Sheet 1, 3 Sheets.

J. Kutts.

Brick Mach.

No. 21,888. Patented Oct. 26. 1858.

Fig. 2.

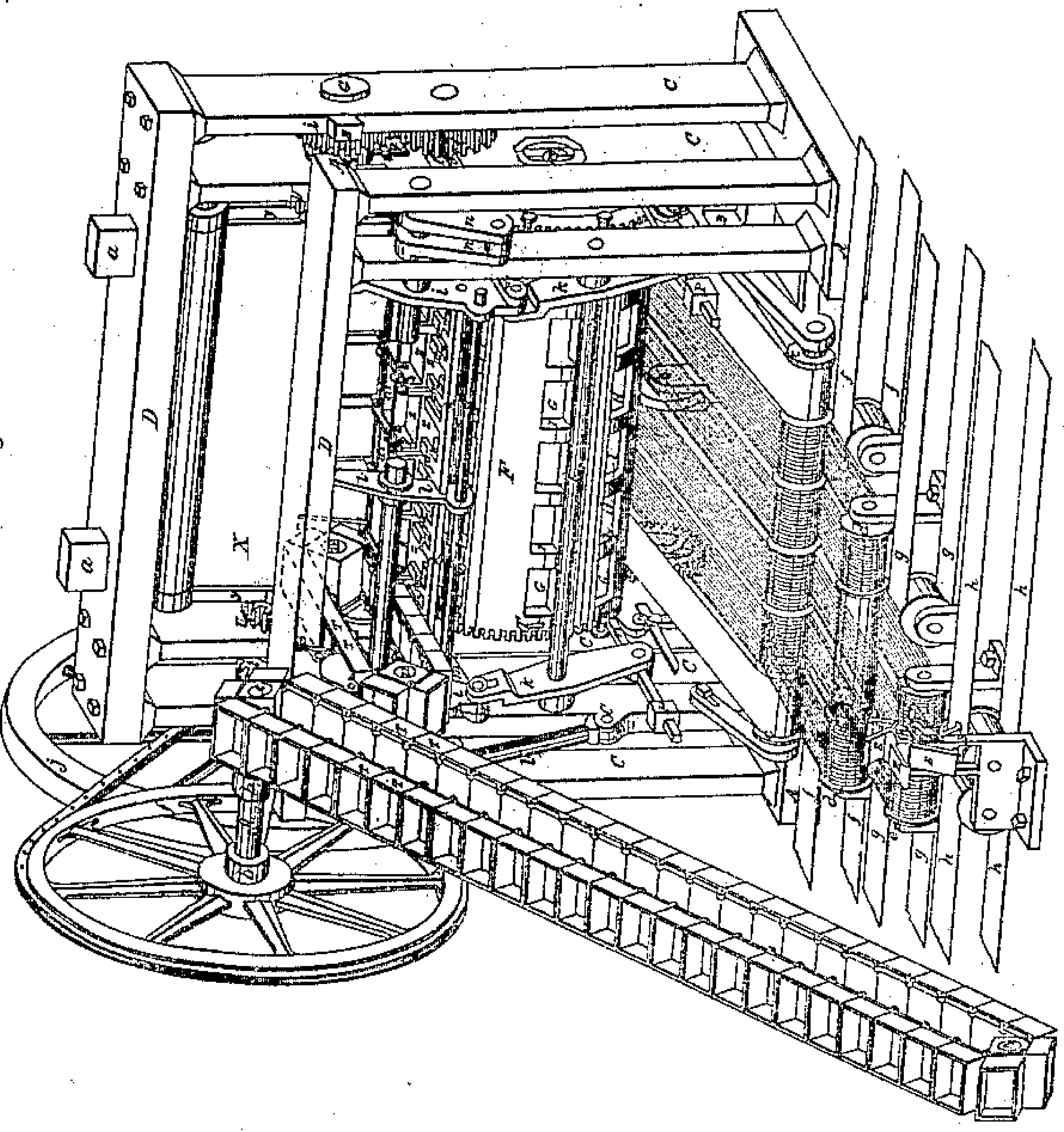
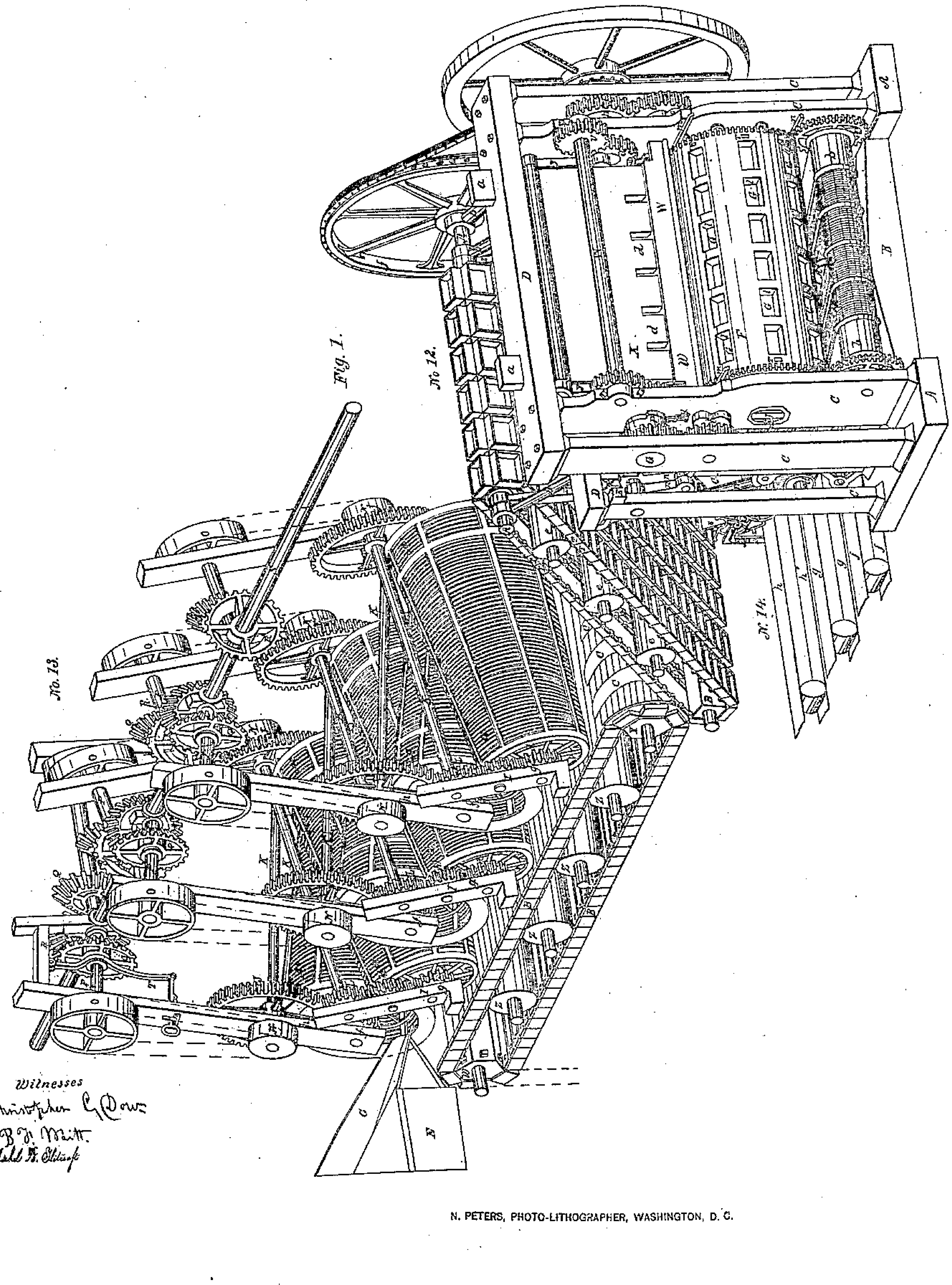


