

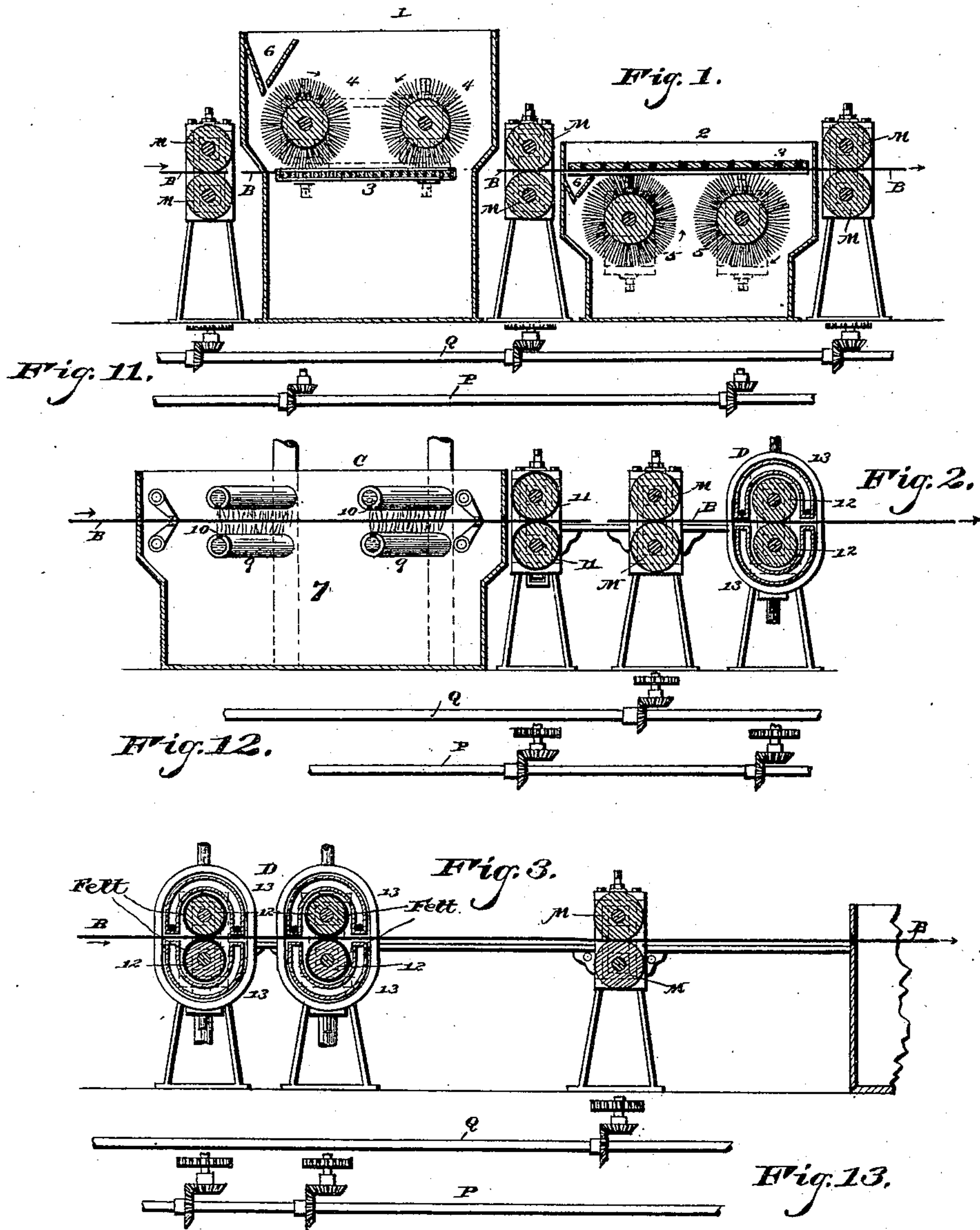
(No Model.)

3 Sheets—Sheet 1.

S. Y. BUCKMAN.  
APPARATUS FOR COATING METAL PLATES.

No. 451,264.

Patented Apr. 28, 1891.



WITNESSES:  
*L. Douville*  
*Robt. Aiton*

INVENTOR.  
*Samuel S. Buckman*  
BY *James D. Searles*  
ATTORNEY.

