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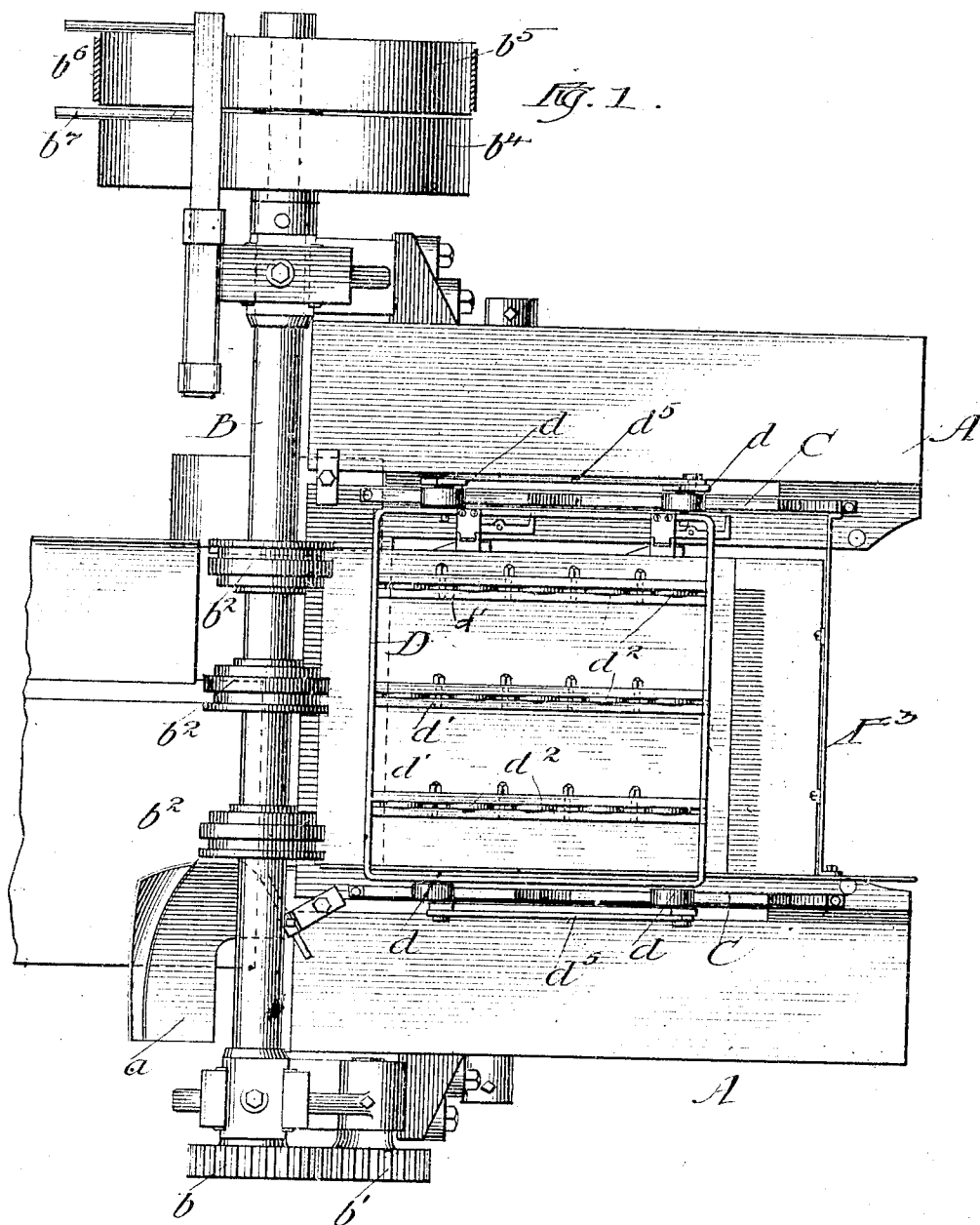
F. McINTYRE.

PATENTED JAN. 7, 1908.

MACHINE FOR FEEDING SHEETS OF METAL, &c.

APPLICATION FILED SEPT. 14, 1906.

