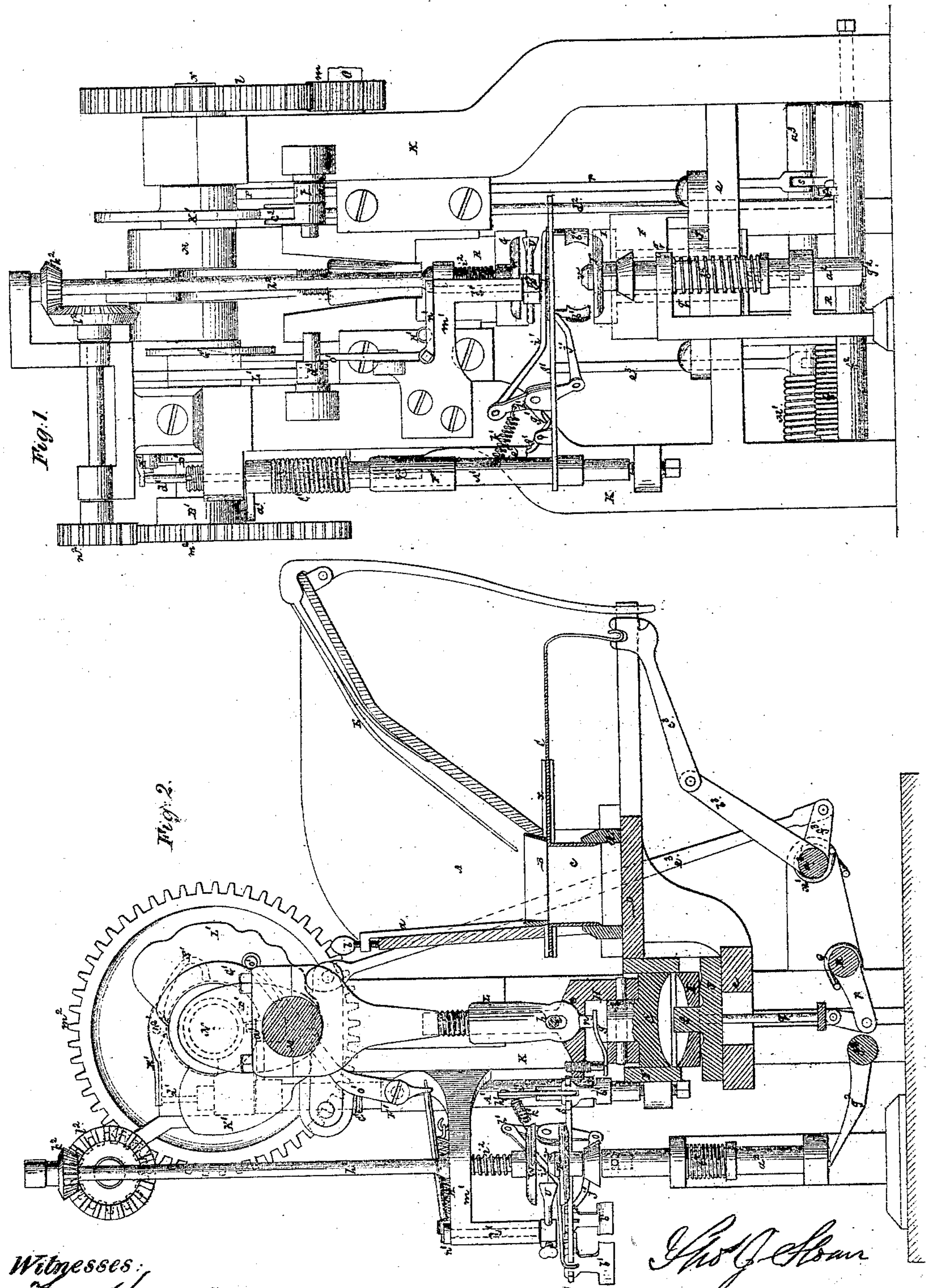
2 Sheets--Sheet 1.