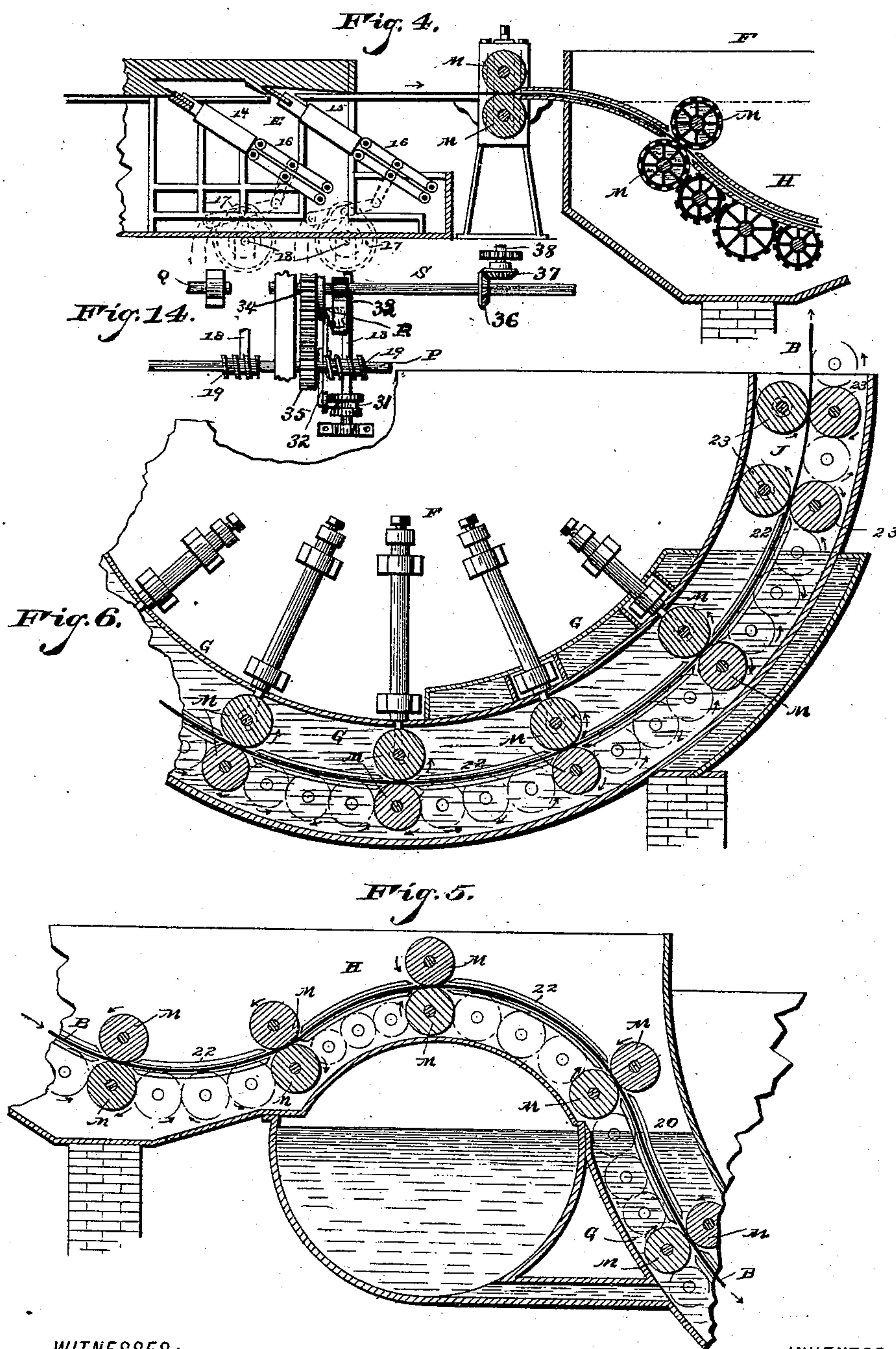
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Samuel S. Buckman.  
BY *John A. Diersheim*  
ATTORNEY.



