

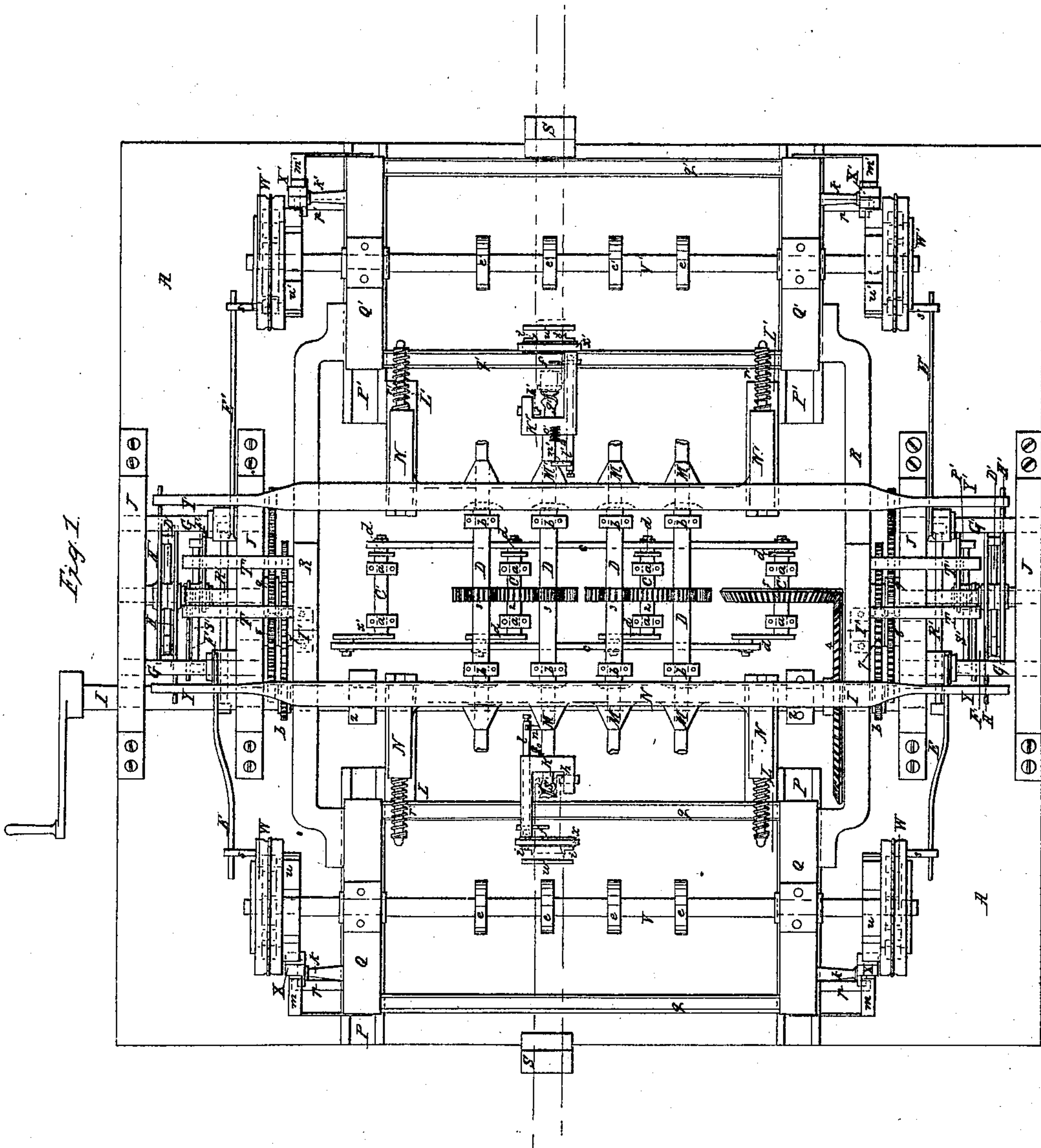
2 Sheets, Sheet 1.

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Making Wooden Boxes.