T. J. SLOAN.

Improvement in Porcelain-Knob Machines.

No. 114,210. Patented April 25, 1871.



Witnesses:

Geo Haines

Ferd. Tusch

Thos J. Sloan

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Fig: 3.

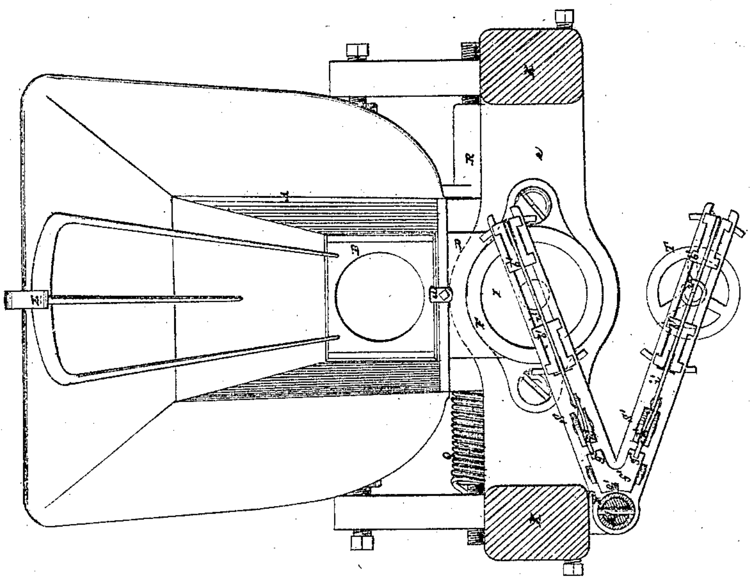
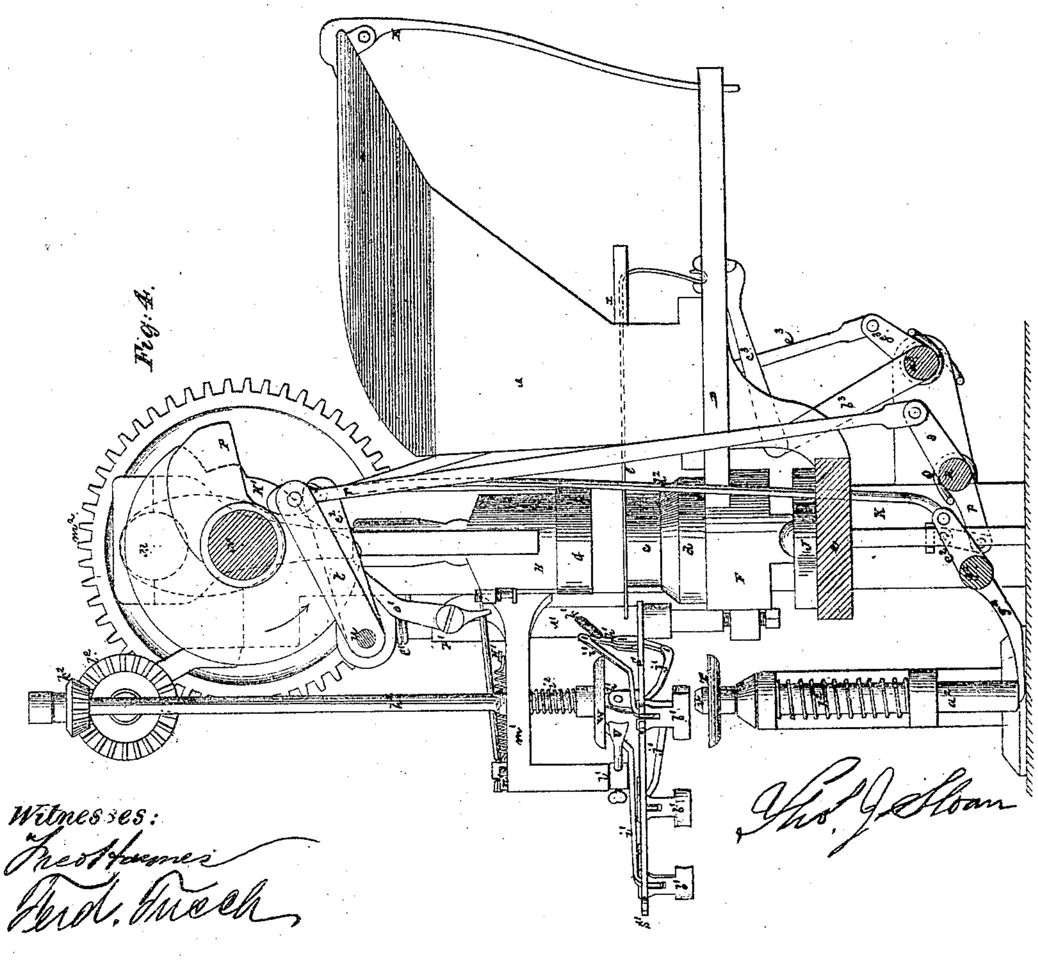