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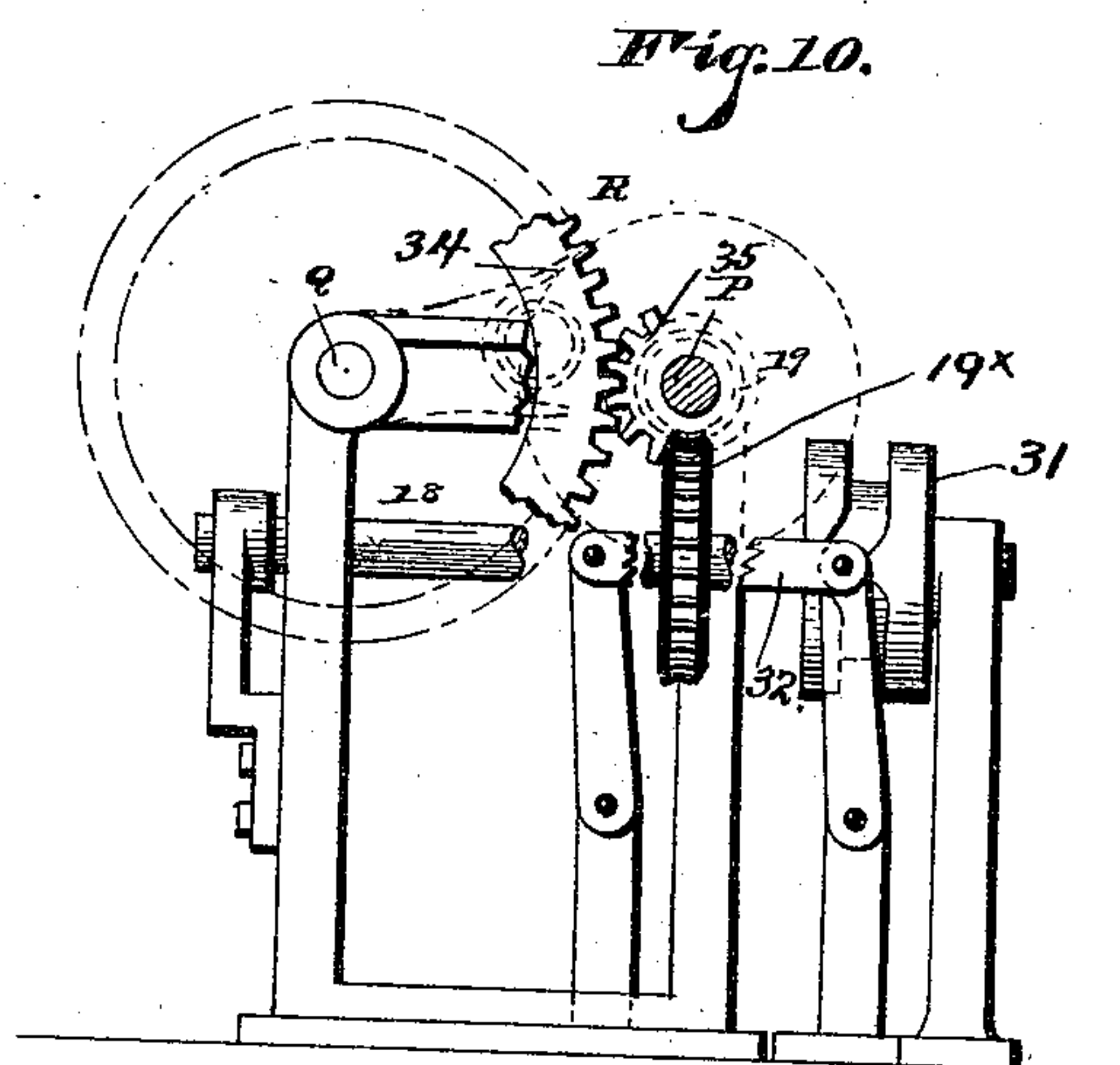
