Specification of John Tomes : artificial teeth, gums, and palates.

A.D. 1845 . . . . . N° 10,538.

SPECIFICATION

OF

JOHN TOMES.

ARTIFICIAL TEETH, GUMS, AND PALATES.

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Artificial Teeth, Gums, and Palates.

TOMES' SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOHN TOMES, of Mortimer Street, Cavendish Square, Surgeon Dentist, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Royal Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Third day of March, in the eighth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said John Tomes, Her especial licence, full power, sole privilege and authority, that I, the said John Tomes, my exors, admors, and assigns, or such others as I, the said John Tomes, my exors, admors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, my Invention of "IMPROVEMENTS IN MAKING ARTIFICIAL TEETH, GUMS, AND PALATES;" in which said Letters Patent is contained a proviso that I, the said John Tomes, shall cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, to be inrolled in Her said Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters

Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said John Tomes, do hereby declare that the nature of my said Invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the Drawings hereunto annexed, and to the figures and letters marked thereon, that is to say:—

My Invention consists, first, of a mode of obtaining correct models of parts of the palates and of the gums, and of any teeth there may be therein, in order to facilitate the manufacture of artificial teeth, gums, and palates; and,

Secondly, my Invention consists of forming artificial teeth, gums, and palates, or parts thereof, by machinery working by means of a blunt tracing instrument and a drill, in such manner that the blunt tracing instrument moving over the surfco f a well-formed model governs the cuttin g of the drill, thus producing a superior and more accurate manufacture of artificial teeth, gums, and palates at comparatively small cost.

And in order that my Invention may be most fully understood and readily carried into effect, I will describe the means pursued by me.

In the manufacture of artificial teeth, gums, and palates, as heretofore practised, when using what is called "dentine" (the principal substance comprising teeth, that of the hippotamus or walrus is generally chosen), as well also when using other materials, it has has been usual to obtain a model by means of wax of the palate, gums, and teeth, or parts thereof, and then to obtain a cast therefrom in plaster of Paris, which, more or less, offers a correct cast of the parts of the palate, gums, and teeth taken by the wax, and this plaster cast the workman uses as a means of obtaining a reversed copy in "dentine" suitable for being placed in the mouth; and he obtains such copy by first roughly rasping or filing the "dentine" into an approximation to the desired shape, and then by applying coloring matter to the surfaces of the plaster cast, and bringing the surface of the "dentine" in contact therewith, he marks the surface of the "dentine," which enables him to judge of the parts to be cut away, and by repeating this operation many times, and using much skill, he ultimately produces a more or less perfect surface to fit the gums, and he forms the teeth and other parts of the outer surfaces by separately cutting away the surface, all which is well understood, the process being tedious and requiring great skill and consequent cost, in order to produce comparative exactness of fitting of the parts to the gums, and to any teeth which may be herein. Now, by my Invention, I first

obtain a very accurate model of the parts required to be made, and then, by machinery of the character above mentioned, I am enabled not only to perform the operation of forming the desired parts more quickly, but to obtain them with surfaces more accurately fitting the gums and other parts than heretofore.

Description of the Process and Machinery for Carrying out my Invention.

In order to carry out the first part of my Invention, I, as heretofore, with care obtain a model of the palate or gums, and of any teeth which may be therein, by means of wax, from which I obtain a plaster cast, which I employ for the purpose of obtaining a model (in a suitable preparation of materials) corresponding with the model obtained in wax, from which I form the dental parts, as hereafter described; but I do not, as heretofore, depend on the model taken in wax being correct, as has heretofore been the custom, and which very often leads to the requirement of the dental parts being tried many times in the mouth and alterations of the surfaces, in consequence of the same not accurately fitting. On the contrary, before proceeding to make the dental parts in "dentine," or other material, I cause the composition model obtained from the plaster cast to be tried in the mouth, and if the same does not very accurately fit, its want of fitting will be seen, or it will on being pressed in different parts tilt or move, and the accurate fitting of the composition model will readily be ascertained from the circumstance that on coming in exact contact with the gums and other surfaces, the air being excluded from between those surfaces and the composition model, it will be found to adhere or remain in contact. Should this not be the case on trying the composition model, then the composition is to be rendered soft by hot water at those parts where it does not accurately fit, and then pressed in contact with the gums and other parts till it accurately fits, when it is to be carefully removed and put into cold water to harden. The composition I prepare in following manner:—I take about eight pounds of shellac, blood lac, or lac, and place it in a vessel, and then place the vessel in a hot-oil bath, similar to those commonly used by chemists, and allow it to remain till the lac is melted; I then add two pounds of the solution of india rubber in spirits or turpentine or naptha, as sold by Mackintosh and Company; I add also six pounds of ivory dust or plaster of Paris or common chalk. The several ingredients are then thoroughly incorporated by stirring over the oil bath. I then pour the hot mass upon a warm slab of iron or stone, and by a roller reduce it to a cake of about a quarter of an inch in thickness; this I call dental moulding composition. In using the so-made composition I proceed in the following manner:—I take