Fig: 4.



Witnesses:

Geo. Haynes

Ferd. Tusch

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United States Patent Office.

THOMAS J. SLOAN, OF BRONXVILLE, NEW YORK.

Letters Patent No. 114,210, dated April 25, 1871.

IMPROVEMENT IN PORCELAIN-KNOB MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, THOMAS J. SLOAN, of Bronxville, in the county of Westchester and State of New York, have invented certain Improvements in Machines for Making Porcelain Knobs and other articles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification.

In the invention which is the subject of this application the material to be worked into a knob or other article is delivered from a hopper, through an adjustable throat operating as a gauge, into a charge-carrier, which is open above and below and travels for a portion of its distance over a detached bed, to convey a charge from the hopper to the dies in which the article is pressed and molded, said charge-carrier being capable of adjustment along with the throat to vary the depth of the chamber in the carrier as the latter is moved under the throat, which, acting as a cut-off, is thus made to measure in any required proportion the quantity of material passed out to the dies.

The invention also consists in a combination of upper and lower dies, arranged to operate in relation with each other and with a die-chamber or case, so that, while the upper die acts in a positive manner to compress the charge between it and the lower die, both dies move up in concert to take the pressed or molded article out of the die-case, under gradually-yielding pressure or hold of the upper die, till the knob or article is moved out of the case, when the upper die leaves it. This prevents the formation of air-cells in the upper surface of the knob and allows for the expansion of the clay or material in various directions, thereby making a closer knob or one more free from cracks on being baked.

The invention likewise includes a combination, with the molding and pressing-dies, of an automatic device for taking the pressed knob or article from between the dies, or from the lower one, to a revolving device for dressing the article; also, an automatic device for discharging or removing the latter from the revolving dresser. This avoids handling of the knob or article prior to being burned, and which is apt to deface it.

To enable others skilled in the art to make and use my invention, I will proceed to describe it with reference to the accompanying drawing, and in which—

Figure 1 represents a front elevation of a machine embodying my invention and as adapted to the making of knobs for doors and other articles;

Figure 2, a central vertical section taken at right angles to fig. 1,

Figure 3, a horizontal section taken, for the most part, immediately above the device which removes the pressed knob from the dies to the rotary dresser; and

Figure 4, a sectional side elevation, close to the interior of one of the side pieces or standards, of the main frame, which carries the working parts.

Similar letters of reference indicate corresponding parts throughout the several figures.

Referring to the accompanying drawing—

A represents the hopper, into which the material to be worked is placed, and from which it is discharged through a throat, B, that is adjustable up or down by a rod, *a*, and set-screw, *b*, to give more or less projection of the throat through the bottom of the hopper.