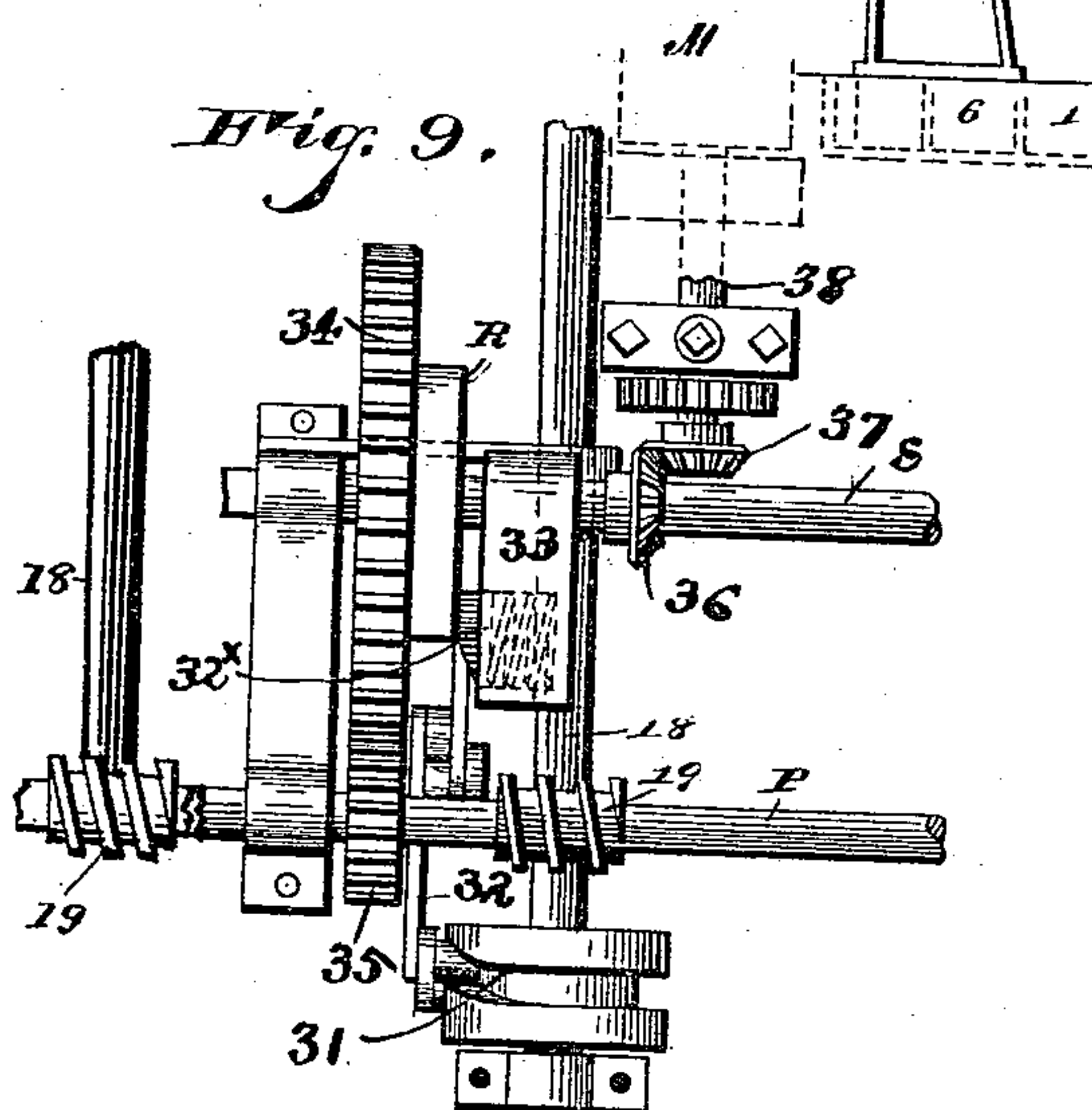
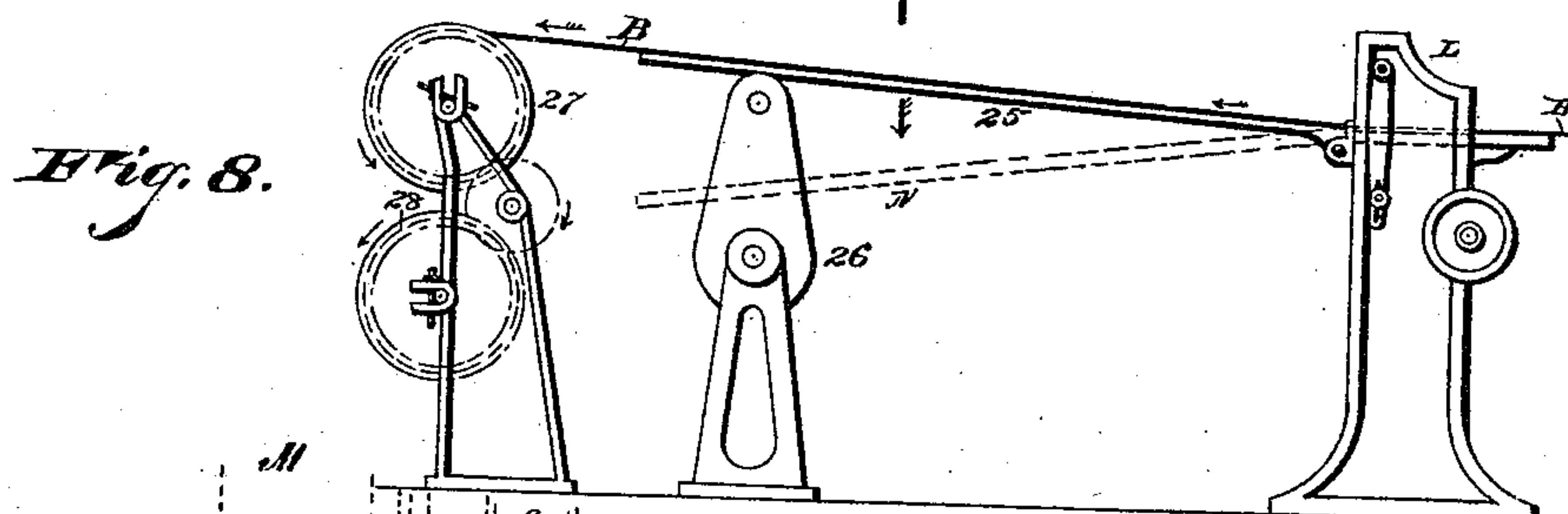
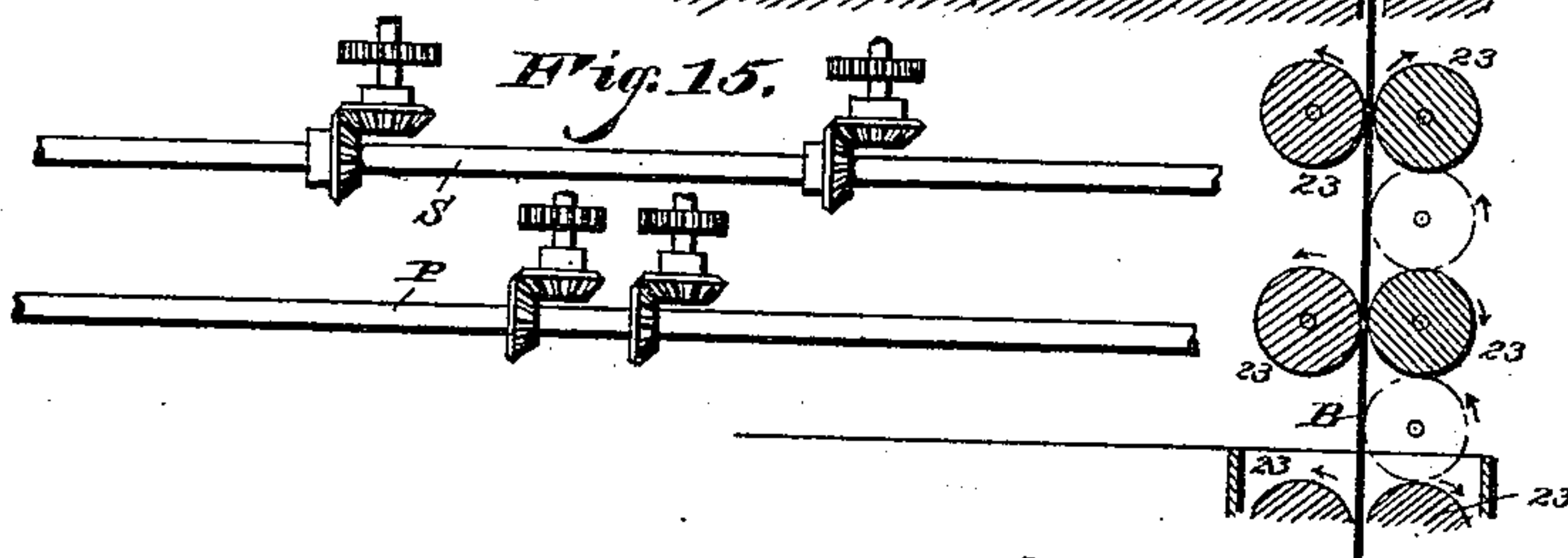