8 SHEETS—SHEET 1.



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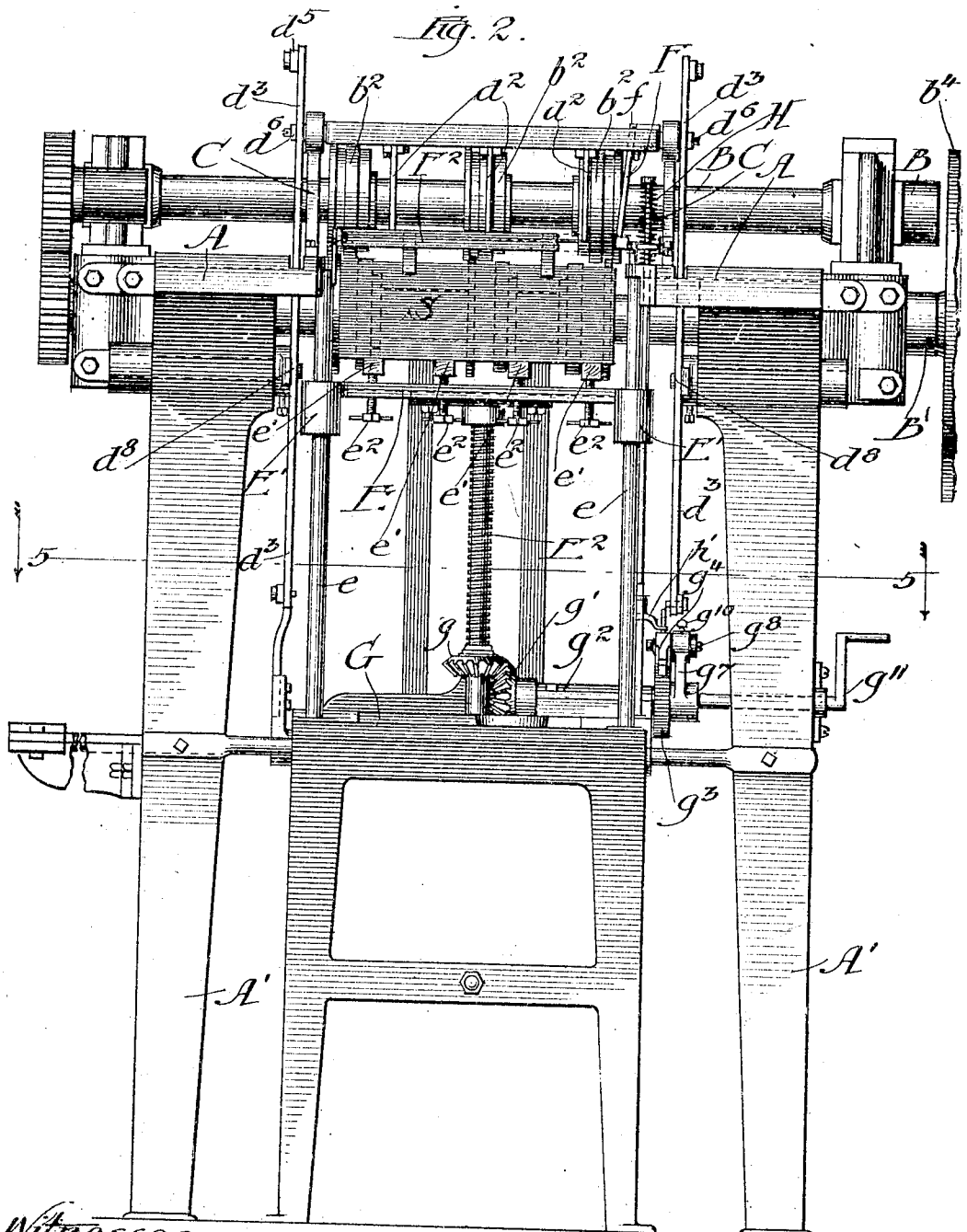
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6 SHEETS—SHEET 2.



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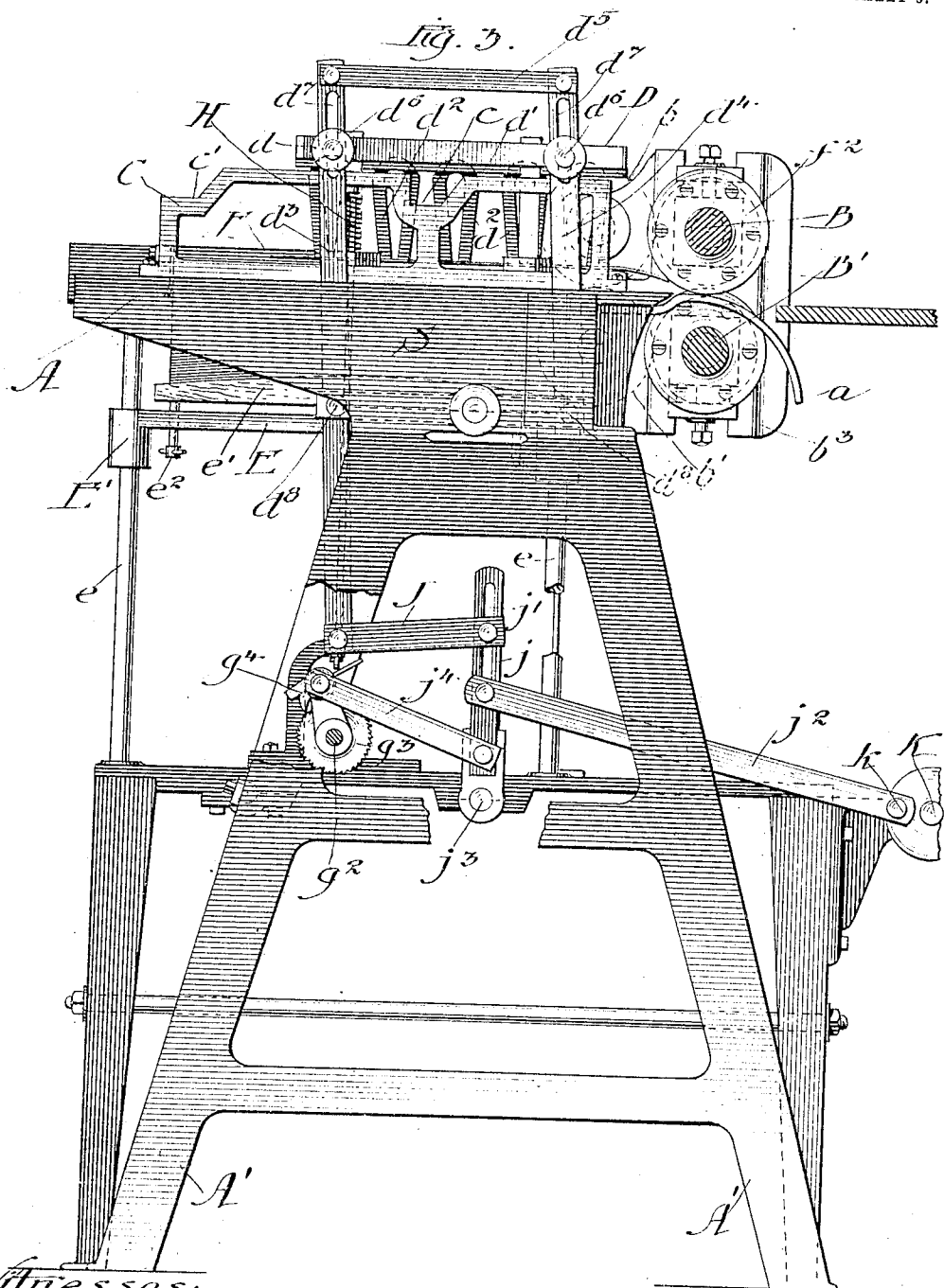
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6 SHEETS—SHEET 3.