Arranged to slide under this throat, in side ways, *x*, attached to the throat, is a charge-carrier, C, capable of yielding in a vertical direction to correspond with the rise and fall of the throat, and formed with a receiving-chamber, *c*, that, when under the throat, serves to receive the material from the hopper.

This receiving-chamber *c*, which is open at its bottom, fits loosely within a lower casing, *d*, that is also open below and rests in a free manner upon a detached stationary bed or table, D, which constitutes a temporary bottom for the charge-carrier while the material is being fed into it from the hopper, and to retain the same during its conveyance by the charge-carrier to the dies which press and mold the material into shape.

The fit of the receiving-chamber *c* of the charge-carrier within the casing *d* is such as to admit of the up-and-down adjustment of the former within the latter in concert with the adjustment of the throat B, as hereinbefore referred to, and which adjustment provides for regulating the feed or quantity of material passed from the hopper into the carrier C, the throat B acting as a gauge and cut-off at different heights from the bed D, accordingly as the throat and carrier are set up or down, and as the carrier in moving forward passes under the throat.

An agitator, E, is arranged within the hopper to assist in filling the receiving-chamber *c* of the charge-carrier while said chamber remains stationary under the throat of the hopper.

After the charge-carrier C has been thus duly packed with clay or material from the hopper it is slid forward over a stationary die-chamber or case, F, immediately in front of the table D, and with its upper edge on the same level, or thereabout, as said table, so that the casing *d* of the carrier passes onto or over the case F, where said casing and chamber *c*, holding the material within them, remain stationary for awhile to deposit the material within the die-case F, after which the charge-carrier C retires to its previous position under the hopper, and an upper die, G, operated by a vertical plunger, H, comes down and, entering the die-case F, presses the material between it and a lower

die, I, to mold the material into knob form, said lower die resting upon a base, J, that is carried by a stationary cross-piece, *e*, and that has a stud, *f*, on it projecting up through the lower die portion I, to form the cavity for the shank of the knob. The upper die G and lower die I then ascend in common to take the molded knob out of the die-case F by the elevation of the lower die I, up through and above the die-case, where said lower die remains stationary for awhile, and during which, or toward the completion of the lower die's ascent, and afterward, including the return of the lower die to its dropped position again, the upper die continues to ascend, leaving the molded knob exposed upon the lower die, as the latter remains stationary above the die-case, for a purpose that will be hereinafter specified.

As there are several peculiarities in the action, as just described, of the dies G and I, which have a bearing upon the production of the knob, the same will now be explained.

The plunger H, which is carried by a frame that slides up and down within suitable guides or ways connected with the side pieces K K of the main frame, operates in its descent, for the most part, with a positive motion to give the necessary pressure on the material between the dies, although at first causing the upper die G to bear only lightly and with a gradually-increasing pressure, by reason of an interposed spring, *g*, carried by the plunger, and a slotted connection, *h*, of the pin *i*, that attaches the plunger to the pitman L, which latter is operated by a revolving crank, M, on an upper shaft, N, that derives its motion by gearing, *l m*, from a main driving-shaft, O.

The pitman L takes its bearing by a teat, *n*, first on the spring *g*, and subsequently in a direct manner, by means of the slot *h* on a concave, *o*, formed in the top of the plunger, and, when thus brought down to a dead or solid bearing, the pin *i* is relieved of strain, from which it is free, in fact, throughout the whole of the descent or pressing action; but it is in the ascent of the plunger and upper die G that the main advantage of the yielding connection between it or the plunger H and its operating-pitman L is established. Thus, by means of the spring *g* and slotted connection *h i*, the upper die G, in rising, together with the lower die I, has a gradually-yielding pressure or hold on the material between the dies till the spring *g* is relaxed and the pin *i* rests upon the bottom of the slot, after which, and when the lower die has come above the die-case, the upper die wholly leaves the material.