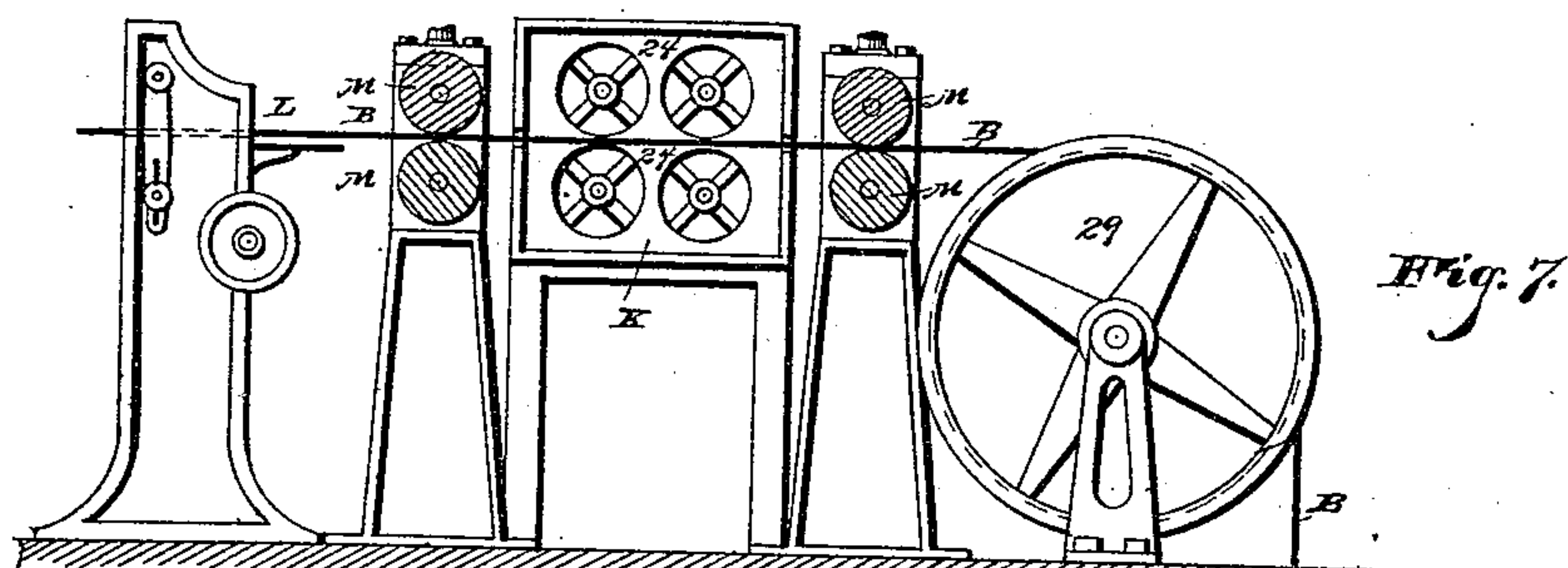
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# UNITED STATES PATENT OFFICE.