Fig. 1.



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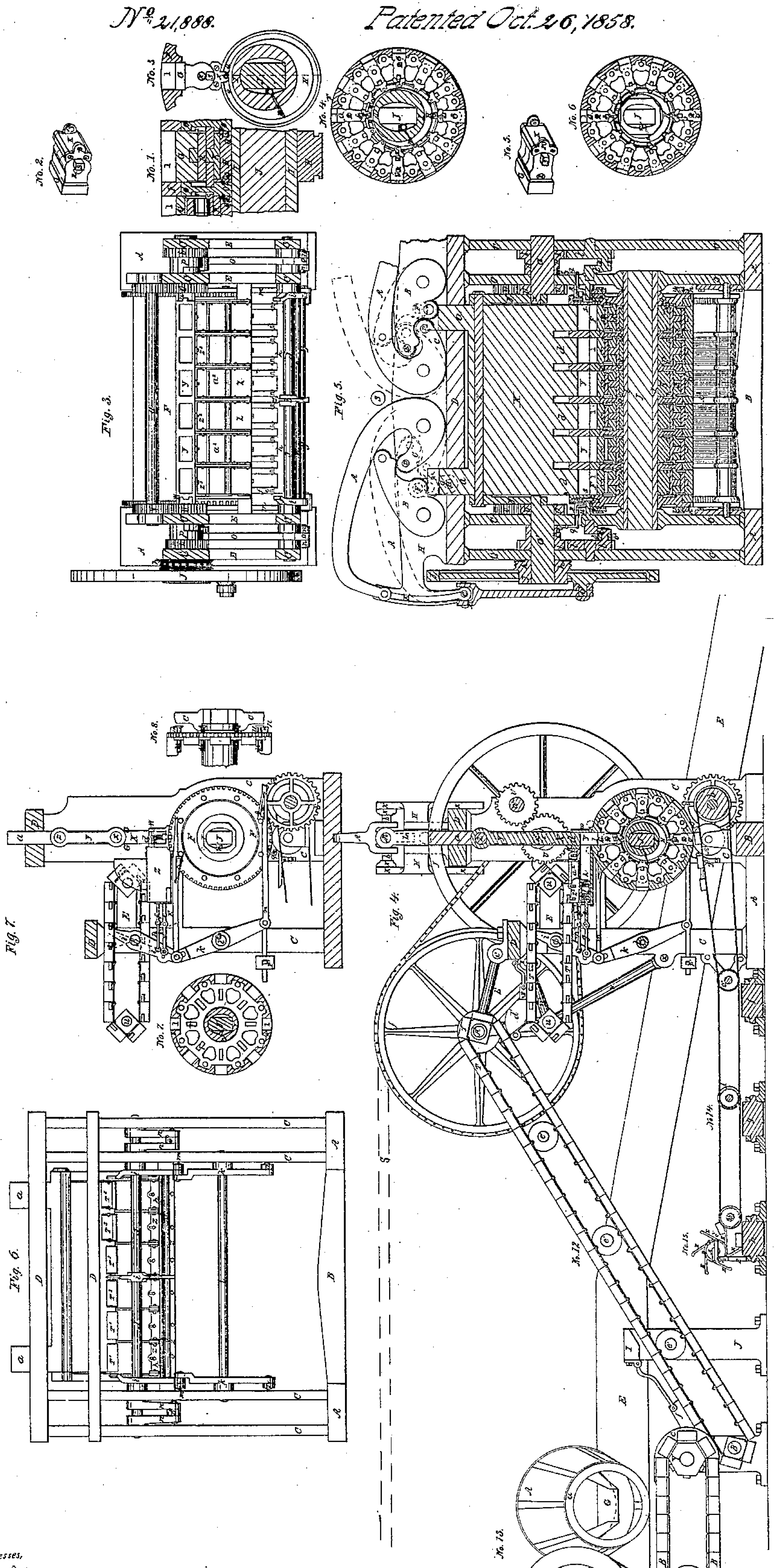

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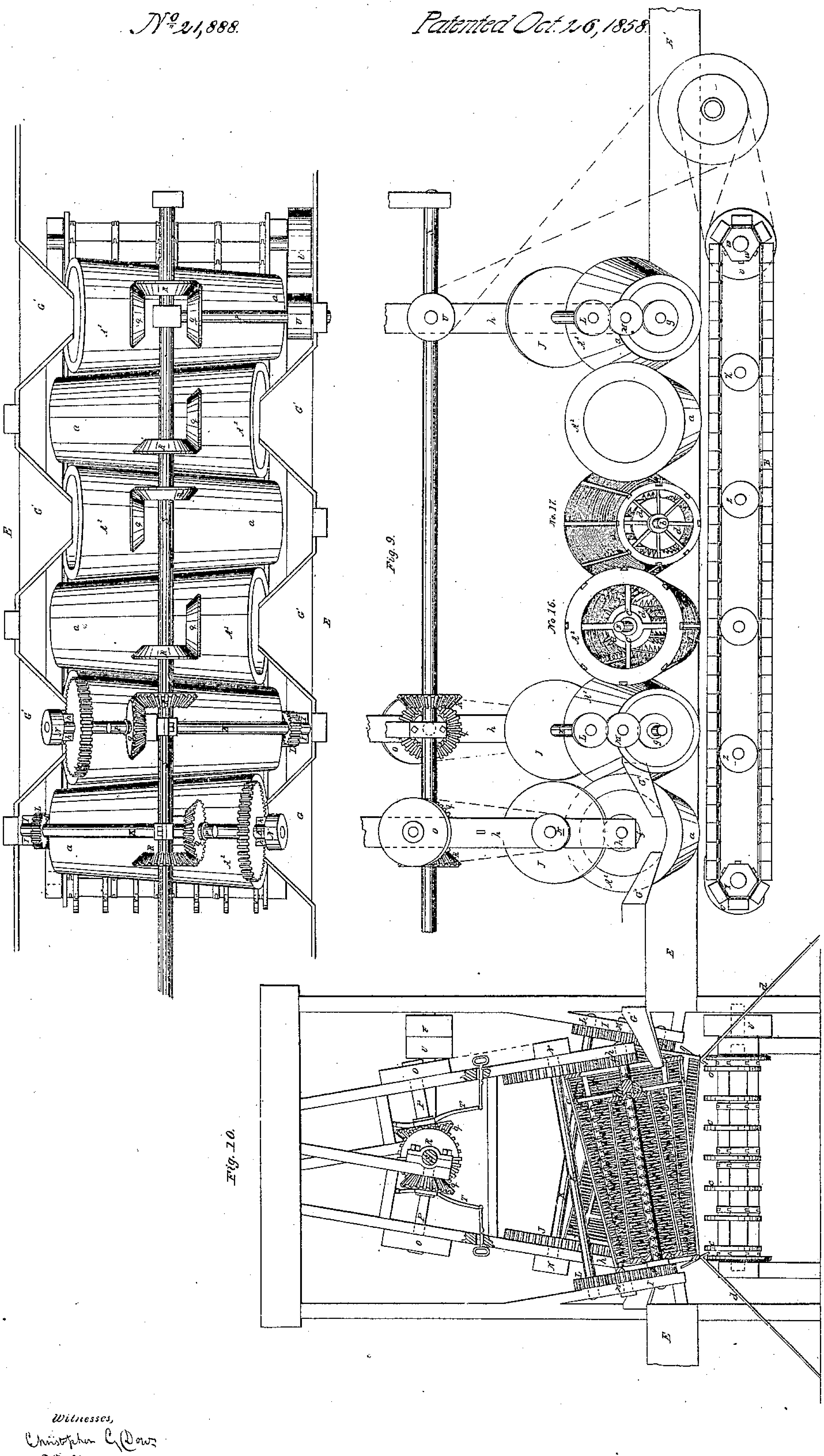