This holding of the material in a gentle manner both above and below till it is clear of the die-case allows for equal or general expansion of the same at different points, and prevents air-cells being formed in the top surface of the knob; also gives a closer finish to the same, and reduces the tendency of the knobs to crack on said surface during the process of burning them.

The lower die I is operated by the conjoint action of a cam, P, on the shaft N, and a spring, Q, through the medium of a rock-shaft, R, which is vibrated in the one direction, to lift the die, through a toe, *p*, link, and sliding frame composed, in part, of rods *q q*, the cam P operating to produce lift of the die by bearing down on a rod, *r*, jointed at its lower end to an arm, *s*, of the rock-shaft, and pivoted at its upper end to a lever, *t*, which has its fulcrum at *u*. The spring Q serves to lower the die I after the cam P has ceased to elevate and hold it raised as required.

After the molded knob has been lifted out of the die-case F and is exposed on the bottom die I above said case, shortly after the upper die G has left it, an automatic device, S, comes forward and, grasping in a gentle manner the molded knob at opposite points on its edge, transfers the knob from off the lower die I to and over a loosely-hung horizontal head or lower circular clamp, T, of a rotary dressing device, where it is deposited and centered by an upper hub portion, *v*, of the clamp entering the shank cavity of the knob. So soon as the automatic device S has taken hold of the knob to transfer it, as specified, the die I drops, and immediately afterward the charge-carrier C comes forward again, and the plunger with the upper die G descends to repeat the operation of forming another knob while the previous one is being dressed.

The rotary dressing device consists in part of the loose head or clamp T, in part of a cutter or scraper, U, and in part of an upper head or circular clamp, W, which has a positive rotary motion communicated to it.

The general action of said dresser is as follows:

Firstly, after the device S has deposited the molded knob on the loose head T and moved out of the way, said head is raised to clamp the knob between it and the upper head or clamp W, when it receives a rotary motion in common with the latter and the loose head or lower clamp T. The cutter or scraper U is then moved forward in a gradually progressive manner to trim or dress off the edge of the knob, after which the cutter retires and the lower head or clamp T descends for a limited distance, when an automatic discharging device, S′, similar to the device S, comes forward and gently seizes, in like manner, the dressed knob, while the lower head T further descends to take its hub out of the cavity in the knob, after which the automatic discharging device S′ retires with the knob, and, releasing hold of the same, drops it on or into any suitable receiver.

It is preferred to so operate the devices S S′ that when the discharging one, S′, of them moves forward to take a dressed knob from off the loose head T the other or transferring device S simultaneously moves forward to seize a molded knob on the lower die I, as the same is presented for removal to the dresser, and so that while the discharging device S′ retires with a dressed knob the other corresponding device S conveys a newly-molded knob to the dresser. This may be done by causing both devices S S′ to be carried in a fast and radial manner by one and the same vertical rocking shaft A′, which receives its several requisite intermittent movements to horizontally swing and give the necessary changing positions and intervals of rest to both devices S S′, relatively with the die I and dressing-clamp T, by means, conjointly with a spring, C′, of a suitably-shaped cam, B′, on the shaft N, and an arm, a^1, on the rock-shaft A′, in pin gear with said cam.

The holding and releasing action of the devices S S′ on the knobs may be effected in a similar manner and at the same time in each device by means of sliding jaws b^1 b^1, a pair to either device.

Both pairs of jaws are simultaneously opened to enable them to release hold of their respective knobs and to remain open, when required, by means of a cam, D′, on the shaft N, arranged to operate on a lever, E′, pivoted as at c^1, and bearing at its one end, on a rod, d^1, which runs concentrically down the rocking shaft A′, and is connected below by pin and slot, with a sleeve, F′, fitted so as to be capable of sliding up and down the shaft A′ and of turning with it.