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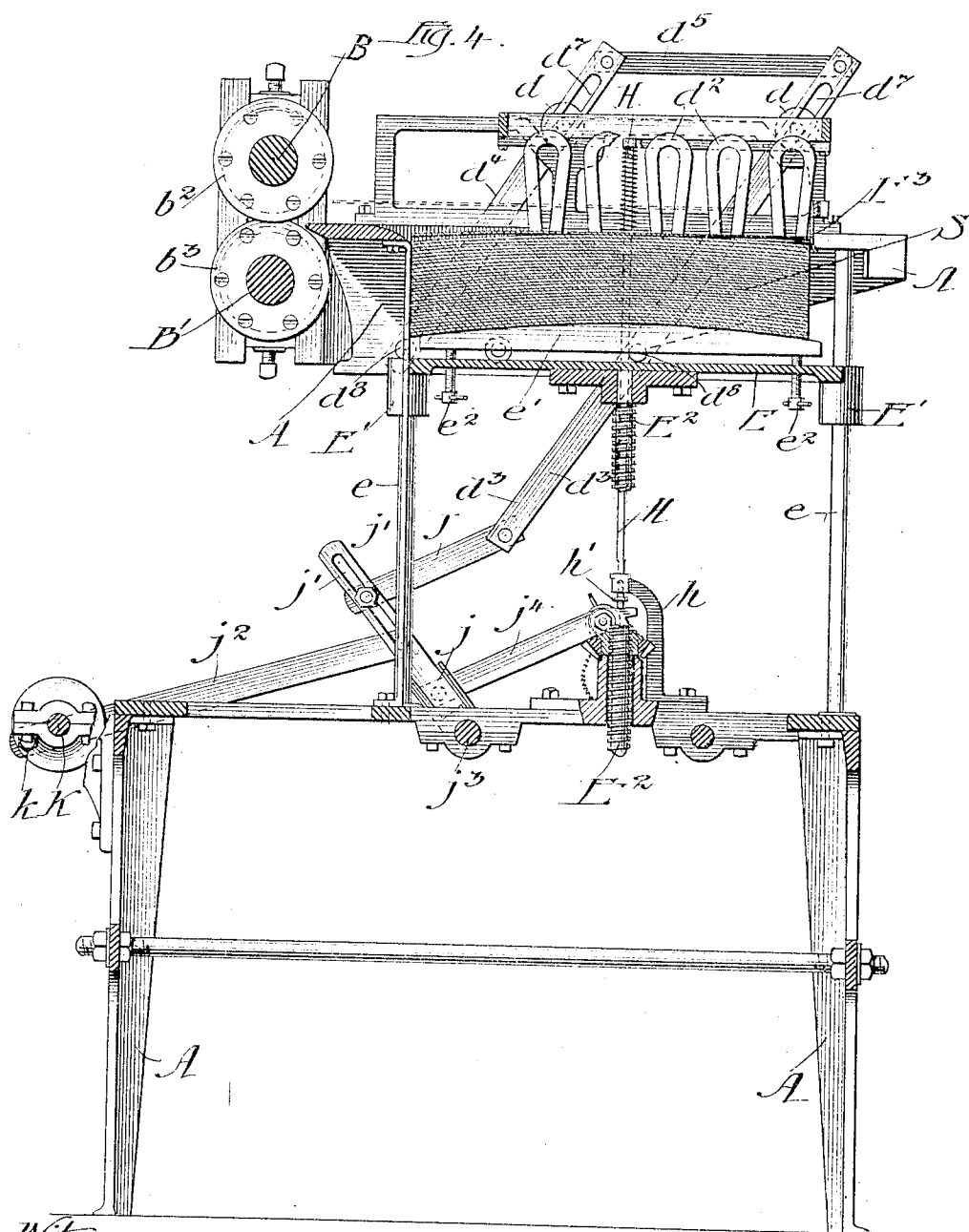
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6 SHEETS—SHEET 4.



