(20.) 2 Sheets--Sheet 1.

J. FENSOM.

Improvement in Machines for making Bricks and Artificial Stone.

No. 122,714. Patented Jan. 16, 1872.

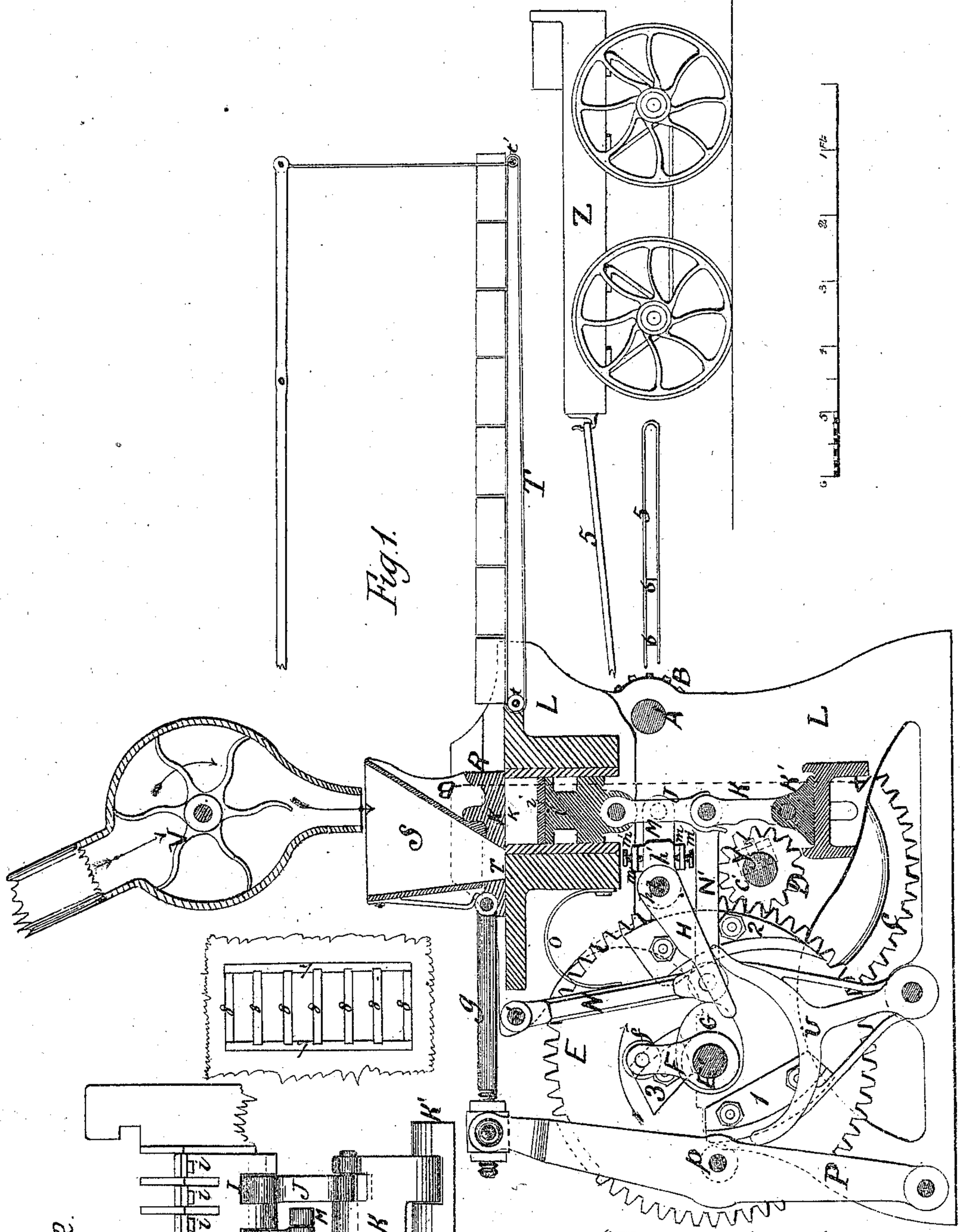

Fig. 1.