a piece of suitable size and place it in boiling water, or otherwise heat it; on its becoming soft I remove it from the water, and press it upon the plaster cast of the mouth. If on removal from the cast I find it does not fit the cast perfectly, I again heat it by means of the boiling water, and repeat the pressure on the cast. Supposing it to fit the cast, I then reduce it to the required size by filing or cutting, and place it in the mouth for trial, as before described. When made to fit the mouth I place the composition model in a ring of metal and pour plaster of Paris into the ring, in such a manner that the surface of the model fitted to the mouth shall remain exposed, whilst the opposite surface is firmly imbedded in plaster; and in this condition I place the model in the machine. Or, instead of imbedding the composition model and working from it, I take a cast of the fitting surface of the model in plaster of Paris, and this cast I press into melted tin or zinc, or other metal, and allow the metal to cool with the cast in it. By this means I transfer the fitting surface of the composition model to metal, and I place the metal in the machine and work from its surface, instead of working from the surface of the composition model. Having copied the surface fitted to the gums I turn both the composition model and the dentine or other material, and then proceed to copy the surface of the teeth opposite the fitting surface. Instead of pursuing the foregoing method I sometimes make use of the plaster of Paris cast or a metallic counterpart (having first tested its accuracy) by placing it in the machine, and copy from its surface a reverse by means hereafter described. I would remark, that I do not confine myself to the exact composition herein described, so long as a composition be employed capable of hardening on the plaster cast, allowing of being formed into the proper shape, as herein described, by filing, and yet when found not to fit to be capable of being rendered sufficiently plastic to correct the errors, and then again to harden, so as to be used as herein described.

I will now describe the machinery employed, and the manner of performing the second part of my Invention, which will readily be understood by reference to the accompanying Drawing A. Figure 1 is a front view, and Figure 2 is a plan of this machine. The same letters of reference are used to indicate the same parts in both Figures. *a* is part of the framing supporting the table and slide bearings. *b* is the face plate, which moves horizontally in the slide *c*, and the slide *c* with the face plate *b* moves vertically in the slide *d*. This horizontal movement is effected by the screw *e*, worked by the handle *f*, and the vertical movement is effected by the screw *g*. The method of working this screw will be hereafter described. To the face plate *b* are affixed two circular discs b^1, b^2, one carrying the model and the other the dentine or other

material in which the model is to be copied. *h* is the tool slide carrying the tracer *i* and the drill *j*. This slide moves horizontally in bearings *k*, which are affixed to the table *l*, this table being attached to the framing *a*; a quick rotatory motion is communicated to the drill *j* by an endless band passing in one of the grooves in the pulley *m*, such band passing round another larger pulley, which may be worked by a treadle or other suitable means. *n* is a lever attached to the tool slide at *o*, and moving on a fulcrum *p*, which is formed by pinning to an arm *q*. This arm moves on a centre q^1 affixed to the table *l*. The working of this lever will be evident on examining the Drawings. The arm *q* has several holes in it, so that the fulcrum *p* of the lever *n* may be adjusted to any required position, according to the thickness of the material being operated upon. *r* is an arm or lever turning on a fulcrum *s* affixed to the side of the table *l*. *t* is a rod communicating with this lever, passing under the table, and connected by another arm *u* with the vertical shaft *v*. This shaft *v* turns in bearings at its upper and lower end, such bearings being affixed to the framing. *w* is an arm proceeding from the shaft *v*, and connected with the ratchet *x* by a link *y*. This ratchet lever *x* turns on the same axis as that of the screw *g*, the screw *g* moving freely within it. To this ratchet lever is attached a spring A actuating the catch B. This catch B takes into the notched wheel C, which moves on and turns the screw *g*. The action of this ratchet is of the ordinary kind. It is evident, that if the tool slide *h* be moved out by the lever *n*, and pressed against the upper arm of the lever *r*, this motion will be communicated through the arms *t*, *u*, to the vertical shaft *v*, and thence through the arms *w*, *y*, to the ratchet lever *x*. This lever *x* as it moves will actuate the movement of the notched wheel C, as will readily be understood by examining the Drawings. The amount of movement of this wheel will depend upon the extent to which the lever *r* is moved by the pressure of the tool slide *h*, and this is regulated by a stop D, affixed to the side of the table, a pin E, placed in the arm *t*, catching against this stop, the position of the pin upon the arm being variable.