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UNITED STATES PATENT OFFICE.

JNO. KUTTS, OF PHILADELPHIA, PENNSYLVANIA.

BRICK-MACHINE.

Specification of Letters Patent No. 21,888, dated October 26, 1858.

To all whom it may concern:

Be it known that I, JOHN KUTTS, of the city and county of Philadelphia, State of Pennsylvania, have invented a new and Improved Machine for Molding and Pressing Bricks and Flooring-Tiles of Various Forms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Plate 1, Figure 1, is a perspective view of the front of the machine, showing the pulverizers, No. 13, the endless chain platform and elevating boxes. No. 12, Fig. 2, Plate 1, is a perspective view of the back part of the machine, omitting the pulverizers, showing the machinery and a section of the elevating and filling boxes in connection with the machine. Fig. 3, Pl. 2, is a plan of the machinery of the press. Fig. 4, Pl. 2, a transverse section of the machine in connection with the filling boxes, elevators and pulverizers. Fig. 5, Pl. 2, a longitudinal section. Fig. 6, Pl. 2, a rear elevation. Fig. 7, Pl. 2, end elevation of the machinery. No. 13, Pl. 1, represents the pulverizers. Fig. 8, Pl. 3, plan of pulverizers. Fig. 9, Pl. 3, side elevation. Fig. 10, front elevation and longitudinal section of the front pulverizer.

The machine consists of a strong frame of iron and such other materials as are requisite.

The letters A A on the frame represent the sills, B the tie sill, C C C vertical posts.

D D are tie-beams the same being bolted together through from top to bottom with suitable wrought iron bolts, with heads, washers and nuts or keys as shown on the drawings. Also the cross ties E as shown on Figs. 1 and 2, Pl. 1, and Figs. 4 and 7, Pl. 2.

In describing the operation and parts of the machinery in Figs. 1 and 2, Pl. 1, letters F F and the Figs. 4, 5 and 7, and Nos. 4, 6 and 7, Pl. 2, all refer to the cylinder. No. 7 is a cylinder 3 feet in diameter with 8 brick molds around on its circumference and 6 in the length. No. 6 is a cylinder $3\frac{1}{2}$ feet in diameter with ten brick molds (1) around its circumference. No. 4 is a cylinder 4 feet in diameter with twelve brick molds (1). The number of brick molds may be extended in length from 1 to 12 or more as may be desired. To each mold (1, 1,) in the cylinder F F is attached a piston (G G) as shown in the various drawings. Nos. 1 and 3 Pl. 2 represent parts of sections on a larger scale:—the said piston having a knuckle joint toward the lower end with shoe (K) which forms a part of the knuckle joint. The under side of the said shoe is concave, resting and traveling around on an irregular eccentric collar H, No. 3, which is permanently attached by means of screw pins or grooves, and slips upon a stationary hollow shaft or axis I I which on the inner side being of an oval form (O). The ends outside are of an octagon form as seen in Fig. 7 and No. 6, Pl. 2. These ends are tightly fitted and fixed in the frame C C, Figs. 1 and 2, Pl. 1, at I I, and No. 8, Pl. 2, in order to keep it from turning. J in Nos. 3, 4 and 6 is an iron truss or beam passing through said shaft, fitting firmly at the top and bottom edges, having open spaces on each side of the same. In one of these spaces is an oil tube (*m*) No. 4, Pl. 2, running through from end to end with feeders (*n*) to the same drilled through the side of the shaft I I. At the several divisions between the piston lengthwise, to each end of the piston shoe is an iron plate (P) screwed on with an ear downward on the sides of the eccentric collar (H) with a friction roller at the lower ends on the inside as shown on Nos. 1, 2 and 3, Pl. 2. On each side of the eccentric collar at (P) is a groove (Q) in which the said friction roller travels freely around. On each side and lower end of the pistons below the joint bolt (R) and above the shoe K is a square prism (*s*) projecting out into a perpendicular slide groove (T) on the division plate (*o*), see Nos. 1 and 7, Pl. 2, which revolves on the shaft I I between the eccentric collar and piston. The division plates (*o o*) are closely fitted inside, against the outer cylinder F, F, through the ears on the plates (*o o*) between the brick molds (*i i*) boxes in the cylinders at (*u*), iron bolts extend longitudinally through the cylinders with large heads outside as per No. 8, Pl. 2. These bolts pass through proper tubes of suitable strength closely fitted between the several division plates. The whole is drawn permanently together by said bolts. The outer edges of the head plates contain cogs which drive a cog-wheel (V) attached to a belt cylinder for carrying off the bricks, see Figs. Nos. 7 and 8, Pl. 2, Figs. 1 and