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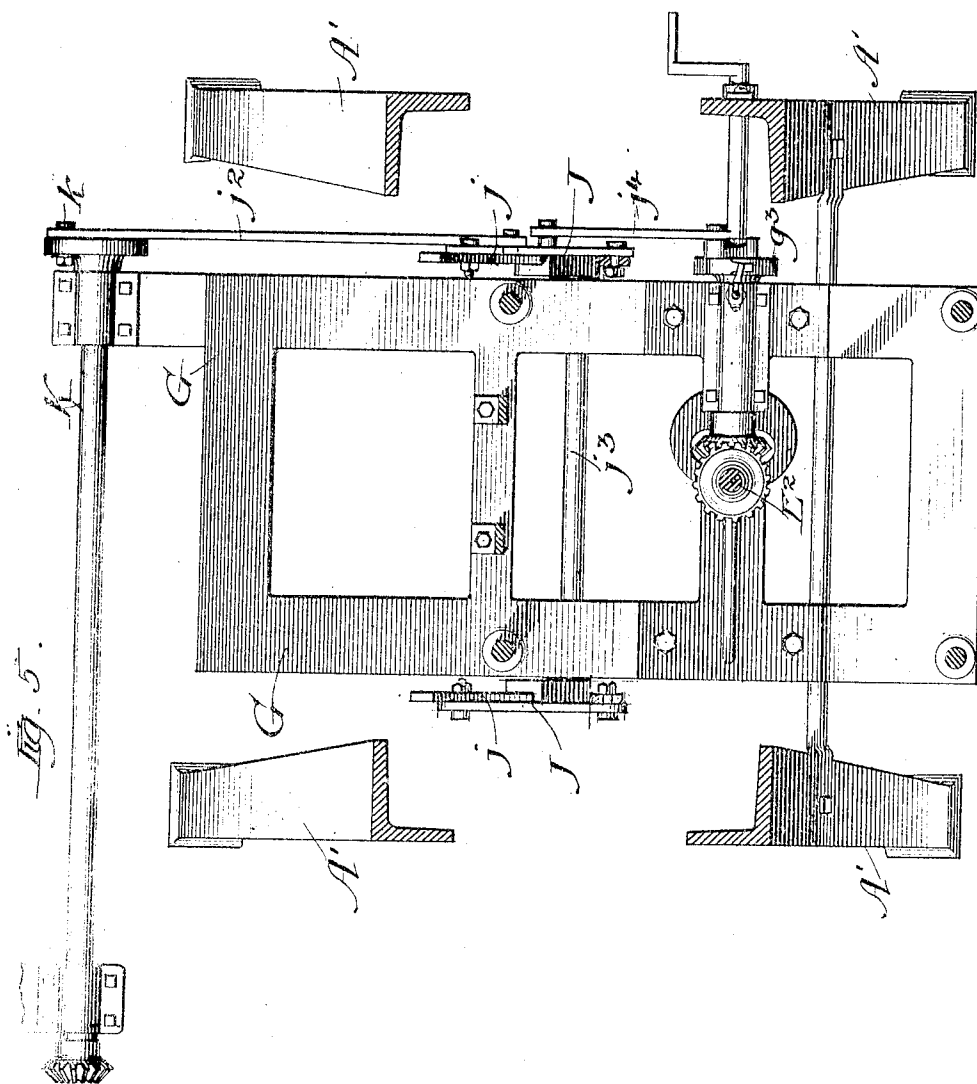
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6 SHEETS—SHEET 5.