I will now proceed to describe the means of working the machine. Having affixed the model and material in which the model is to be copied (which I will hereafter call the work), by suitable clamps or other means, to their respective discs b^1, b^2, I select a tracer and drill of equal size. The tracer and drill are adjusted by suitable means to the highest point of the model and work. The drill is then set in rapid motion by a band, as herein described, and the tool slide is moved forwards by the action of the lever *n*. The various parts of the surface of the model and work are exposed to the action of the tracer and drill by the combined action of the screws *e* and *g*, by which the

horizontal and vertical movements of the face plate *b* are effected. The horizontal movement is effected by turning the handle *f*, and the vertical movement is effected either by pressing the tool slide *h* against the lever *r*, which is connected with the ratchet by various arms, as herein described, or by turning the handle F. A weight G is affixed to the tool slide at H, and thus the tracer and drill are influenced to press upon the model and work, the workman at pleasure assisting such pressure by moving the lever *n*. It will be evident from these remarks, that the model and "work" by their horizontal and vertical movements present each point of their surfaces successively to the action of the tracer and drill, and the pressure of the tracer upon the surface of the model will cause each undulation to be followed. Thus a fac simile of the model will be produced in the "work," for by the above arrangement simultaneous movements are effected in the tracer and drill, and simultaneous movements are also secured in the model and "work"; it therefore follows that the drill must produce in the material submitted to its action a surface similar to the one passed over by the tracer. It may be remarked, as an important feature in my Invention, that a section of the drill at its point as it revolves must be similar in size and form to a section of the tracer at its point.

I will now describe a method of producing by the drill a surface perfectly the reverse of the surface passed over by the tracer. I is a face plate, containing a disc I^1, and moving in the same slide as the face plate *b*. The screw which causes it to move backwards and forwards is formed on the same spindle as the screw *e*, and is cut into exactly equal threads, but this screw is cut in the reverse direction to the screw *e*; by this means the motion though equal is reversed, the two face plates approaching or receding from each other. J is a drill attached to a tool slide K, similar in form to the drill *j*, and moving in bearings L affixed to the table *l*. This drill J is caused to revolve by a band in a similar manner to that of the drill *j*; the tool slide *h*, by a lever M which turns on a fulcrum N, which should be at its exact centre. Thus any motion given to the tool slide *h* will communicate a reverse motion to the tool slide K. When a reverse copy of the model is required the cutter of the drill is taken out of the tool slide *h* and placed in the tool slide K. The purposes for which this reverse is required have been previously explained. It will be thus at the option of the operator to use this method of producing an exact reverse of the cast, or the method before described of producing an exact fac simile of the model. Other arrangements of machinery may be used, so long as there shall be a tracing instrument governing the cutting drill as herein described.

And I will now explain machinery where the drill is in the same line with the tracing instrument in place of being parallel thereto, as above described. The accompanying Drawing B illustrates this form of machine, which is constructed upon the same general principle as the one already described. The tracer A and the drill B are mounted upon a vertical tool slide C; the axis of the tracer and drill being in the same vertical plane, the tool slide C moves vertically in the frame D, and is counterpoised by the weight E. F is the face plate on which to fix the model, and G is the face plate on which to fix the dentine or other material to be worked. These face plates F, G, may be constructed to move upon an axis so as to present any angle to the tracer and drill. Let into the face plates are two discs similar to those in the machine already described. The parallel face plates are fixed to the slide H, which moves horizontally upon its bearings by the handle I in the frame J, while the frame J is wound backwards and forwards in its bearings in the frame L by the handle K; but in this, as in the machine previously described, this movement of the frame J may be effected by a ratchet. Motion is given to the tool slide C either by a handle, as in the machine already described, or by the simple pressure of the hand. The mode of working this machine is very similar to that of the machine previously described, and therefore will require no lengthy description. The workman having selected a tracer and drill of equal size, having fixed the model and work upon their respective discs, and having adjusted the tracer and drill to the highest point of the model and work, causes the drill to revolve rapidly by any suitable means, and causes the tool slide with its tracer and drill to press upon the model and work by means herein described. The various parts of the surface of the model and work being exposed successively to the action of the tracer and drill by turning the handles I and K, and the depth to which the drill pierces the material being regulated by the impingement of the tracer upon the surface of the model a fac simile of the model will thus be produced. When under-cutting is required, the face plates F and G are moved equally in their centres, and thus will present the surfaces of the model and work to the action of the tracer and drill at any angle required.