2, Pl. 1. The movement within the cylinder F, by turning the said cylinder around, the end heads and division plates (*o o*) within turn around on the stationary shaft or axis I I and the piston travels around the irregular eccentric collar (H) and when on the under side of the meridian it is flush with the outer face of the cylinder and it passes around upward on the back side of said cylinder and is gradually drawn inward by the eccentric collar until it arrives at the upper center meridian, under the press boxes where the clay is pressed into the molds; after passing forward from under the press box beam to about $\frac{1}{8}$ of right angle from the upper meridian, the piston is slowly forced out again and arriving at the lower $\frac{1}{8}$ of right angle forward next to the lower meridian it is more suddenly forced out depositing the brick on the belting.

The piston is kept perpendicular to the center and outer circle by the sliding pin (*s*) in the groove (T) in the division plate (*o o*) while the shoe K and the friction roller (P) in the side groove (Q) on (H) accommodate themselves to the angle or inclination of the curve of the eccentric collar, W W. Directly over the center and in close contact with the cylinder is a double chamber or press box beam extending longitudinally between the frame posts, C C, resting and fastened on the same at each end. In said beam are two sets of boxes, one perpendicular set in front over the center of the cylinder F, F. The boxes (*y y*) longitudinally in the beam are the same in number and size as the molds (1 1 1) on the cylinder (F F) fitting exactly over them so that the die or stamp (*d*) of the press beam X X, inserted in the top of said boxes *y y* will pass through them and onto the cylinder molds (1 1 1). The other set of feeding boxes (*z z*) are horizontal or at right angles and back near the bottom of the vertical press boxes (*y y*) in front communicating into the same by an opening as (*y z*) Fig. 4 Pl. 2.

The bottom, division, and end plates of the feeding boxes (*z z*) and front box beam are cast in connection making one piece of casting. The back end or head plate of said boxes is in one piece from end to end being screwed on near the lower edge to the bottom plate with stout head screws, through slot holes near the lower edges of the said head plates in order to be raised or lowered as may be desired. The top plate (z^2, z^2) of said boxes are cast in sections with hopper holes (a^2) in the same, with flanges and ears abutting against the division plates and ends with bolt heads, screws and also screwed to the top edge of the back head plate. The top plate can be raised or lowered, the same as the back head plate, as the size of the box may be desired. See (z^2 z^2) Figs. 3, 4 and 6, Pl. 2. The feeding piston (*b*) in the feeding box (Z) is made in a box form and constructed so as to be compressed or extended as required to fit the feeding box (*z*) and over the feeding piston is a cut off slide (*c*) with friction rollers on the side edges, on each side which shut up the hopper opening while the piston moves forward and backward; there are two piston rods (*e e*) to each piston, also two sliding rods (*f f*) to each cut off slide which are connected by a hinge joint to a plate or brace frame (I, *h*) sufficiently strong and hung to a rocking lever (*i i*) which is attached and swings on the rocking shaft (*j*);—the frame (*h h*) into pinion holes and the frames (I, I) into slot holes as shown on the sides of the levers, see Fig. 1, Pl. 1, Figs. 3, 4, 6 and 7, Pl. 2.