SAMUEL Y. BUCKMAN, OF PHILADELPHIA, PENNSYLVANIA.

## APPARATUS FOR COATING METAL PLATES.

SPECIFICATION forming part of Letters Patent No. 451,264, dated April 28, 1891.

Application filed October 2, 1890. Serial No. 366,909. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL Y. BUCKMAN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Coating Metal Plates with Tin or Alloys Thereof, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to improvements in apparatus for coating sheet-metal plates with tin or alloys thereof; and it consists of an apparatus composed of devices each of which is adapted to perform a separate step in the process, the respective devices having operating mechanisms so connected that the plates to be coated are received at one end of the apparatus and automatically passed through the same, being cleansed, united, coated, burnished, and wound in rolls of such lengths as desired.

It further consists of the combinations of parts, substantially as hereinafter described.

Figures 1, 2, 3, 4, 5, 6, 7, and 8 represent a vertical section of an apparatus for coating sheet metals embodying my invention. Fig. 9 represents a plan view of a section of the main shaft and a secondary shaft with connecting gearing and clutch. Fig. 10 represents an end view of the parts shown in Fig. 9. Figs. 11, 12, and 13 represent plan views of the main and a secondary driving-shaft for the operating mechanism of the cleansing and drying devices and the feed-rollers. Fig. 14 represents a plan view of main and secondary shafts with operating mechanisms for the edging device. Fig. 15 represents a plan view of operating mechanism for the burnishing device.

Similar letters and numerals of reference indicate corresponding parts in the several figures.

Referring to the drawings, A designates a scouring device, the same consisting of two boxes 1 and 2, having the guides 3 therein, in which the plates B to be coated are held while being passed through the device. The said boxes are provided with rotary brushes 4 4 and 5 5, as shown, the brushes of each set rotating in opposite directions.

6 6 designate chutes leading into the boxes 1 and 2 for conveying sand or other scouring material to the brushes.

C designates a spraying device consisting of a box 7, having openings in its ends for passing the plates of metal into and from the same, and above and below the guides 8 therein are pipes 9 9, having perforations 10, so that water fed from any suitable supply can be sprayed on both sides of the plate at the same time.

B designates a drying device consisting of drying-rollers 11 11, having a rubber coating, and the felt-covered rollers 12 12, each of the latter having steam-jackets 13 for drying the said felt covering.

The above parts—viz., the scouring, spraying, and drying devices—are not more specifically described herein, being *per se* no part of this invention, and the same are more fully described and claimed in an application for Letters Patent for improvement in apparatus for cleansing sheet-metal plates, filed September 11, 1890, Serial No. 364,689.

E designates an edging or folding device for securing the ends of the plates of sheet metal together, so as to form a continuous sheet of the same, and consists of two formers 14 15, provided with toggle-levers 16 16, which are operated by the rotation of the cams 17 17 on the shafts 18 18, so as to force the formers against the rear end of the front plate and the front end of the rear plate in such manner as to form bent portions adapted to be hooked together and seamed when brought into contact. Worm-wheels 19<sup>x</sup> on the said shafts 18 engage with worms 19 on the main shaft P of the apparatus for operating said shafts 18, and thereby the cams 17. This specific edging device, *per se*, is also made the subject of a separate application, and is not, therefore, more fully described herein, being completely set forth, illustrated, and claimed in an application for Letters Patent, Serial No. 369,160, filed October 24, 1890.

F designates the coating device, consisting of a dipping-pot G, having an entrance-limb 20 and an exit-limb 21, with the guides 22 therein. A grease bath H receives the sheet before its passing into the limb 20, and a grease bath J is adapted to receive the said sheet, if necessary, as it leaves the pot. Squeezing-rollers 23 regulate the thickness of the coating as the sheet emerges from the coating material.