N^o 12,149.

Patented Jan. 2, 1855.

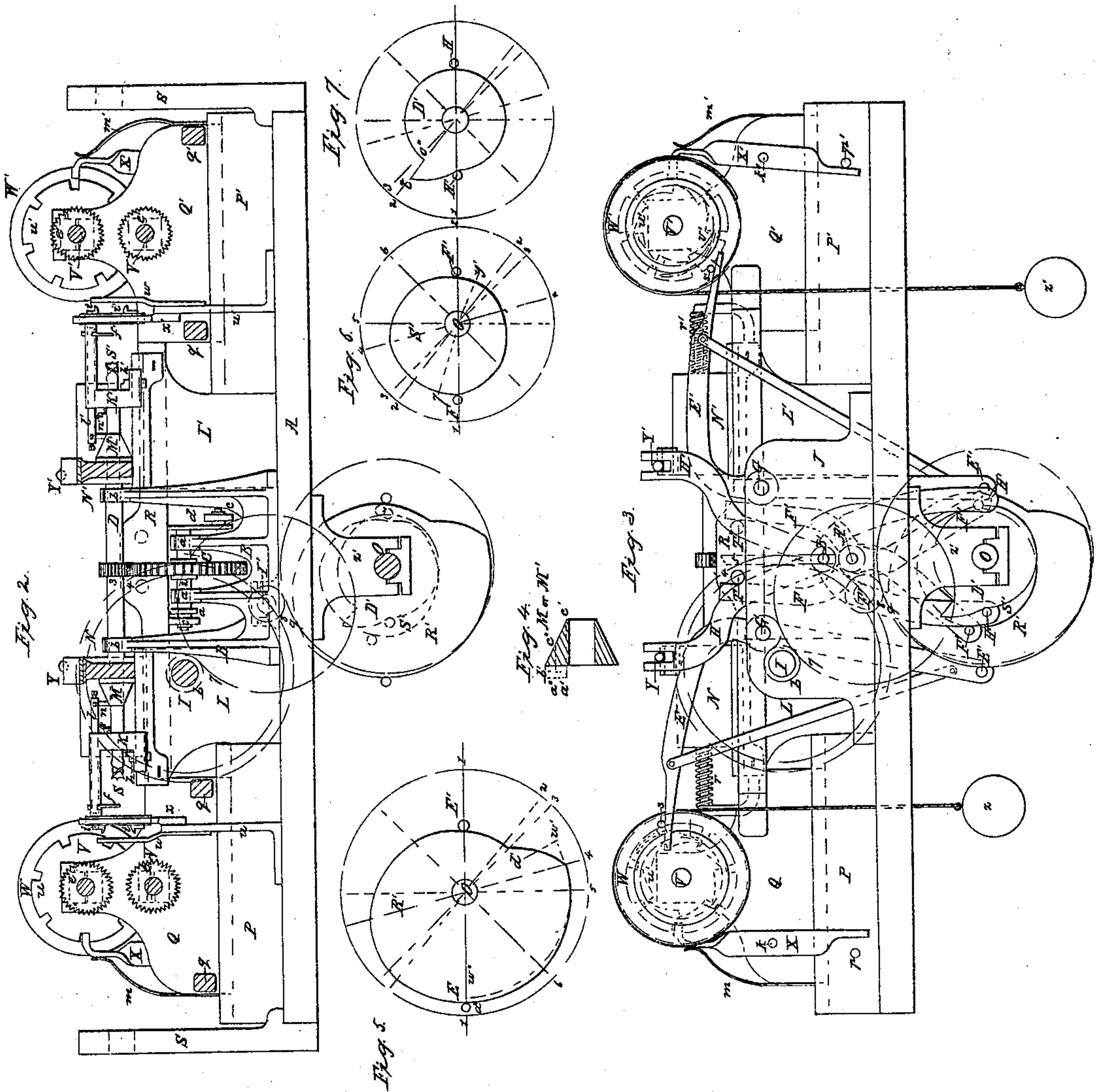


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UNITED STATES PATENT OFFICE.