This sleeve F′ is fitted with a leg, e^1, that rests on the rear arm of a lever, f^1, which has its fulcrum on the radial arms or main portions of the devices S S′, and which is bifurcated in front of its fulcrum for the purpose of operating on toes g^1 of levers h^1, that are connected above and below its fulcrum by rods i^1 j' with the opposite sliding jaws b^1 b^1 of each pair of jaws. Springs k^1, one to either lever h^1, serve to close the jaws when released from opening action by the rotation of the cam D′.

The cutter or scraper U of the rotary dressing device is moved in a progressive manner toward the knob when under operation in the dresser, and retired when required by the alternate action of a cam, G′, on the shaft N and a spring, H′. To this end said cutter is secured to a vertical spindle, l^1, in a fixed standard, m^1, and provided at its upper end with an arm, n^1, on which the spring H′ pulls to retire the cutter, as against the action of the cam G′, which operates upon a lever, o', connected with the arm n^1, to feed the cutter up to its work.

The loosely-revolving lower head or clamp T of that portion of the rotary dresser which holds the knob while being dressed is elevated, partially lowered, afterward further lowered, and its necessary retention in such different positions effected, all as hereinbefore referred to, as follows:

Said lower head or clamp T is carried by a vertical rod, a^2, which is free to slide up and down in its bearings, and is moved and held down by a spring, b^2, as against the lifting action of a cam, K′, on the shaft N, said cam bearing on a lever, c^2, which is connected by a rod, d^2, with an arm, e^2, of a lower cross-shaft, f^2, that is free to rock in its bearings and carries on the opposite side of its axis a toe, g^2, which bears against the lower end of the sliding rod a^2 to lift the latter, and through it the clamping-head T.

The other or upper clamping-head W has a positive and continuous rotary motion communicated to it by means of a vertical shaft, h^2, on which it is hung so as to turn with the shaft, but with freedom of self-adjustment up or down, under control of the spring i^2, to effect a soft or elastic hold on the knob. This shaft h^2 is driven by bevel-gear k^2 l^2, which derive their motion from the shaft N by spur-gear m^2 n^2.

The charge-carrier C is operated, as hereinbefore described, by the conjoint action of a cam, L′, on the shaft N, and a spring, M′, on a lower shaft, a^3, which is hung to rock in its bearings, and is connected, as by an arm, b^3, and rod, c^3, with the rear end of the carrier.

The cam L′ acts upon a lever, d^3, to force the carrier back through a rod, e^3, and arm, f^3, on the shaft a^3, such action being as against the effect of the spring M′, which operates to throw the carrier forward. Said cam L′ is jogged on a portion of its periphery to cause the rear end of the carrier C, when thrown back and in communication with the hopper, to give a series of jerking actions to the agitator E, by the contact of a leg or tail from the latter with the rear end of the carrier.

Having now described my invention, and how the same may be carried into effect, I wish it to be distinctly understood that the details of the same and means of communicating to the several parts their requisite motions may be variously modified without changing the distinguishing character or leading features of the invention.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The adjustable throat B of the hopper, in combination with the charge-carrier C and bed D, over which the receiving-chamber of the carrier travels, substantially as specified.

2. The combination, with the die-case F, of the upper and lower dies G I and plunger H, operating together to lift the molded article out of the die-case and to retain a yielding pressure on said article while being so lifted, essentially as herein set forth.

3. The combination in the one machine, with the charge-carrier C and molding devices F G H I, of the rotary dressing device T V W for trimming the edge of the molded article as it comes from the dies, substantially as specified.

4. The combination, with the molding-dies G I and rotary dressing device T V W, of an automatic device S for transferring the molded article to the dressing device, essentially as described.

5. The combination, with the molding-dies G I, rotary dressing device T V W, and automatic transferring device S, of an automatic discharging device, S′, for removing the dressed article, substantially as specified.

THOS. J. SLOAN.

Witnesses:
FRED. HAYNES,
FERD. TUSCH.