shaft E, as represented in Fig. 6 of the drawings; hence I do not limit myself in this respect. Neither do I limit myself to the particular form of the tongs, as the same may have to be varied according to the shape of the articles to be held by said tongs. Neither do I wish to limit myself to the arrangement of the arms B B, extending radially from an intermittent rotary support, inasmuch as carriers of different forms, adapted to carry the articles to be heated, may be arranged to move automatically and intermittently toward and from the heater, either by a reciprocating motion or oscillatory motion.

What I do claim as new, and desire to secure by Letters Patent, is--

1. In combination with the heater, carriers mounted on a rotatory support and with their free ends in a path across the heater, holders or tongs connected to said carriers, and a trip-



per arranged in the path of the heater to automatically throw the heated articles from the holders, as set forth.

2. In combination with the heater, carriers 5 mounted on a rotatory support and with their free ends in a path across the heater, tongs connected to said carriers, spring holding the tongs normally closed, and a tripper in the path of the heater to automatically open said 10 tongs, as set forth.

3. In combination with the heater, a series of arms carried on a rotatory support and arranged with their free ends in a path across the heater, shafts journaled longitudinally in 15 said arms, pinions secured to said shafts, segmental racks adapted to mesh with said pinions, and holders or tongs secured to said shafts, substantially as and for the purpose set forth.

4. In combination with the heater, a series of arms carried on a rotatory support and with their free ends in a path across the heater, a corresponding series of projections on said support, a rotary cam arranged to successively 25 engage said projections, and holders carried on the free ends of the said arms and adapted to carry the articles to be heated, substantially as set forth.

5. The combination of a series of arms extended from a rotatory support, a corresponding series of projections on said support, a rotary cam arranged to successively engage said projections, shafts journaled longitudinally on the aforesaid arms, holders or tongs connected 35 to the outer ends of the said shafts, pinions secured to the inner end portions of the shafts, and two sets of segmental racks arranged to engage the pinions at diametrically opposite points thereof, and the racks of each set situated at different points in a circle concentric with the pivoted support of the aforesaid arms, 40 substantially as described and shown.

6. In combination with the arms extended from a rotatory support, and the normally-closed tongs having one of their respective 45 jaws locked on the free ends of said arms and the companion jaws hinged to the fixed jaws and provided with tripping-shanks, and an arm sustained across the path of the said tripping-shanks and by their encounter open the tongs, 50 substantially as set forth.

7. The combination of the turn-table A, the arms B B, projecting therefrom and provided with the lugs *c c*, the jaws *a a*, locked on the 55 free ends of said arms, the jaws *a' a'*, provided with the shanks *b b*, the plate C, arranged stationary above the turn-table, the arm D, supported movably vertically and pivoted above the plate C and adapted to engage the lug *c*, 60 the spring *d*, secured to the aforesaid plate and arranged to actuate the arm D, the arm D', extended from the arm D and reaching with its free end across the path of the shanks *b b*, and a lifter adapted to lift the arm D clear from 65 the lug *c*, substantially as and for the purpose set forth.

8. In combination with the frame H, the

turn-table A, the arms B B, projecting therefrom and provided with the lugs *c c*, the shafts 70 E E, journaled longitudinally in said arms and having affixed to them the pinions F F', the brackets I, having affixed to them the segmental racks I', adapted to engage the under side of the pinion F, the stationary plate C, having affixed to it the segmental racks K, adapted 75 to engage the upper side of the other of the aforesaid pinions, the jaws *a a*, rigidly attached to the outer ends of the shafts E E, the jaws *a' a'*, hinged to the said fixed jaws and provided with the shanks *b b*, the springs *e e*, holding the jaws normally closed, the pivoted arm 80 D, supported movably vertically and adapted to engage the lugs *c c*, the spring *d*, arranged to actuate the arm D, the arm D', extended from the arm D and reaching with its free 85 end across the path of the shanks *b b*, and the plunger *f*, adapted to lift the arm D, substantially as and for the purpose set forth.

9. The combination of the arm B, carried on a rotatory support, the shaft E, provided 90 with the pinions F F', the segmental racks I' and K, adapted to engage said pinions, respectively, at opposite sides, the locking-plate L, rigidly attached to the arm B, the plate M, fixed to the shaft E, and the dog *g*, connected 95 to the latter plate and adapted to engage the locking-plate at different points of the circumference thereof, substantially as described and shown, for the purpose set forth.

10. In combination with the arms B B, carried on a rotatory support and provided with 100 lugs *c c*, the shafts E E, provided with the pinions F F', the segmental racks I' and K, adapted to engage said pinions, respectively, at opposite sides, the jaws *a a*, fixed to said 105 shafts, the jaws *a' a'*, hinged and provided with the shanks *b b*, the locking-plates L L, rigid on the arms B B, the plates M M, fixed to the shafts E E, the dogs *g g*, connected to the latter plates and adapted to engage the locking- 110 plates, the stationary plate C, the arm D, pivoted above said plate and movable vertically and adapted to engage the lugs *c c*, the spring *d*, arranged to actuate the arm D, the arm D', extended from the aforesaid arm and having 115 its free end in the path of the shanks *b b*, and the plunger *f*, adapted to lift the arm D and throw the same out of engagement with the lug *c*, substantially as described and shown.

11. In combination with the arms B B, carried on a rotatory support, and the jaws *a a'*, 120 carried by said arms and provided with the shanks *b b*, the spring-actuated pivoted arm D, provided with the slot *h*, the arm D', provided on the arm D, and the clamping-bolt *i*, passing 125 through the arm D' and slot *h* and adjustably securing the two arms to each other, as described and shown.

12. The combination of the tubular shaft *n*, turn-table A, provided with the projections *l* 130 *l*, arms B B, extended from said turn-table and provided with lugs *c c*, tongs *a a' b*, carried by said arms, the plunger *f*, extending longitudinally through the shaft *n*, the sleeve N,



riding on the upper end of said plunger and  
having rigidly secured to it the arm D, adapt-  
ed to engage the lugs *c c*, the arm D', extended  
from the arm D and adapted to trip the tongs,  
5 the wheel O, having affixed to it the cams *o o*,  
the pivoted lever P, having one end under the  
plunger *f*, and the push-bar R, riding on the  
opposite end of said lever and arranged in the  
path of the cams *o o*, to be actuated thereby,  
10 substantially as described and shown.

In testimony whereof I have hereunto signed  
my name and affixed my seal, in the presence  
of two attesting witnesses, at Syracuse, in the  
county of Onondaga, in the State of New York,  
this 2d day of June, 1887.

HARVEY WHITE. [L. S.]

Witnesses:

ROYAL H. THOM,  
L. J. WELLS.