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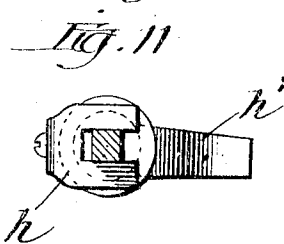
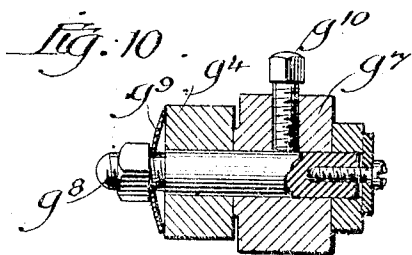
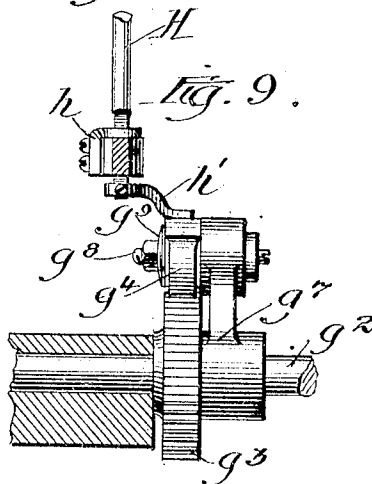
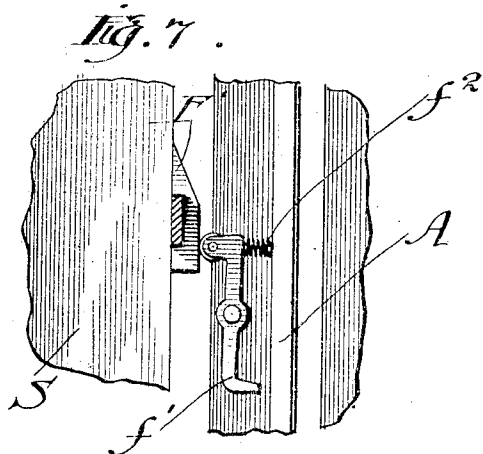
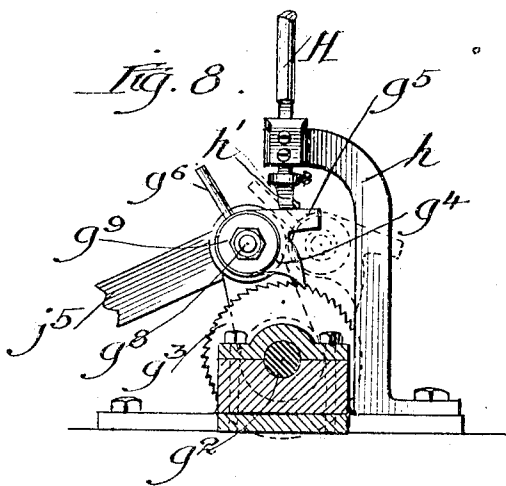
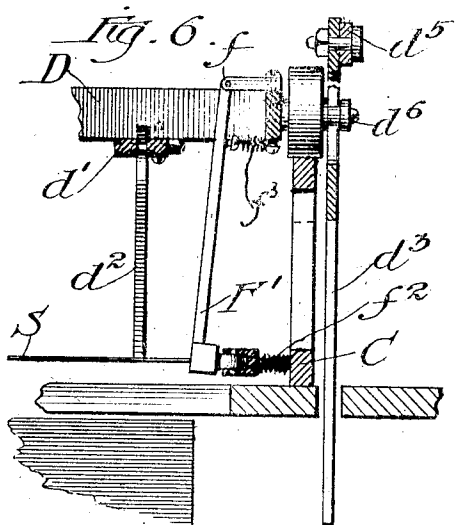
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PATENTED JAN. 7, 1908.

MACHINE FOR FEEDING SHEETS OF METAL, &c.

APPLICATION FILED SEPT. 14, 1906.

6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

FINLAY MCINTYRE, OF CHICAGO, ILLINOIS.

MACHINE FOR FEEDING SHEETS OF METAL, &c.

No. 875,837

Specification of Letters Patent.

Patented Jan. 7, 1908.

Application filed September 14, 1906. Serial No. 334,673.

To all whom it may concern:

Be it known that I, FINLAY MCINTYRE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Feeding Sheets of Metal and the Like; and I do hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings.

10 This invention relates to machines for feeding sheets of metal and the like, and has particular reference to machines for feeding sheets of tin plate.

15 The common usage of the present time is to handle metal sheets by hand in feeding them to slitters, formers or other metal working machines. This method is expensive and disagreeable by reason of the physical discomfort in handling sharp edged metal sheets.

20 My purpose in this invention is to take boxes of tin plate as they come from the factory, knock the box from around them, and place the sheets in the machine without disturbing the pile or further handling except for cleaning purposes.

25 My feeding mechanism is applicable to any form of machine for working sheets of metal and the like, and while I herein describe it in its application for slitting machines, I would not be limited in the scope of my invention by so doing.

30 My invention consists, first, in an automatic device for carrying the sheets of metal and the like separately to the metal working machine.

35 It consists, second, in the mechanism for automatically elevating a plurality of sheets of metal and the like to a position wherefrom they may be successively picked up by the said carrying mechanism.

40 It consists, third, in the various novel devices and combinations of the same nature, herein illustrated and described, together with their mechanical equivalents, and pointed out with more particularity in the claims appended hereto.

45 In the drawings, Figure I represents a plan view of my device. Fig. II is an elevation taken from the end opposite the cutting rolls. Fig. III is an elevation of one side, and Fig. IV an elevation of the opposite side, parts being broken away in each view to better expose the mechanism. Fig. V is a sectional plan view taken through the line 5 of

Fig. II. Figs. VI to XI inclusive show enlarged details of my device.