I would remark, in respect to the second part of my Invention, that I am aware that machines have before been made for cutting wood and other materials for various purposes, having drills governed by tracing instruments, in a similar manner to the machinery above described; and I mention this circumstance in order to state that I do not claim the constructing of such machinery, nor do I confine myself to the details shewn and described when carrying out the second part of my Invention.

And I wish it to be understood that what I claim is,—

First, the mode herein described of obtaining correct models of teeth, gums, and palates for dental purposes.

And, secondly, I claim the forming of artificial teeth, gums, and palates, or parts thereof, by means of machinery working by a blunt tracing instrument moving over a suitable model and governing the cutting of a drill, as herein described.

In witness whereof, I, the said John Tomes, have hereunto set my hand and seal, this Twenty-ninth day of August, in the year of our Lord One thousand eight hundred and forty-five.

JOHN (L.S.) TOMES.

AND BE IT REMEMBERED, that on the Twenty-ninth day of August, in the year of our Lord 1845, the aforesaid John Tomes came before our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

SENIOR.

Enrolled the Third day of September, in the year of our Lord One thousand eight hundred and forty-five.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1857.

FIG. 1.

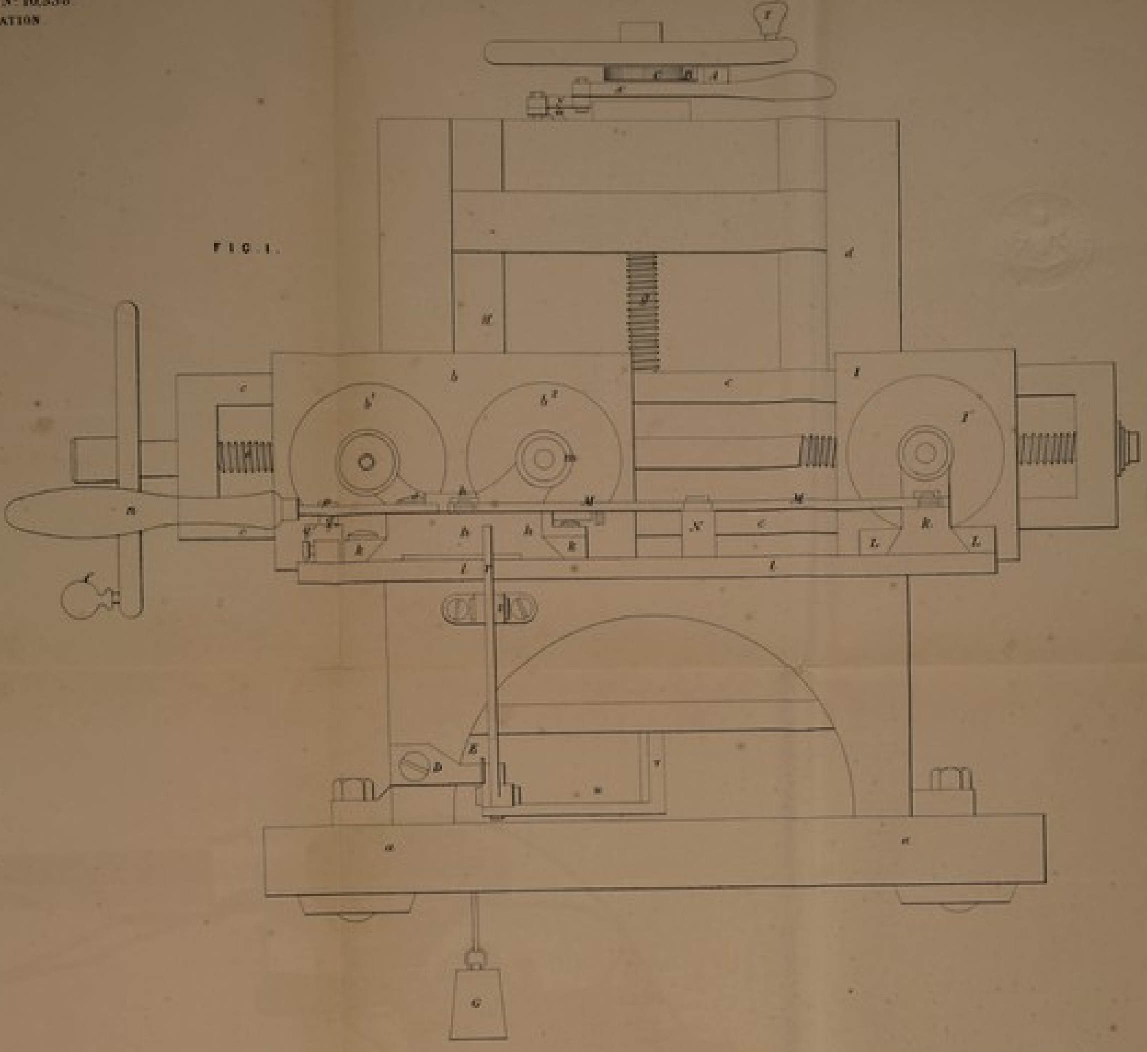
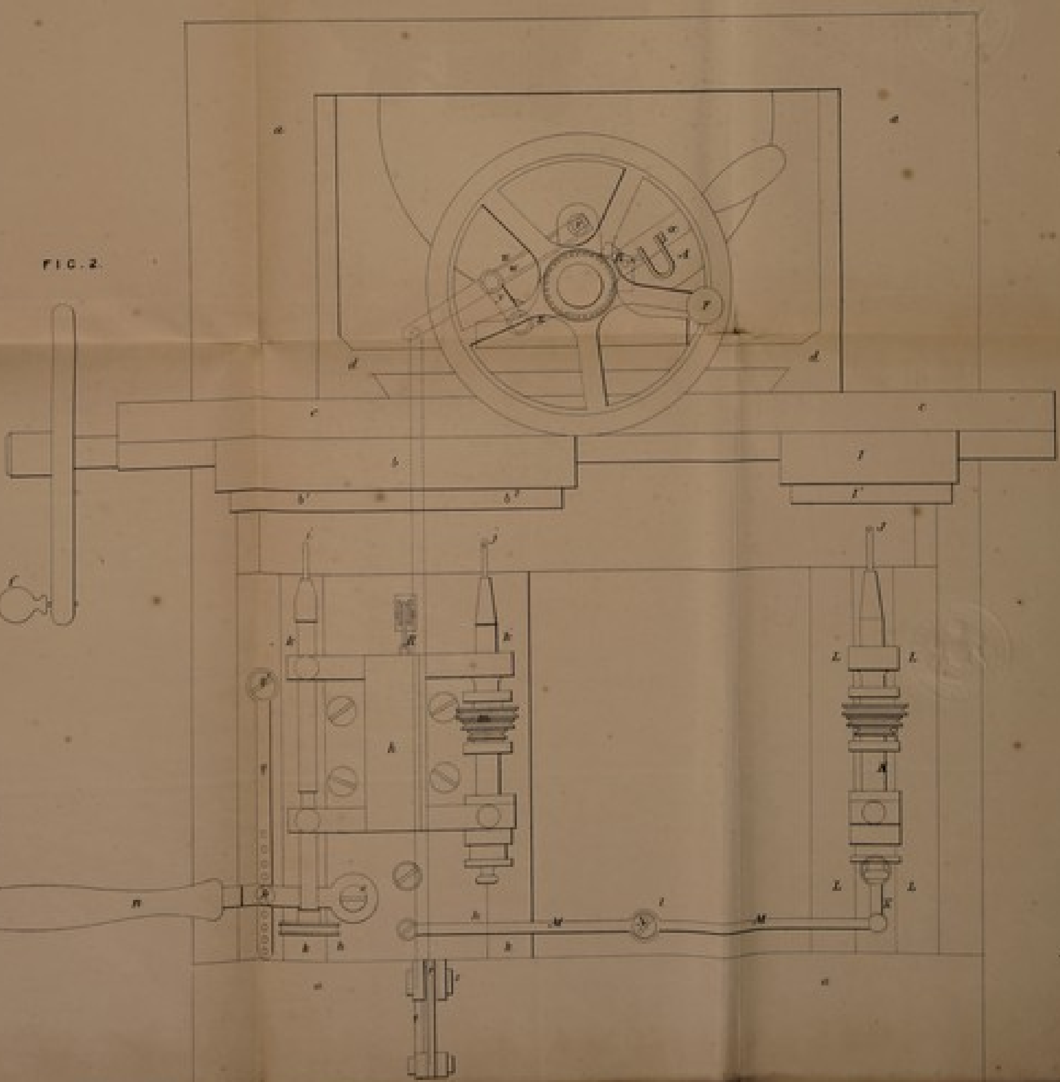


FIG. 2.