LOUIS KOCH, OF NEW YORK, N. Y., ASSIGNOR TO THEODORE PINCUS.

MACHINE FOR MANUFACTURING WOODEN BOXES.

Specification of Letters Patent No. 12,149, dated January 2, 1855.

To all whom it may concern:

Be it known that I, LOUIS KOCH, of the city of New York, in the county and State of New York, have invented a new and useful Machine for Turning, Boring, and Finishing Wooden Boxes; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1, represents a top view; Fig. 2, a longitudinal section and Fig. 3, an end view of the machine.

The other figures represent detail parts to be referred to, in the following description.

A, is the bedplate of the machine.

B, are frames fastened to the bedplate provided with bearings *a* and *b* to carry the shafts, C and C', and spindles D.

2, are wheels fast on the shafts C.

3, are pinions on the spindles D and worked by the wheels, 2.

d, are small cranks, one of which is fastened on each end of the shafts C and C'.

c are connecting rods, by which the cranks, *d*, are connected.

K, K', are toolholders, one of which is attached on each end of the spindles, D, and revolve with the same. Each toolholder contains four different kinds of tools or knives, consisting first—*i*, *i'*, one or more tools for turning the outside of the wood, second *g*, *g'*, a tool for boring out the wood, thirdly, *h*, *h'*, a knife for turning the shoulder on, for the cover, and fourthly *f*, *f'* a tool for cutting off the boxes after the same are finished. The tools *i*, *i'*, *g*, *g'* and *h*, *h'* are firmly attached by screws, so as to be moved and fitted for different sizes of boxes; the tools, *f*, *f'*, for cutting off the boxes are fastened to spindles, *l*, *l'*, passing through an arm of the toolholder or resting upon the same in bearings. These spindles, *l*, *l'*, have on their outer extremity an arm *n*, *n'*, firmly attached resting upon the surfaces of cones M, M', and are provided with small springs, *o*, *o'*, so as to keep by their action, the arm *n*, *n'*, always against the surface of said cones.

L, L', are standards firmly screwed to the bedplate A and upon which the frames N, N', rest in grooves, capable of a slight motion forward and backward on the same.

M, M', are cones fast on the frames N, N',

and through which said frames and cones the spindles D pass.

Y, Y', are projections fast to the frames N, N', by which the same are moved forward, as will be hereafter described.

r, *r'*, are springs made to press against the frames N, N', so that by the action of said springs, those frames are brought back again, after having been moved forward.

P, P', are standards firmly attached to the bedplate-A.

Q, Q', are supports resting upon the standards P, P', so as to be capable of sliding on the same in grooves. These supports are securely connected together by rods *q*, *q'*, and again by the frames R so as to form one whole, capable of sliding simultaneously upon the standards, P, P', forward and backward.

T, T', are projections fast to the frames, R, and by which the same, and therefore the supports, Q, Q', are made to move as will be hereafter described.

V, V', are shafts running in adjustable bearings in the supports, Q, Q', and provided with ratchet wheels, *e*, *e'*, between which said wheels the wood, out of which the boxes are to be made, is firmly held stationary, or made to press into the toolholders, as may be required. The lower shafts V, V', with their ratchet wheels, *e*, *e'*, turn freely in their bearings. U, U', are pulleys keyed on the ends of the upper shafts, V, V', and by which said shafts are turned, or can be held fast.

W, W', are pulleys loose on projections of the pulleys U, U', and provided with internal springs, *v*, *v'*, which said springs are made to fit into teeth cut on the projections of the pulleys U, U', so as to lock the pulleys, W, W', to the pulleys U, U'.

S, S', are pins fast on the pulleys, W, W', by which the same are turned, as will be hereafter described, thereby turning the pulleys, U, U', as well as the upper shafts, V, V', at the moment the internal springs, *v*, *v'*, fit one of the teeth, cut on the projections of the pulleys U, U'.