More particularly described, A represents the frame of my machine, supported by the standards A' A'. To the forward end of my machine is journaled parallel shafts B, B', which carry at one end gears b and b' respectively. The gears b and b' mesh, thereby giving the shafts B and B' coincident movement. Upon the shafts B and B' are mounted cutting rolls of any desirable form, b^2 and b^3 respectively, which rolls serve the purpose of slitting the sheets fed into them by the feeding mechanism hereinafter described. Upon the shaft B' opposite the gear b' is mounted the belt pulley b^4 , through which the power is transmitted to the shafts B and B' and the cutting rolls b^2 and b^3 . The shifting pulley b^5 rotates freely upon the shaft B' and is intended to hold the power belt b^6 when the cutting rolls are at rest. A shifting fork b^7 of usual construction is provided to move the belt b^6 from pulley b^5 to pulley b^4 and back again.

A guide a is provided at the forward end of the machine to carry away the waste of the sheet in slitting.

My feeding mechanism I describe as follows:—Upon the frame A, at right angles to the cutting roll shafts B and B', I construct parallel roller tracks C C. These tracks are provided with recess c and the slope c' . The forward wall of the recess c or the one nearest the cutting rolls b^2 , b^3 is sloping, while the rear wall or the one farthest removed from the cutting roll is perpendicular or nearly so. The angle of the slope c' is of the same pitch as that of the said forward wall of the recess c .

A roller rack D is provided fitted with rollers d d d d , opposed to and engaging with the tracks C, C. The rack D is provided with slotted cross arms d' d' , which carry secured thereto the magnets d^2 d^2 . A rocking frame consisting of uprights d^3 and d^4 , joined at the top by the cross arm d^5 is secured to either side of the rack D, and is designed to move the same along the track C. The securing of the said rack D to the said frame is effected by the sliding engagement of the pins d^6 , projecting from the sides of the said frame, with the elongated slots d^7 d^7 in the upper ends of the arms d^3 and d^4 . This sliding engagement is necessary to allow the rack D to slide along the track C while the moving frame rocks on a pivot. The said

frame is pivoted to the machine at the points d^3 . The uprights d^3 project some distance below the lower end of the uprights d^4 , and are designed to be joined by a series of levers to the power of the machine. The table upon which the sheets to be slit are placed consists of the square bed E, which is fitted at its corners with sleeves E' , which have sliding engagement with the upright rods e, e . Upon this bed E are placed the ribs $e' e' e'$, adjustably connected therewith by the adjusting screws $e^2 e^2$. These ribs $e' e'$ are so constructed that the upper face slopes upward toward the center of the length, and upon these ribs the sheets are intended to rest. The sloping upward allows the top sheets of the pile placed upon the table to separate from the others at the ends, as the tendency of a single sheet of metal is to rest flat and not bend to the conformation of its resting place, as will a pile of sheets. This insures the ready lifting of the single sheet by the magnets $d^2 d^2$.

In operation the uprights d^3 and d^4 rock on their pivots d^3 and carry the rack D along said track C until the rollers $d d$ engage the slopes of the recesses c and c' , when the rack D drops into said recesses and the magnets $d^2 d^2$ engage the sheets to be slit. The uprights d^3 and d^4 then rock in the opposite direction and carry the rack D out of the recesses c and c' , and forward along the track C, thereby lifting one sheet S, and carrying it forward to the cutters b^2 and b^3 which engage the sheet and disengage it by force from the magnets $d^2 d^2$.

In the operation of picking up the sheet S by the magnets $d^2 d^2$, the position of the sheet is liable to be shifted and the edge of the sheet not be presented at right angles to the said cutting rolls. I therefore provide a means of guiding the sheet accurately to the said cutting rolls, to-wit:—On one side of the frame A of the machine I provide a fixed channel guide F and opposed to one side edge of the said sheet. On the opposite side of the machine and opposed to the other side edge of the sheet I provide a swinging arm F' pivoted to the rack D at f . The lower or free end of the arm F' engages the roller faced dog f' which is pivoted to the frame A. This dog is normally held pressed inward toward the sheet S by a small spring f^2 . The small spring f^3 serves to normally hold the arm F' outward from the sheet S. The arm F' moving with the rack D engages the dog f' , by which engagement it forces the sheet S against the guide F and the sheet S is presented to the cutting rolls at right angles. A back guide F^2 is fixed to the frame of the machine and is designed to act as a stop at the rear of the said sheets, to prevent them from slipping backwards.