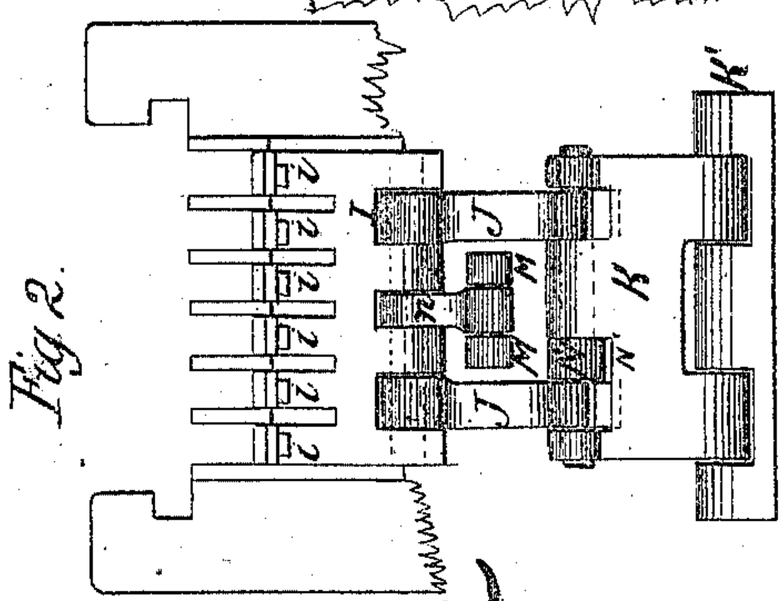

Fig. 2.

"Inventor"
John Fensom
By Donald C. Ridout
his Attorney

Witnesses"
Edward Turrell
William Sykes

(20.)

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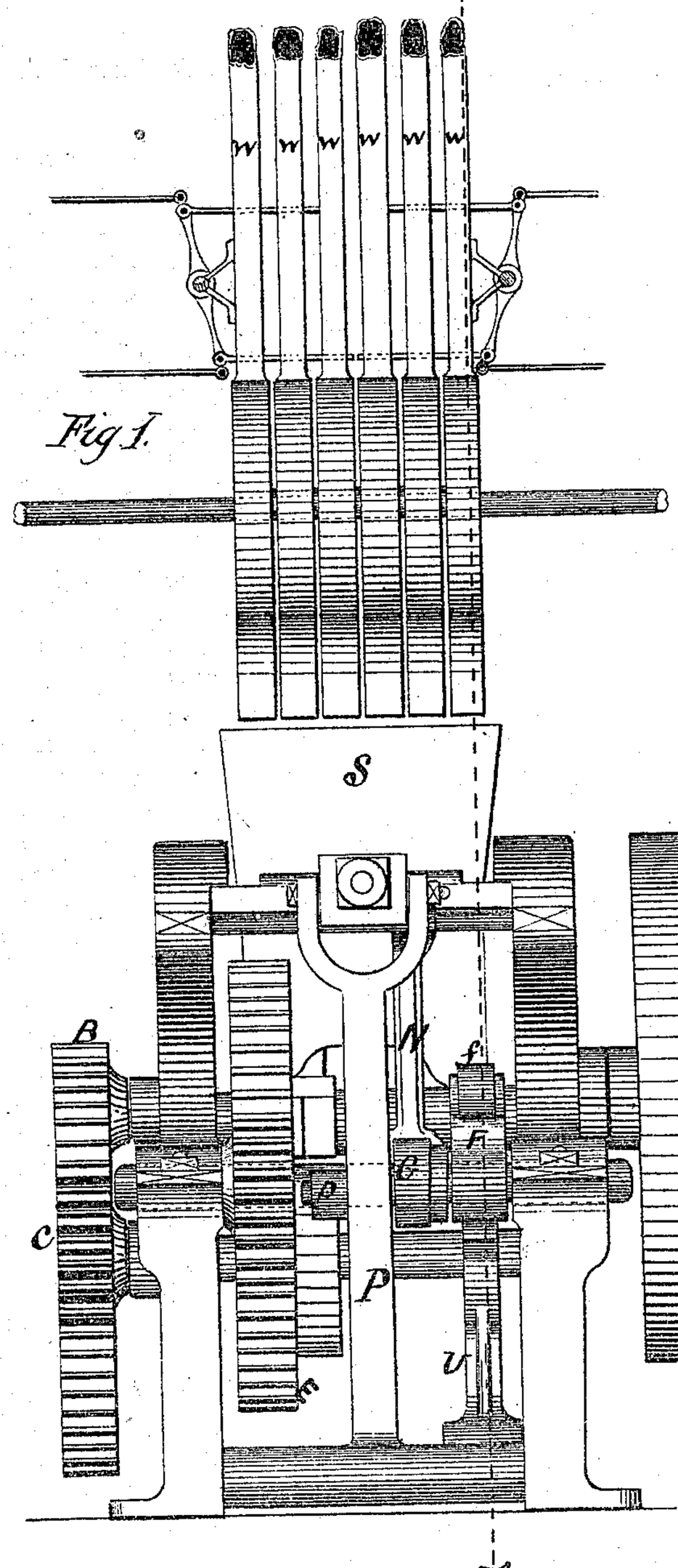