Z, Z', are weights attached to cords, which pass over the periphery of the pulleys W, W', to keep these pulleys always in such a position, that the pins, S, S', shall always bear against the levers E, E'. The pulleys, U, U', have a certain number of grooves cut on the periphery, the number varying according to the size and description of

boxes, which are required to be made. The teeth cut on the projections of the pulleys, U, U', as before mentioned are of equal number, with the number of grooves on those pulleys.

X, X', are levers turning on centers, k, k' , fast to the supports, Q, Q', the upper ends of which fit into the grooves cut on the pulleys, U, U'.

m, m', are springs likewise fast to the supports, Q, Q', and so arranged as to act against the levers, X, X', in such manner, as to keep the same, at given moments, in the grooves of the pulleys, U, U', and thereby preventing the upper shafts, V, V', from turning. p, p', are pins or projections fast to the standards, P, P', or to the bedplate, A, and so arranged that when the lower end of the levers, X, X', come in contact with the same, said levers are thrown out of the grooves of the pulleys, U, U', setting thereby the same at liberty and allowing the upper shafts, V, V', to be turned as will be hereafter described.

S are guides for the wood, out of which the boxes are to be turned, and screwed to the outside of the bedplate.

u, u', are standards screwed to the bedplate having on one side guides w for the wood screwed on, and on the other side frames x, x' , in which said frames the outer end of the tool holders, K, K', are guided.

I is the main driving shaft running in gearings, z, fast to the bedplate A.

4, is a bevel wheel keyed on the shaft I running in a corresponding bevel wheel, 5, keyed on the shaft, C'', and from which the motion is communicated to the shafts C through the connecting rods c and cranks d.

6, is a pinion fast on the shaft I working in a wheel, 7, fast on an intermediate shaft I' resting in bearings attached to the bedplate.

8, is a pinion fast on the intermediate shaft I' working in a wheel 9, fast on the shaft O, which latter runs in bearings z' attached to the underside of the bedplate A.

J are frames screwed to the bedplate A and carrying the centers A', B', G, and G'.

R' is a cam fast on the shaft O.

E, E', are levers turning upon the centers, G, G', the lower end of which rest against the two sides of the cam, R', and the upper end against the pins, s, s', fast on the pulleys W, W'.

S' is a second cam fast on the shaft O.

F, F', are levers turning upon the center A', the lower end of which rest against the two sides of the cam S' and the upper ends against the projections, T, T', fast to the frames R.

D' is a third cam fast on the shaft O.

H, H', are levers turning on the center B' the lower end of said levers resting against the two sides of the cam D' and the upper

ends against the projections, Y, Y', fast to the frames N, N'.

Fig. 4, represents the cones M, M', separate. The same are so constructed that the distance, $a' b'$, is equal to the radius of the largest size boxes capable to be made upon a machine; it follows therefore that the frames N, N', to which those cones are attached must move the distance, $a' c'$, if the largest size boxes are made; but if a box be made whose radius is equal, $a'' b'$, then the distance necessary for the frames, N, N', to move, will be only equal to, $a'' c'$, and the time required for this operation is then in proportion as the distance $a' c'$ is to $a'' c'$.

Fig. 7, represents the cam D' by which the frames, N, N', through the levers, H, H', are moved. This cam is so constructed that the height $o'' t$ is equal to the amount of motion required to be given to the frames N, N'.

Fig. 6, represents the cam S' by which the supports, Q, Q', are moved through the levers, F, F'. This cam is so constructed that the surfaces from 1 to 4 are concentric with its center, but of different radius and this space be equal to the time those supports are required to remain stationary, it follows therefore that when the levers, F, F', are in contact with the surfaces of this cam, during the space from 4 to 1 those supports will be moved either to the right or to the left. The difference between the radius O y and the radius O y' is equal to the distance said supports, Q, Q', have to be moved, and which distance must be equal to the depth the wood requires to be bored out.