In the construction of the feeding mechanism, it is seen that the magnets will pick up

the sheets at levels varying in range from the level of the track C to the level of the recesses c and c' . I must therefore provide means for elevating the sheets within the said range of the magnets just described. I provide a screw E^2 , one end of which is rigidly secured to the bottom face of the table bed E. This screw projects downward and engages the mechanism fixed to the lower bed G of the machine. This mechanism consists first of a nut g which engages the screw E^2 . Upon the outer face of the nut g is cut a bevel gear which meshes with another gear g' , fixed to a shaft g^2 extending to the side of the frame A. Upon this shaft g^2 is fitted a ratchet wheel g^3 . Opposed to the said ratchet wheel is a pawl g^4 , which is secured to an arm g^7 which is rotatably connected to said shaft g^2 . The connection of the said pawl with the said arm is constructed as follows. Through a perforation in the arm g^7 I pass a headed bolt g^8 and upon it against the outside face of the pawl g^4 I place a spring disk g^9 . A set screw g^{10} engages the side of said bolt g^8 and holds it in place. The spring disk g^9 bears against the pawl g^4 and holds it in its adjusted position against the force of gravity. Upon the upper face of the pawl I provide two lugs g^5 and g^6 , the purpose of which will now be described. A spring controlled plunger H is fitted perpendicularly in the frame of said machine. Its upper end lies opposed to the rack D and is adapted to engage therewith when said rack drops into the recesses c and c' . Its lower end having sliding engagement with a slotted bracket h fixed to the bed G is fitted with a foot h' and lies opposed to said pawl g^4 , between the lugs g^5 and g^6 .

In operation, when a sheet S is picked up by the magnets $d^2 d^2$ and carried forward to the rolls, the rack D returning to engage the magnets $d^2 d^2$ with a succeeding sheet, drops into the recesses c and c' until the magnets make contact with the top sheet S. If the said sheet is near the lowest level of the range of the magnets, the rack D strikes the upper end of the plunger H, driving it downward so that the foot h' engages with the lug g^5 of the said pawl g^4 . The pawl g^4 is thereby engaged with the ratchet g^3 and is held in such engagement by the spring disk g^9 . The pawl is forced in a circle on its rotating arm g^7 until the lug g^6 engages the foot h' when the pawl g^4 is disengaged from the ratchet g^3 . As the ratchet g^3 is thus revolved, the shaft g^2 is made to revolve and through the said bevel gears g' and g the screw E^2 is turned and the table bed E and the sheets thereon elevated the distance desired to bring the succeeding sheet S to the proper elevation to be picked up by the magnets.

It is intended that the action of the rack D and the table bed E be reciprocating. This is effected as follows: To the upright d^3 I rotatably fix one end of an arm J which is

adjustably connected at its other end with an arm j at an elongated slot j' . Also adjustably engaged with said slot j' is an arm j^2 which is connected at its free end with a crank pin k fixed to the power shaft K . The other and free end of the arm j is fixed to a rock shaft j^3 , journaled to the bed G . An arm j^4 is pivoted at one end to the arm j and at the other end to the arm g^7 of the pawl g^4 .

10 The power conveyed from the shaft K through the arm j^3 by means of the crank pin k rocks the arm j back and forth on the shaft j^3 and the arm J connecting with the mechanism of the rack D and the arm j^4 connecting with the mechanism of the table bed E , being both connected with the rocking arm j the action of the two mechanisms is reciprocal. The adjustment of this reciprocation is effected by manipulating the adjustable connections of the arms J and j^2 with the slotted arm j .

To the outer end of the shaft g^2 I fix a crank g^{11} , which with the pawl g^4 disengaged from the ratchet wheel may be used to lower the table E when it is desired to place a new supply of sheets thereon.

While I describe herein the use of magnets as the means for carrying the sheets forward to the metal working mechanism, there are other automatic means which may be employed to effect the same purpose, such as vacuum devices of various kinds, and I would not be limited in my invention to the particular means described herein.

35 I would not be limited in the details of my construction and any modification for mechanical economies may be made which come within the spirit of my invention. The means of effecting the reciprocating action of the raising of the table and the feeding the sheet may be modified. I show one form which to me seems preferable.

It is my intention that my invention shall be applied to the slitting of sheets of metal, paper, felt or any other kind of material which may be conveniently fed to the cutting device in sheets, and the expression used herein, "sheets of metal and the like" is intended to refer to sheets of any material, metal paper, felt or whatever kind which may be so fed in sheets.

What I claim as my invention is:—

1. In a machine for feeding sheets of metal and the like, the combination with a metal working mechanism, of a feeding mechanism consisting of a roller track, a roller mounted rack engaging said track, automatic carrying means fixed to said rack, and means for automatically moving said rack along said roller track.

2. In a machine for feeding sheets of metal and the like, the combination with a metal working mechanism, of a feeding mechanism, consisting of a roller track, recesses fitted in the face thereof, a roller bearing rack adapt-

ed to engage said track and said recesses, automatic carrying means fixed to said rack and means for automatically moving said rack on said track and engaging the same with the said recesses and disengaging it therefrom.

3. In a machine for feeding sheets of metal and the like, the combination with a metal working mechanism, of a feeding mechanism consisting of a roller track, a rack having sliding engagement with said track, automatic sheet carrying means attached to said rack, and means for actuating said rack, consisting of lever arms attached at one end to said rack, pivoted to the frame of said machine, and adapted to engage at its free end the power shaft of said machine.