"Inventor."
John Fensom
By Donald & Abbott
his Attorney

"Witnesses"
Edward L. Farrell
William Sykes

122,714

UNITED STATES PATENT OFFICE.

JOHN FENSOM, OF TORONTO, CANADA.

IMPROVEMENT IN MACHINES FOR MAKING BRICKS AND ARTIFICIAL STONES.

Specification forming part of Letters Patent No. 122,714, dated January 16, 1872.

SPECIFICATION.

I, JOHN FENSOM, of the city of Toronto, in the county of York, Province of Ontario and Dominion of Canada, engineer, have invented a certain Machine for Making Bricks and Artificial Stone, of which the following is a specification:

Nature and Objects of the Invention.

My invention relates to an improved system composed of a pressing-machine, which, in combination with other machinery worked in conjunction with it, forms a complete system, whereby bricks and artificial stone can be economically and efficiently prepared with a minimum amount of manual labor; and consists in an arrangement whereby the material about to be pressed is measured by valves peculiarly arranged and packed in the molds by centrifugal force or the force of gravitation, instead of the tampers which are now used for that purpose, the pressure-plate of the molds being actuated by powerful machinery of which the pressing-machine is composed, and so worked that the bricks when formed are thrown out of the molds and placed upon an endless apron which carries them to and arranges them upon the truck which is to convey them to the drying-kiln. The said truck when being thus loaded is worked automatically in conjunction with the pressing-machine in such a manner that as each row of bricks is deposited by the apron upon the truck it (the truck) is moved away the length of one brick in order to receive the next deposit.

Description of the Accompanying Drawing.

Figure 1, Sheet 1, section side view through *x y*. Fig. 2, Sheet 1, end view, showing toggles section through A B. Fig. 1, Sheet 2, end view.

General Description.

Before describing the operation of my system I will first explain the construction of the pressing-machine and then show how it operates in conjunction with the rest of the machinery of which my system is composed. A is the driving-pulley, keyed to the shaft A′. B is a pinion, also keyed to the shaft A′, and gearing into the spur-wheel C, which, with the pinion D, is keyed to the shaft C′, the spur-wheel E being geared into the pinion D and keyed to the main shaft E′. This shaft will then revolve much slower than the driving-pulley A, and the power, of course, is correspondingly increased. I will not claim any particular size for the spur-wheels and pinions mentioned, as their arrangement is merely compound gearing by which the power applied to the pulley A is multiplied before reaching the main shaft E′; but it will be sufficient to say that the power must be thus increased sufficiently to permit the machine to perform the work required of it. The wiper F and cam G are keyed or cast to the main shaft E′ at the proper angle to each other. The wiper F is exactly opposite to the arm H, which it presses down at each revolution, as hereafter described, the friction-roller *f* forming the bearing. In the drawing I have shown my machine with six molds, and it will therefore manufacture six bricks at each revolution; but, of course, the number of molds is varied and may be altered, as hereafter described. As the molds are arranged across the machine the side view, Fig. 1, merely shows the length and depth of one ram *i*, fitting in its place. Fig. 2, Sheet 1, shows how the casting I is divided in order to form the six rams *i* which fit the corresponding molds. The upper toggles J are jointed at one end to this casting, and form at the other end a toggle-joint with the lower toggle K, as shown. The toggle K works in the casting K′, which is properly secured to the main frame L. The arm H works upon the shaft *h*, which is, as also are all the shafts, supported by the frame L. The shaft *h* passes through the sleeve of the arm M. This arm has lugs *m* upon it, through which the set-screws *m′* pass and are screwed against the short arm *h′*. This arm *h′* is cast or forged solid with the arm H; therefore the set-screws *m′* bind the arm M to the arm H, and the angle formed by the two can also be altered by them when necessary. The other end of the arm M is connected to the casting I by the link *n*. (See Fig. 2, Sheet 1.) The hanger N is swung on the shaft *n′*, and is jointed to the link N′, which is connected at the other end to the toggle K at the point where the toggle-joint is formed. (See Fig. 2, Sheet 1.) The hanger N is exactly opposite to the cam G, which presses against it at each revolution, bearing against a friction-roller which is at the point where the hanger N and link N′