The dipping-pot herein shown is described and claimed in an application made by me of date August 30, 1890, Serial No. 363,498.

K designates a burnishing device consisting of a number of wheels 24, suitably mounted and having a peripheral surface adapted to polish or burnish the faces of the coated sheet.

L designates a cutting device, which is provided with suitable operating mechanism of any well-known character, and which being of any ordinary construction is not more fully described herein.

N designates a device for reeling the sheets when cut on two separate drums, and consists of a pivoted table 25, on which the sheet is adapted to travel, and which rests upon a rotary eccentric or cam 26 on a shaft operated by the main driving-shaft and adapted to raise or lower the table, so that the sheet thereon may be fed alternately to either an upper drum 27 or to a lower drum 28. Placed convenient to the several named devices are adjustable feeding-rollers M of any well-known construction.

The scouring, drying, coating, edging, burnishing, cutting, and reeling devices herein described are each connected with the main driving-shaft P, so as to be operated thereby, and the feeding-rollers M, in advance of the edging device, are operated from a secondary driving-shaft S, having a clutch R, with operating mechanism consisting of a grooved cam-wheel 31 on the shaft 18, a pivoted lever 32, having an end connected with and operated by the rotation of said wheel 31 and an end connected with and operating a detent 32<sup>x</sup>, fitted in the sleeve 33 of the clutch mechanism, said sleeve being fixed on the secondary shaft S, so as to rotate therewith. A loose gear-wheel 34, mounted on the said shaft S, meshes with a gear-wheel 35, rotatably secured to the main shaft P. A bevel gear-wheel 36, mounted on the shaft S, meshes with the bevel gear-wheel 37 on the shaft 38 of feed-roller M, and thereby operates the same. It will be seen that as the detent 32<sup>x</sup> is moved so as to engage with the clutch R the shaft S is rotated by the rotation of the main shaft P, and when the said detent is disengaged from said clutch the shaft S does not receive motion. The feeding-rollers M, in the rear of the edging device, are operated from a secondary shaft Q, which also has a clutch connection (not shown) with operating mechanism connected with the main shaft similar to the clutch connection and operating mechanism hereinbefore described, said parts being so timed and connected as to automatically and consecutively operate the several parts, as follows: A plate of sheet metal is passed between the feed-roller M at one end of the apparatus, and so enters the scouring device, being held in the guides thereof. The advance end of the plate passing from the said scouring device is drawn into the spraying and then into the drying

devices, after which it is passed to the edging or folding mechanism. The advance plate is passed through the said folding device until its rear end is above the second former 15, when the front end of the following plate is above the former 14, each succeeding plate being fed at such intervals to the apparatus. The secondary shafts Q and S, which operate the feeding-rolls so as to advance the plates, are then stopped by means of their clutch connections, and the mechanism operating the formers are then put in motion, so as to open the toggle-levers 16 and force the formers 14 15 in contact with the respective ends of the plates, so as to form hooks on the same, as shown in Fig. 4. The formers are then lowered, so as to be free from the plates, and the shaft Q is again put in operation, so that the rear plate is advanced until its hooked front has reached the hooked rear end of the first plate, when it readily unites with the same. The secondary shaft S is then operated by means of its clutch-connection with the main shaft, so as to advance the sheet thus formed. It will be seen that the clutch mechanism of the shaft Q is so operated as to connect its shaft with the main shaft slightly in advance of the time of the operation of the clutch of the shaft S, so as to advance the rear plate and permit its union with the front plate before the feed-rollers advance the sheet thus formed. The sheet is now advanced until the end of the rear plate is above the former 15, when the shafts Q and S are stopped. In the meantime the first plate of the sheet has passed through the grease bath H and into the dipping-pot, and a new plate has been fed to the scouring device. When the rear end of the sheet is above the former 15, the front end of the new plate is under the former 14, whereupon the operation is the same as has been described. The sheet on leaving the dipping-pot is squeezed between the rollers 23, so as to regulate the thickness of the coating, and is then passed into the cooling and burnishing chamber K, after which it is passed through the cutting device L and along on a pivoted table 25, on which it is guided to either one of two drums 27 or 28, according as the table is raised or lowered by the rotary cam 26. It is wound on said drums in lengths cut by the cutting device L, according as desired, and which may be regulated by any ordinary mechanism suitable for that purpose.

The devices herein described are placed in the order as shown, and may be either on the one floor or ground or on different floors, as shown in the drawings, the devices in Figs. 7 and 8 being on an upper floor, the sheet B passing over a carrier-wheel 29 to the burnishing device. The shafts which operate the mechanisms on the said upper floor are connected with the main shaft, so as to be rotated thereby.