To the lever (*i i*) at the lower end is attached a second rocking lever (*k*) fastened and swinging on a second rocking shaft (*l*) acting simultaneously with the first lever (*i i*). At the joint between the levers is the horizontal propelling bar (*m'*) extending over the two upper bolt heads on each side of the center on the cylinder ends. Fig. 7, Pl. 2, having a spring catch (*o'*) which falls behind the inner bolt head and propels the cylinder forward. At the lower end of the lever *k* the bar (*n*) has a similar spring lever reverse movement to that on the bar (*m'*). The bar passes below the second bolt head on each side of the meridian of the cylinder head. The spring lever springs up in front of the front bolt and drawing backward while the spring lever on the bar (*m'*) pushes forward. When the rocking levers (*i i*) and (*k*) are in motion the joint action of the bars (*m'*) above and (*n*) below, will turn the cylinder F F around on the stationary shaft I I. The bar (*n*) extends back of the lever (*k*) with a balance weight (*p'*) to the same and also a spring fastening the under side toward the front end with a friction roller to the same, which presses backward and forward upon a horizontal T bar screwed fast to post C. The upper end of the rocking lever (*i i*) acts against the spring (*s*) which is fastened to the end of the endless chain filling boxes (T T T) on the side next to the lever, which is so formed that when it moves backward it presses the spring in and passes by it; the spring resuming its natural position. On the forward movement of the lever it takes hold back of the spring, forcing it forward the width of the box, and so on alternately. See plan of boxes, No. 11, Fig. 6, Pl. 2, showing the springs and heads of the middle and end levers (*i i*).

Fig. 6 gives the side elevation of two boxes. 1 1, 2 2, are longitudinal sections of boxes one on each side of the center lever. 3, 3 a longitudinal section of 2 boxes, with double sides and ends. The inside rim is fastened to the outer boxes with screws.

On the ends of the outer boxes are slot holes so that the inner rim can be raised or lowered regulating the exact quantity that they are desired to hold. No. 9, is a sectional perspective of one on a larger scale. No. 10, shows a double box in perspective the endless chain with filling boxes (T T) see Figs. 4 and 7, Plate 2, which run around two square shafts (U U) the front one being nearly over the hopper (a^2) and hung to the end ties (E) with a ratchet wheel to the same at each end. The shaft (U) at the back end of said boxes is supported by braces (V) and jointed against the post C at x, at the upper end of the post (C) at the points (v and n') and above the shaft (U). At A′, is another similar square shaft supported by the braces (3 3) the lower end being jointed on the braces (v and n') and the lower ends of the braces 3 3 contain the journal of the shaft U. The brace (b') is jointed at (c) over the tie beam (D).

Around the shaft runs an inclined endless chain and elevating boxes (T T T) either single or double sides and ends like those described at Nos. 9 and 10, and 3, 3, Figs. 33, Pl. 2. The said chain and boxes run around the shaft (A′) extending down around a similar square shaft (B′) under the front end of an endless traveling bed or chain platform. Under the pulverizers, (e' e' e') between A′ and (B′) are friction shafts having friction rollers with pinions at each end resting in a trussed frame not shown in drawings extending from the shaft (A′) to shaft B′. At the upper and under shaft (A′,) and the elevating boxes and over the shaft (U) and supplying boxes is a hopper (d') hung against the braces (3 3). The elevating boxes empty themselves into said hopper which is kept in constant action by the motion of the filling boxes which are thrown up and down by the turning of the square shafts (U) (E) against the hopper is a scraper, hinged by a rod to the tie beam D. Said scraper prevents the filling boxes from becoming overcharged.

At each end of the shaft (A′) is fastened an endless chain wheel (f,) which chain passes around a pulley (h) which is fixed to the main driving shaft (G′,) behind the fly wheel, J. At every turn performed by said pulley the chain-wheel will make a quarter revolution or the width of one of the elevating boxes on the shafts A′ and B′, see Figs. 3, 4, and 5, Pl. 2, Figs. 1 and 2, Plate 1. On the inside of the outside post (C) at each end is the driving wheel (i i) on the driving shafts G′ G′, which drives a crank wheel (l l). Immediately below from the said crank is a connecting rod or pitman (o^2 o^2) which connects with the rocking crank (n n) on the rocking shaft (j j) which propels the rocking levers i i and (k k) see Fig. 6. In connection with the driving wheel (i i) on the driving shaft (G′) is a collar (p p) extending to the inner post (C.) Under the center of said collar against the post (C C) is a small bar (q) which stands perpendicularly downward. At the upper end of said bar is a friction roller which works on a ridge or into a groove part way around the collar (p p). The bar (q) is connected at the lower end by a joint to a knee lever (R) and held by a clamp screwed over it toward the upper end. The other end of the lever (R) inside of the posts (C C) acts under the head of a spring check bolt (s') against the press boxes (y y) at each end of the press box-beam (W w) and through the center of the bed plate into the main cylinder (F F) into the holes (T′ T′) between the mold boxes (1 1) and the gearing teeth on the end of the cylinder.