are connected. When the cam G is not pressing against friction-pulley referred to the hanger N is kept perpendicular by the spring O or by some other suitable means, and as it is connected to the toggle-joint, as described and shown, it (the toggle-joint) will lie correspondingly bent, and the casting I lowered. The valve-lever P is pivoted at its lower end to the frame L, and the valve-spindle *g* is attached to its other end, as shown. The cam-plates 1, 2, and 3 are bolted to the face of the spur-wheel E in such positions that as the spur-wheel E revolves they press in their turn against the friction-roller *p* and work the valve *k*, as hereafter described. The valve *k* covers the six molds, except when the port *r* is over them, when they are open. S is a hopper extending over and leading to the port *r*.

Having now described the general construction of the machine, I will proceed to explain its operation, and the *modus operandi* of my system. In the position of the machine shown in drawing we must imagine that the molds are filled with the material about to be pressed. The toggles have also been straightened by the cam G pressing against the friction-roller in the joint between the hanger N and link N′, as shown and before described; therefore the pressure has just been given, the valve *k* being immediately over the molds. In the meanwhile the spur-wheel E, driven by the powerful gearing before described, is still revolving, as indicated by arrow. The cam-plate 1 is just commencing to press against the roller *p*, pushing the valve *k* full back by the time the other end of the plate is reached. By that time the wiper F is pressing down the arm H, which, being connected, as before described, to the casting I out of which the rams *i* are formed, raises them, and they push out the bricks which have been pressed. The set-screws *m′* which connects the arm H with the arm M are for the purpose of altering the angle of the two arms in order that when the arm H is pressed down by the wiper F the bricks shall be completely thrown out of the molds. To proceed, when the bricks have thus been completely thrown out of the molds the cam-plate 2 has by that time reached the friction-roller *p*, and, pressing against the outside of this roller, draws the valve *k* forward over the molds, pushing the bricks off onto the apron T.

The cam-plate 2 draws the valve *k* forward till the port *r* is over the molds, and while the valve *k* is thus moving the rams *i* have dropped either by their own weight or by the wiper F touching the rocker-arm *u*, so as to make its opposite arm press against the lower side of the arm H, which will, of course, have the effect of drawing down the rams, as will be understood by drawing. The molds being thus their full size, and the port *r* being open, as described, the machine is in the proper position to receive the material about to be pressed. This material (whatever it may be) is carried by elevators up into a reservoir above the machine, from whence it is carried by conductors into the hopper S through a centrifugal wheel, V, which is revolving at a great speed, and forces the material into the molds through the hopper S and port *r*. When the reservoir into which the material is to be elevated can be placed at a considerable altitude the centrifugal wheel may be dispensed with and the material driven into the molds by the force of gravitation. In either case I have valves arranged in the conductors and worked automatically so as to keep up the material till the port *r* is over the molds, when they open and permit just enough to pass through to fill the molds, and then cut off the supply. As an illustration, I have shown on Sheet 2 a system of valves arranged for this purpose in the conductors W, which any mechanic will understand.