Fig. 5, represents the cam R' by which the pulleys, W, W', through the levers, E, E', are turned upward and as those pulleys are then locked to the pulleys, U, U', which latter pulleys are keyed fast to the upper shafts, V, V', that motion is communicated to said shafts. When the box is finished and cut off, the wood has to be moved toward the toolholder, first the depth, the hole has been bored out, and secondly, the thickness of the bottom of the box.

On the cam R' the height $d' w'$ is made equal to the depth the hole has been bored out, and by the before described connection the wood is therefore brought as much toward the toolholder, and the space from 3 to 4 is the time allowed for said operation, while the heights $d'' w''$ is made equal to the thickness of the bottom, and the space from 4 to 1 is the time allowed for this operation. The main driving shaft I may in practice be placed at any other convenient position, and connected then by gearing in the usual manner with the shafts C' and O in such manner as to give to said shafts the required speed.

The operation of this machine is as follows; In the position represented in the

following drawing (where in Fig. 1, the wood is represented in red lines) the wood on the left hand side has been sufficiently far bored out and the recess for the cover turned on, while on the right hand side the wood is clear of the tools g' and h' and ready to be cut off, in which position the wood is held now stationary. Now set the machine in motion, when the toolholders will be set revolving as well as the shaft O, through the respective gearing as before described. While the shaft O turns through the space from 1 to 2 the lever H' is acted on by the projection, $o''t$, on the cam D' and presses the frame N', with the cones M' attached, forward, thereby compressing the springs r' . By this forward motion of said frame the arms n' are forced up, the inclined surface of the cones M', turning the spindles l' and consequently the knives f' so as to bring the latter toward the center of the wood, by which operation the box is cut off.

Secondly. While the shaft O turns through the space from 2 to 3 the lever H' falls from the projection, $o''t$, of the cam D' to its original surface, and the spring r' , compressed by the before described action, forces the frame N' back again to its first position by which backward motion the arms n' on the spindles l' are relieved and forced back again by the action of the spring o' thereby bringing the knives f' to the outside periphery of the wood and out of action. In the position represented in the drawing the lower end of the lever X' has come in contact with the pin or projection p' and has, by said pin, been thrown out of one of the grooves on the pulleys U' setting thereby the latter at liberty to be turned. The spring v' of the pulleys W' fits likewise into one of the teeth on the projections on the pulleys U', and locking thereby the two pulleys together.

Thirdly. While the shaft O turns through the space from 3 to 4 the projection, $d'w'$, on the cam R' has acted on the lever, E', pressing thereby the pin s' , fast to the pulley W', upward, and as this pulley is now locked to the pulley U', as before described, the upper shaft V' is partly turned around thereby advancing the wood toward and into the toolholder K', as much as the depth of the hole, the wood has been bored out. While the shaft O has turned through the space from 1 to 4 as just described, the levers F and F' have rested on that part of the surface of the cam S' which is concentric with its center, and had therefore no motion communicated to them, consequently the supports Q Q' have during that time remained stationary.

Fourthly. While the shaft O turns through the space from 4 to 1 the lever F' is acted on by the cam S' and moves by its connection with the projection T' fast on

the frames R, (which said frames connect the supports, as has been before described,) the supports Q Q' from the right hand to the left, forcing thereby on the right hand the wood into the toolholder K' and against the boring tool g' and afterward against the tool h' , whereby the wood is bored out and the groove for the cover turned on; and at the left hand of the machine, the wood is brought out of the toolholder K, clear of the boring tool g , as this motion is equal to the depth, the hole has been bored in, as before described. During this time, that the shaft O turns through the space from 4 to 1 the cam R' acts still on the lever E' giving to the same and therefore to the pulleys U' and W' (as those two pulleys are still locked together) and consequently to the wood between the ratched wheels e' a second motion, in combination with the one just described, and which said motion is equal to the thickness of the bottom of the box. The wood, on the right hand side, receives therefore, during this time, two motions, one from the movement of the supports Q, Q', and one from the motion communicated to the upper shaft V' through the pulleys U' and W', and which said two motions are together equal to the whole length of the box. While the wood is pressed into the toolholder K', as just described, the knives, i' , turn the outside of the same.