The ridge or groove on the collar (p p) on the driving shaft is so regulated that when the machine is in motion, the cylinder (F F) is held in check between its movements by the check spring bolt (s). At every start the bolt is thrown up until it sets in the next hole (T′) and so on alternately. There is a second driving wheel (U U) on the driving shaft inside the inner post (C C) which drives the coupling wheels (V V) on a connecting shaft (W′). Inside of the driving wheel (U) on the inner end of the driving shaft (G′) is an eccentric pinion (x) which in connection with a wrought iron pinion bar (z z) cast into the press beams (X X); near the upper end (y) is an eccentric toggle lever which acting on the pinions (x and z) forces the press beam up and down. On the top at each end of said beam are perpendicular slots or guide arms (a a) running through the tie beam (D) and slide up and down through the same. In order to accomplish greater power on large machines I have added the compound levers (A and B), see Figs. 4 and 5, with a tip lever (C) having a friction roller (D) inside of the fulcrum on the outside lever (A). There is also a friction roller at the inner end of the lever (B) at (E) and also at the fulcrum (F) which acts on the arm of the press beam (X X) which can also be attached to the said arm by links (G and H). When the outer lever (A) raises the tip lever (C) it throws the inner lever (B) and press beam up. While the outer lever is forced down it presses the lever (B) and press beam down as the levers on the right hand are represented. The said compound levers are fixed in a strong box beam (H′ H′). The upper part of said beam extends over and beyond the outside of the fly wheel (J J) and on the end are two upright bars or frame (K) with segmental curved grooves inside in conformity with the circle of lever (A). At the extreme end at (l) where the upper end

of the connecting rod (L) at (M M) connects forming a universal joint on the cross pinions on a cross bar (*l l*); this bar has a slide block or shoe (N) Fig. 4, Pl. 2, at each end on the grooves of (K K). At the lower end of the rod (L) connects, with the connecting rod of the steam engine on the pinion (o^3) on the fly wheel (J J). Under the center and between the two center molds (1 1) and in contact with the main cylinder F F, is a friction roller (A^2). On the cylinder (*b b*) communicating with the gearing wheel (V V) and cylinder (*c' c'*) are endless belts and cords for carrying off the bricks. The two outside belts end on the cylinder (*c' c'*) the two next to the outside are cord belts ending on cylinder (*d d*) and the two inside belts are cord belts ending on the extreme outer cylinder (*e e*). At the end of said belts and in front, under the cylinders *c' c'*, (*d* and *e*) are belts. *f*, *g*, and *h* are small drums (A) No. 15 centered on proper frames around the said drums are wings or flies (E E E) fixed or fastened tangentially against said drums, and small inclined planes (D D D) around the rim on the sides of said drums. Against these planes is a friction roller (c^2) on the end of a spring (*f*) in form of an L screwed on the post (B). The inclined planes are so regulated that when the roller is set between the plane, one of the flies is opposite and nearly on a level with the belt on the cylinder (*c*) and the lower fly is nearly at the outer edge of the belt (*h*) below. After depositing a brick the weight of the next brick after it is deposited on the fly from the belt on cylinder (*e*); it will propel the friction roller (c^2) over the next inclined plane and bring the second fly in the position of the first to receive the next brick while the first brick is deposited on the belt (*h*) below and so on.

Fig. 8, Pl. 3, is the plan of the pulverizing machines. Fig. 9, is an elevation of the same and Fig. 10 is the front elevation and a section of the front pulverizer A^2a and the external side of the pulverizer A^2a from the front. The pulverizers A^2a are of a conical form laid side by side, large end against small end and vice versa as shown on Figs. 8 and 9, and are hung on inclinations with the large end upward and small end downward. The axis of which form an opposite reverse inclination to each other as represented on Figs. 9 and 10. The pulverizers are constructed with two rims, one at the large end which is open as shown, No. 16, Fig. 9, and the other at the small end, which is supported by spokes centering into a hub through which the axes pass at (C' C') No. 16, which sustain the large end of the outer cylinder; there are eight, more or less strong bars passing longitudinally over the said rims from end to end of the cylinders at equal distances apart, around its circumference and thoroughly secured on said rims. On the inside of said cylinder is a small cylinder or heads with bars fastened securely on them which extend from the inside of the hub or wheel (C' C') to the inside of the lower end. The upper head of the inner is cast or fastened firmly on the upper part of the shaft (E) which runs through the hub (C') into a journal of the frame (*h*). Outside of the pinion wheel (*f*) the shaft (*b*) centers into the shaft (E) inside of the head of the inner cylinder by a pinion (G) passing through the lower head (*d'*) of the inner cylinder past the outer cylinder and pinion wheel which are firmly fastened on the same and into a journal with frame (I). When the driving wheel (J) is in motion and acting on the pinion wheel (*f*) the shaft (E) will turn the inner cylinder; the lower end which rests and turns on the axis (*b b*) inside of the lower head of the outer cylinder and it turns in the hub (C' C') on the outside of the upper head (*d'*) and on the pinion wheel (*g*) of the axis (*b'*) inside of the upper head (*d*). The pinion wheel (L) on the other end of the driving shaft (K) by a third pinion wheel (M) on a cross band will give the pinion wheel (*g*), shaft (*b'*) and outer cylinder in connection a reverse motion. The upper end of the outer cylinder, by the wheel (C' C') is supported by the shaft, (E) outside of the upper head (*d'*) of the inner cylinder and turns around on said shaft (E) and the upper end of shaft (*b'*) by a pinion (*g*) in the lower end of the shaft (E) inside of the said upper head (*d'*) of the inner cylinder to the bars of the outside cylinder; inside the wheel (C' C') and to the outside and inside of the bars of the inner cylinders also on the shaft. (*b' b'*), are strong diagonal teeth or spikes which are so set and extended as to cut between and through each other. The screen around the outside cylinder is made in sections by a frame fitted between the bars above described and rabbeted in the edges and fastened to the same. The said frames are fitted with rods across or lengthwise or wires plaited or otherwise as may be the most suitable for such screens. (N) is a driving pulley on the driving shaft (K). (*o*) is a pulley on the connecting shaft (P). (Q) is a connecting wheel of the shaft. (R) is the driving wheel of the main shaft (S). (T) is a lever which throws the connecting wheel (Q) in and out of gearing. (U) is a pulley which drives the pulley V connecting to the end of the hexagonal shaft (W) at the end of the endless traveling bed and propelling the same. The shaft (Y) at the outer end of the traveling bed or platform is also a hexagonal shaft similar to shaft (W) having corks on their sides at