I do not intend, however, to confine myself to the description of valve shown, as there are various styles which will answer the purpose, and can be worked, as described, from some convenient portion of the machine. When the molds have been thus filled the valve *k* is carried back by the cam-plate 3 till it covers the molds, where it remains while the material is being pressed into shape by the cam G straightening the toggle-joint, as before described. In the drawing the toggle-joint is shown perfectly straight; therefore the entire pressure has been given. The amount of pressure is, of course, regulated by the inclination of the toggle-joint, and in order to regulate this inclination I place in a convenient position a bracket, Y, which is shown by dotted lines. A set-screw through this can be adjusted so as to prevent the toggles falling to a greater inclination than is required. The endless apron T is supported at one end by the roller *t* working in the frame L on a level with the valve-seat. The other end is held by rods, &c., attached to some convenient point in the machine, by which the end *t′* of the apron is made to dip down to the truck Z every time a fresh row of bricks is thrown out of the molds, as before described. The truck Z is at the same time made to move away the length of one brick; therefore, when the machine is full working, as a row of bricks is thrown out of the molds, a corresponding row at the other end of the apron is deposited upon the truck Z, which is then moved on ready for the next row.

There are various ways which would suggest themselves to the mind of a mechanic for working the truck Z as described. I therefore do not claim any peculiar way to do so; but one of the simplest ways is to have a double rod, 5, one end of which can be hooked onto the truck Z, as shown, and the other end placed upon a pulley on the main shaft E′, the pulley to have a single tooth, which at each revolution would catch a cross-bar, 6, (see plan of 5,) and move the truck Z forward the required distance, the cross-bars 6 being, of course, placed the proper distance apart.

In the commencement of the description I mentioned that the number of the molds could

be altered. I may add that the shape of them can be also changed. For the purpose of permitting these changes the molds are formed by the two long plates 7 and the cross-plates, marked 8, (which are the bridges between each mold.) These plates are fitted into the frame, as shown, and any mechanic will understand that by moving the plates 8 closer together the number of molds can be increased and the shape of them altered by forming the plates 7 and 8 for that purpose. By these changes various fancy styles of bricks can be made.

Although in illustrating the application of centrifugal wheels for the purpose of filling the molds I show a separate wheel placed immediately above each mold, I wish it to be distinctly understood that I do not consider it absolutely requisite to have a wheel for each mold; nor that they should be placed immediately above them, as their position and the number required in proportion to the molds will be determined by experience.

It is scarcely necessary to add that any suitable material may be used in the construction of my machine, and that the design of the component parts thereof can be altered, as the taste of the constructing engineer dictates.

Having now described all the mechanical details of my invention, I will mention, in conclusion, the advantage I gain by the arrangement or system of machinery of which my machine, as a whole, is composed. In all machines for the same purposes with which I am familiar the material is put in the molds and the bricks removed from the machine by manual labor; whereas by the systematic arrangement of my machine there is no handling whatever, the material being elevated into the upper reservoir by conveyers properly applied, and the exact quantity of the material is accurately measured into the molds by valves adjusted in the conductors, as described, and the bricks, when pressed, are thrown from the molds, carried by the apron T, and deposited upon the truck Z, which is also automatically worked, as described. It will therefore be seen that my system is complete, and that all the parts work in conjunction with each other, manufacturing the bricks from the raw material and depositing them, when finished, upon a truck without any handling, and with no more attention than is necessary to see that the machine is kept in order.

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

1. The combination of valved charger W, centrifugal V, reciprocating hopper and valves S and *k*, mold X, and plunger *i*, constructed and operated as and for the purpose set forth.

2. The combination of cam G, hanger N, spring O, arm N′, toggles J *k*, and plunger *i*, as shown and described.

3. The combination of wiper F, rocker-arm U, levers H and M, toggles J *k*, and plunger *i*, when constructed and arranged in the manner and for the purpose set forth.

4. The arrangement of parts herein shown, consisting of valved charger W, centrifugal V, hopper S, valve *k*, mold X, endless apron T, truck Z, and their operating devices, when constructed and operating as and for the purpose shown and described.

City of Toronto, August 19, 1871.

JOHN FENSOM.

Witnesses:

DONALD C. RIDOUT,

CLAUD L. CAYLEY. (20)