In the drawings the operating mechanisms for the cleansing, drying, and reeling devices



are shown as connected with the main driving-shaft; but it is evident the said devices may be operated by mechanisms connected with the secondary or other suitable driving-shafts, such last mechanisms not being claimed herein, and, forming no part, *per se*, of this invention, are not shown or described herein, as any well-known or usual mechanism can be used.

10 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An apparatus for cleansing metal plates, connecting successive plates, and coating the  
15 sheet thus formed with tin and alloys thereof, having cleansing, edging, coating, burnishing, cutting, and reeling devices, feed-rollers in front and rear of said edging device, separate mechanism connected with a main driving-shaft for operating the edging device independent of the feed-rollers, and mechanism  
20 connected with the main shaft for operating the feed-rollers, said parts being combined and arranged in the order named, substantially as described.

2. In an apparatus for the purpose set forth, the combination of cleansing, edging, and coating devices, feed-rollers in front and rear of said edging device, a main driving-shaft,  
30 mechanism connected therewith for operating the feed-rollers, and separate mechanism also connected with the main shaft for operating the edging device, substantially as described.

3. An apparatus for the purpose set forth,  
35 having devices for cleansing sheet-metal plates, an edging device for connecting successive plates together, a coating device, and feed-rollers in front and rear of said edging device, said rollers having operating mechanism including clutch connections with a main shaft, and said connecting or edging devices  
40 having separate operating-shafts, said parts being combined and arranged substantially as described.

4. An apparatus for coating metals with tin and alloys thereof, having cleansing, edging, coating, and burnishing devices, feed-rollers in front and rear of said edging device, separate operating mechanisms for said  
50 cleansing, edging, coating, and burnishing devices connected with a main shaft, a secondary shaft for a part of the feed-rollers, and another secondary shaft for the other feed-rollers, each of said secondary shafts having  
55 a clutch connection with the main shaft, said parts being combined and arranged in the order substantially as described.

5. An automatic tinning plant consisting of a cleansing device, an edging device, a  
60 coating device, and a burnishing device, feed-rollers in front and rear of said edging device, a main driving-shaft, secondary shafts for operating the edging device, with mechanism uniting them with the main driving-shaft, and separate secondary shafts having  
65 clutch connection with the main driving-shaft for operating the feed-rollers in front and rear

of the edging device, said parts being combined and arranged in order substantially as described.

6. An apparatus for coating sheet metal with tin or alloys thereof, having a cleansing, an edging, a coating, and a burnishing device, and feed-rollers in front and rear of said edging device, said cleansing and burnishing  
75 devices having separate operating mechanisms connected with a main shaft, and the feed-rollers having a secondary driving-shaft with a clutch connection with the main shaft, said parts being combined and arranged in  
80 order substantially as described.

7. An apparatus for coating sheet metal with tin or alloys thereof, having cleansing, edging, coating, burnishing, and rolling devices, feed-rollers in front and rear of said  
85 edging device, operating mechanisms for said devices connected with the main shaft, and secondary shafts for the rollers having clutch connections with the main shaft, said parts being combined and arranged in order sub-  
90 stantially as described.

8. An automatic apparatus for coating sheet metal with tin or alloys thereof, having cleansing, edging, coating, and burnishing  
95 devices, feed-rollers in front and rear of said edging device, a main driving-shaft, and mechanisms connected with the main shaft for operating said cleansing, coating, and burnishing devices, and separate mechanisms for operating said edging device, said  
100 parts being combined and arranged in order so as to automatically and consecutively perform said operations of cleansing, edging, coating, and burnishing, substantially as described.

9. An automatic tinning plant consisting of a cleansing device, an edging device, and a coating device, feed-rollers in advance of said cleansing device, and other feed-rollers  
110 in front and in rear of said edging device, operating mechanism for said edging device connected with the main driving-shaft, and separate secondary shafts having clutch connection with the main driving-shaft for operating the feed-rollers in front and in rear  
115 of the edging device, said parts being combined and arranged in order substantially as described.

10. A tinning plant consisting of cleansing, edging, coating, burnishing, and reeling  
120 devices, feed-rollers, a main driving-shaft, and mechanism connected with said cleansing, edging, and burnishing devices for operating the same, secondary shafts for operating the sets of feed-rollers in advance and in rear of  
125 the edging device, and separate clutch mechanism for connecting each of said secondary shafts with said driving-shaft, said parts being combined and arranged in order substantially as and for the purpose set forth.

SAMUEL Y. BUCKMAN.

Witnesses:

JOHN A. WIEDERSHEIM,  
A. P. JENNINGS.