each end of the shaft to keep the endless platform from slipping around them, see Fig. 9.

(*z z z*) are friction rollers or shafts.

The sides (B B) on each side of the platform are of suitable height and made in blocks in lengths of the bottom. When they turn around the cylinders at each end, they separate and are closed when they come on a straight line.

c c c in front of the traveling bed or platform are guides to direct the clay into the elevating boxes. See Figs. 8, 9, and 10 (*d d*). On each side below are gravel and stone sheets, see Fig. 10.

E′ E′ on each side of the pulverizing machine is an elevated floor on which the clay is deposited each having an inclined plane at each end for carts to pass up and down in rotation.

G′ G′ are chutes from the aforesaid floors (E′ E′) and extend into the large end of the cylinder A^2a, at A^2 on which the clay is carried into said cylinder (*f*) in front of the traveling bed in conjunction with the elevating boxes, is a scraper, fastened to a cross beam (I) on post (J) Nos. 12 and 13 Plate 2 and is so arranged as to keep the elevating boxes from becoming overcharged.

The process of making the bricks is as follows: Viz: The clay is placed on the elevated flooring on each side of the pulverizers, from which it is thrown into the larger ends of the cylinders; passing through the pulverizing cylinders it becomes thoroughly pulverized and falling on the endless traveling platforms below, leaving the stones and other coarse substances pass out at the smaller or lower end of the cylinders, where it is deposited under the flooring on each side of the pulverizers. The clay on the traveling platform is conveyed into the elevating boxes in front and carried up by the elevators, by which it is thrown into the hoppers and feeding boxes of the press. The horizontal feeding piston performs the part of labor commonly performed by the press-piston in other presses, which require a longer motion with less power, and can be made to work more rapidly; this motion forcing it from a loose state into the press-boxes under the beam into a compressed mass: the press beam from its short, rapid motion and powerful eccentric toggle lever, or the compound lever power or the forces of both in connection, pressing the clay into the molds of the cylinder into a solid form; then after the cylinder has made a half revolution forward; deposits the pressed brick on the endless belting below, which carries it to the final belt, passing the molded bricks out of the building into the kiln.

What I claim as of my invention and desire to secure by Letters Patent is—

1. The main cylinder F, when constructed and arranged in the manner and for the purpose specified:—that is to say; with the stationary hollow axis with the beam or truss J, through the same, the eccentric collar (H), piston (G,) with its knuckle joint and shoe (K) and division plates O, these several parts being constructed, arranged and operated as and for the purposes set forth.

2. I also claim the arrangement of the double chamber, or box beam W, over the cylinder F, as described in combination with the back horizontal pistons (*b*) and cut off slide (*e*) propelling bars (*m*) and (*n*) and levers (*i* and *k*) all arranged for joint operation in the manner and for the purpose set forth.

3. I also claim the compound or double levers (A) and B in the box (H′) over the press beam X, when these are constructed and arranged in connection with the gearing or fly wheel (J) substantially in the manner and for the purpose set forth.

4. I also claim the double rimmed elevating and filling boxes (T) Pl. 2, Nos. 9, 10 and 11, when constructed as, and for the purpose specified.

5. I also claim the pulverizers (A^2a) when constructed, arranged and operated in the manner and for the purpose specified.

6. I also claim the fly or wing wheel for lowering the brick from one belt to another belt at right angles thereto when constructed, arranged and operated substantially as described.

JOHN KUTTS.

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