4. In a machine for feeding sheets of metal and the like, the combination with a metal working mechanism, of a feeding mechanism consisting of a track, a roller bearing rack engaging said track, magnets fitted to said rack, and means for automatically moving said magnets into contact with said sheets and automatic means for actuating said rack.

5. In a machine for feeding sheets of metal and the like, the combination with a metal working mechanism, of a feeding mechanism consisting of a track, a roller bearing rack engaging therewith, automatic carrying means fixed to said rack, means for automatically moving said rack along said track, and a movable table adapted to hold said sheets and means for automatically moving said table into contact with said automatic carrying means.

6. In a machine for feeding sheets of metal and the like, the combination with a metal working mechanism, of a feeding mechanism, consisting of a recessed roller track, a rack engaging therewith, automatic sheet carrying means fixed to said rack, means for automatically moving said rack on said track and into engagement with said recesses, a sheet carrying table lying opposed to said automatic sheet carrying means, and means for automatically elevating said table.

7. In a machine for feeding sheets of metal and the like, the combination with a metal working mechanism, of a feeding mechanism consisting of a roller track, recesses fitted in the upper face thereof, a roller bearing rack adapted to slidably engage said track and recesses, magnets fixed to said rack, and a sheet carrying table opposed to said magnets, and means for automatically moving said table reciprocally with the action of said magnet bearing rack.

8. In a machine for feeding sheets of metal and the like, the combination with a roller track, a magnet bearing rack having sliding engagement with said track, means on said track to change the elevation of said rack at a fixed point in its said sliding engagement,

a table opposed to said rack at the said point of change of elevation and means for automatically raising said table reciprocally with the action of said rack.

5 9. In a machine for feeding sheets of metal and the like, the combination with a roller track, a magnet bearing rack having sliding engagement with said track, means on said track to change the elevation of said rack at
10 a fixed point in its said sliding engagement, of a table opposed to said rack at the said point of change of elevation and means for raising said table, consisting of a screw attached to said table and means for automati-
15 cally turning said screw.

10. In a machine for feeding sheets of metal and the like, the combination with a metal working mechanism and a feeding mechanism, consisting of a magnet bearing rack horizontally opposed to said metal
20 working mechanism, and means for dropping said rack to a lower level at a fixed point, of a sheet bearing table opposed to said magnets and means for elevating said table, reciprocally with the action of said rack, consist-
25 ing of a screw fitted to said table, a nut engaging said screw and bearing on the frame of same machine, a spring controlled plunger fitted to said machine and adapted to engage
30 said rack at the said point of dropping to a lower elevation, and means for cooperating said plunger and said nut.

11. In a machine for feeding sheets of metal and the like, the combination with a
35 metal working mechanism and a feeding mechanism, consisting of a magnet bearing rack adapted to slide horizontally on said machine and to drop to a lower level at a fixed point, of a sheet bearing table opposed
40 to said rack at the point of its said lower level, and means for elevating said table reciprocally with the action of said rack, consisting of a screw fixed to said table, a nut engaging said screw and bearing on the
45 frame of said machine, a bevel gear fitted on said nut, a shaft journaled to the frame of said machine, fitted with a bevel gear at one end, meshing with said bevel gear fitting on said nut, and fitted at its other end with a

ratchet wheel, a pawl engaging said ratchet
50 wheel adapted to rotate with the said shaft as an axis, a spring controlled plunger adapted to engage said pawl and said rack and means of rotating said pawl on said axis.

12. In a machine for feeding sheets of
55 metal and the like, the combination with a metal working mechanism, and a feeding mechanism, consisting of a magnet bearing rack adapted to slide horizontally on the frame of said machine and to drop to a lower
60 level at a fixed point, of a sheet bearing table, a screw attached thereto, a nut engaging said screw and bearing on the frame of said machine, a shaft having beveled engagement with
65 said nut, a ratchet wheel mounted on said shaft, a rocking arm engaging said shaft, a pawl rotatably attached to said arm, a spring disk attached to said arm and bearing against
70 said pawl, front and rear lugs fitted to the upper face of said pawl, a spring controlled plunger fitted to the frame of said machine, adapted to engage said rack at the point where it drops to a lower level, the lower end
75 of said plunger engaging said front and rear lugs, whereby said pawl is respectively engaged with and disengaged from said ratchet wheel, and means for rocking said pawl carrying arm upon said shaft.

13. In a machine for feeding sheets of
80 metal and the like, the combination with a metal working mechanism and a feeding mechanism, of a sheet bearing table, and means for periodically elevating said table, consisting of a screw, a nut engaging said
85 screw, a shaft engaging said nut and adapted to rotate the same, a ratchet wheel fitted on said shaft, a rocking arm journaled on said shaft, a pawl rotatably fitted to said rocking arm, adapted to engage said ratchet wheel, automatic means for actuating said rocking
90 arm, and means for automatically engaging said pawl with said ratchet wheel, and disengaging it therefrom.

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