By the motion of the supports Q and Q' the lower end of the lever X' has come clear of the pin p' and is now through the action of the spring m' pressed against the periphery of the pulley, U', and falls at the moment the above described motion of the supports, Q, Q', is finished, into the next groove of the pulley U', holding thereby the same, and consequently the upper shaft V', stationary, until the lever X' comes again in contact with the pin or projection p' , in the backward motion of the supports.

While the shaft O has turned through the spaces from 3 to 1 the lever E has moved down the incline on the cam R'. The pulley W is then acted on by the weight Z attached to the cord passing around the periphery of said pulley, thereby pulling the pulley W around, in such manner as to keep the pin s always against the lever E. During this time the internal spring v slides over the back of a tooth cut on the projection of the pulley U until it falls into the next tooth. The upper end of the rod X is held by the spring m in one of the grooves of the pulley U, preventing thereby the same from turning while the pulley W is turning backward on the projection of the pulley U as just described.

During the time, that the shaft O has made one half revolution, as has just been described, the wood on the left hand side of

the machine has been brought clear of the borer *g* and the boxes on this side are now ready to be cut off, while from the wood on the right hand side one set of boxes have
5 been cut off, the wood been again sufficiently advanced, and has been bored out and the recess for the cover turned on.

By the second half revolution of the shaft *O* the above mentioned operation will be
10 repeated, only with this difference, that those operations, which have been described as having been performed on the right hand side of the machine, will now be performed on the left hand and vice versa. By every
15 one whole revolution of the shaft, *O*, two sets of boxes will therefore be turned, bored, and cut off, that is of the largest size boxes capable to be made in a certain machine.

To make different sized boxes the cams,
20 *R'*, *S'*, *D'*, must be changed for others similar as regards construction, but differently divided as regards to space each projection occupies, and the pulleys *U* and *U'* must be
25 changed for similar ones, but having a greater number of grooves and teeth. For example, if it is desired to change these cams and pulleys so as to be able to make a size of boxes half as large in every respect, then on the cam *D'* the height *o'' t* requires
30 to be only one half of the former and it requires, consequently, only one half of the time, for the operation to be performed in, and the same will be the case with the cams, *R'*, *S'*, and the pulleys *U* and *U'* will re-
35 ceive twice the number of grooves, as well as twice the number of teeth on their projections, consequently we shall be able to make of this kind of boxes 4 sets by every one whole revolution of the shaft *O* and so on
40 in proportion to the size of boxes.

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

1. I claim the means of making different sized boxes on the same machine, by the mere change of the cams, *R'*, *S'*, *D'*, and
45 the pulleys *U*, *U'* corresponding to the size of boxes as described.

2. I claim, cutting off the boxes, when finished by tools *f* or *f'* fastened to spindles, *l* or *l'*, said spindles being attached to the
50 toolholders, and worked by an arm *n* or *n'* fast on the end of the spindles as described.

3. I claim the construction and application of the frames *N* or *N'* with cams, *M*, *M'*, respectively, attached, actuating through
55 the arms *n* or *n'* the spindles *l* or *l'* and consequently the tool *f* or *f'*, said frames being worked by cams *D'* and levers *H* or *H'* as described.

4. I claim the arrangement and connection of the supports, *Q*, *Q'*, provided with shafts and ratchet wheels, between which
60 latter, the wood, out of which the boxes are to be made, is held, said supports being worked by cams *S'* and levers *F* or *F'*, for
65 feeding the wood to the tools and releasing the same as specified.

5. I claim the construction of the pulleys *U* and *W* or *U'* and *W'* worked by cams *R'* and levers *E* and *E'* as well as by weights
70 *Z* or *Z'* as described, said pulleys when connected, acting upon the upper shafts *V* or *V'*, running in the supports *Q* or *Q'*, for approaching the wood up to the toolholders, after the completion of each set of boxes.

LOUIS KOCH.

In presence of—

HENRY E. ROEDER,
JAS. B. MONLEAU.