The enrolled drawing is partly colored.

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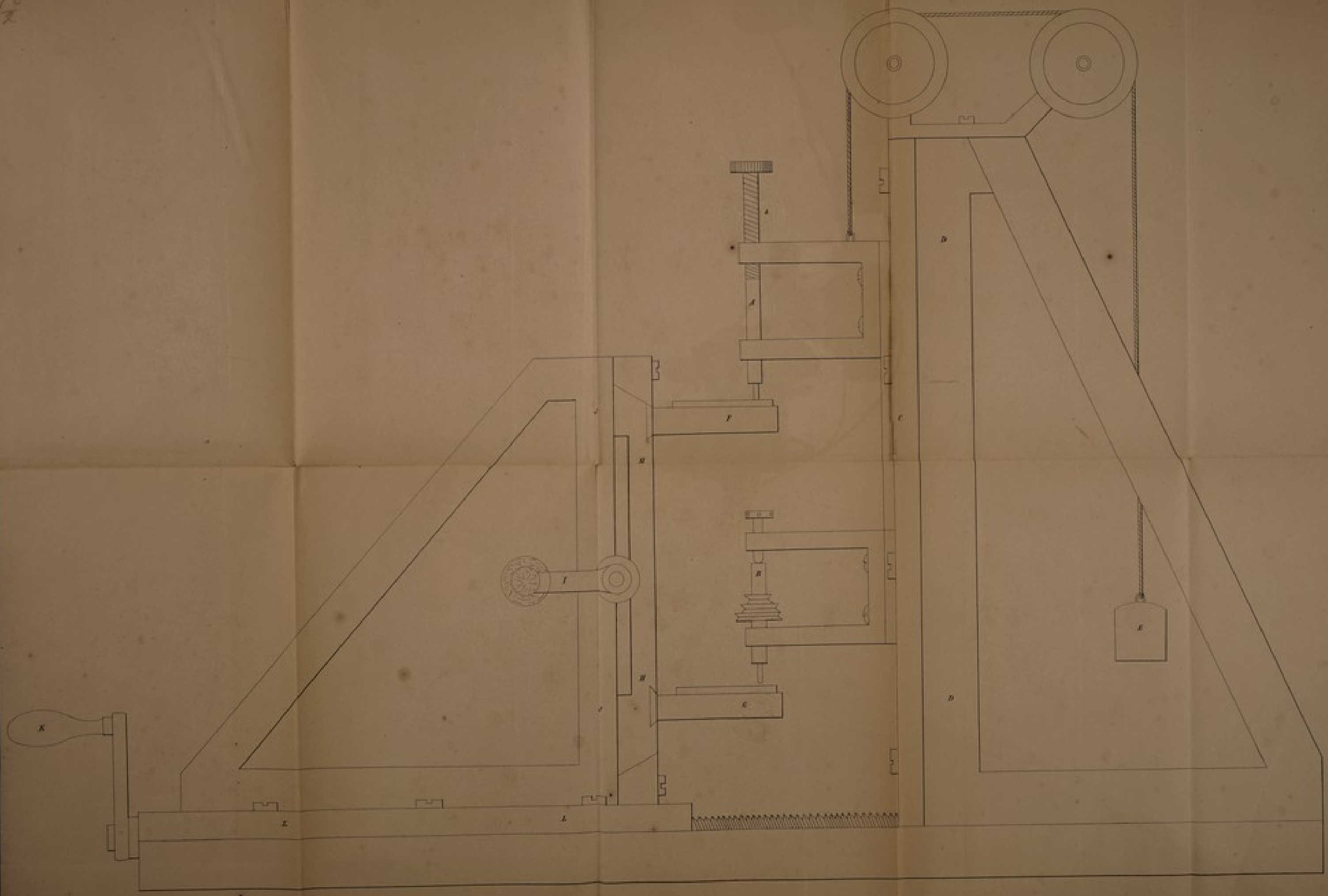
(2 SHEETS)



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