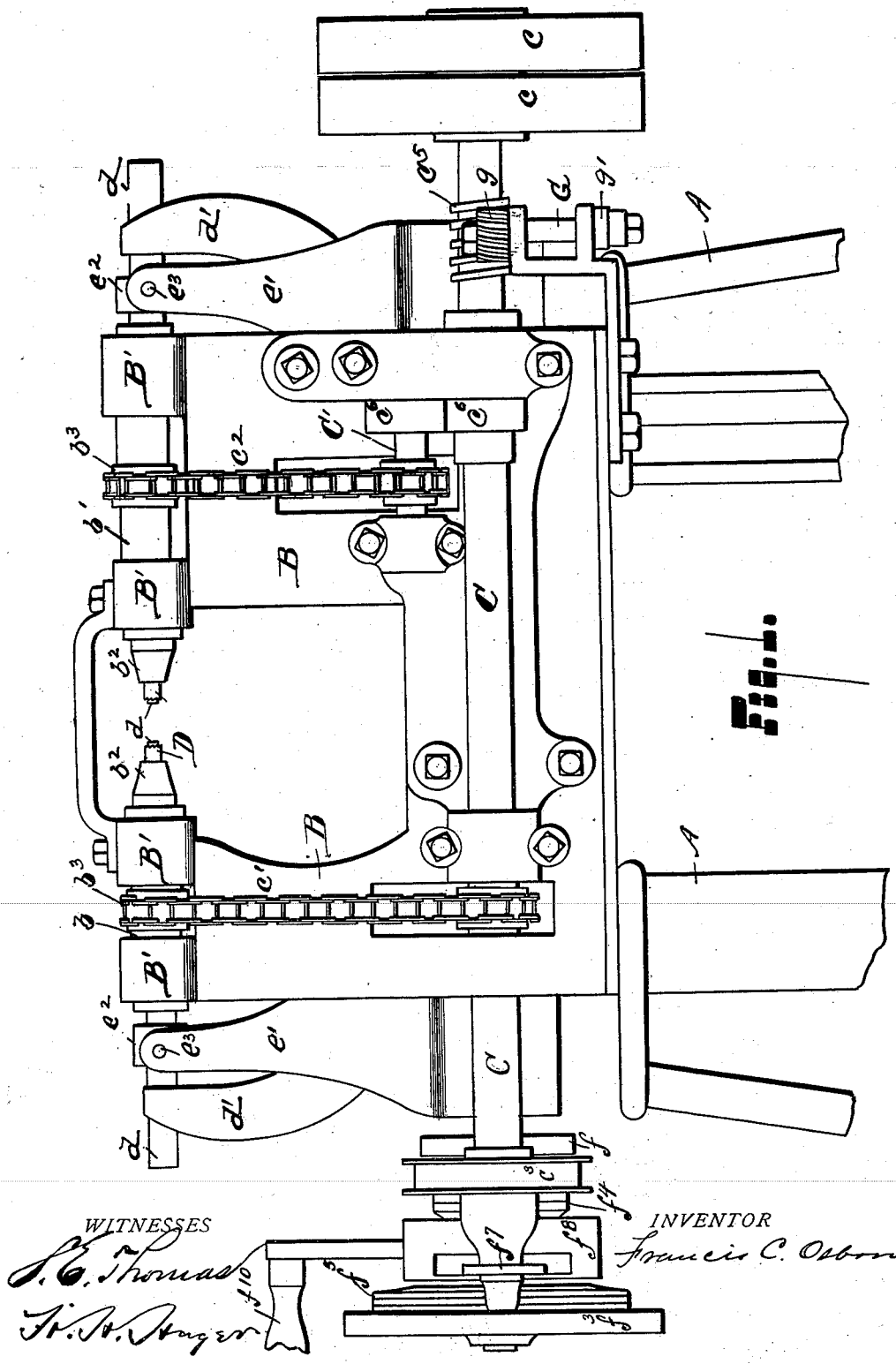
No. 650,189. Patented May 22, 1900.

F. C. OSBORN.

DOUBLE SAW FOR CUTTING BUTTON BLANKS.

(Application filed June 29, 1895. Renewed Jan. 15, 1900.)

(No Model.) 6 Sheets—Sheet 1.



WITNESSES

S. G. Thomas

F. W. Steiger

INVENTOR

Francis C. Osborn

No. 650,189. Patented May 22, 1900.

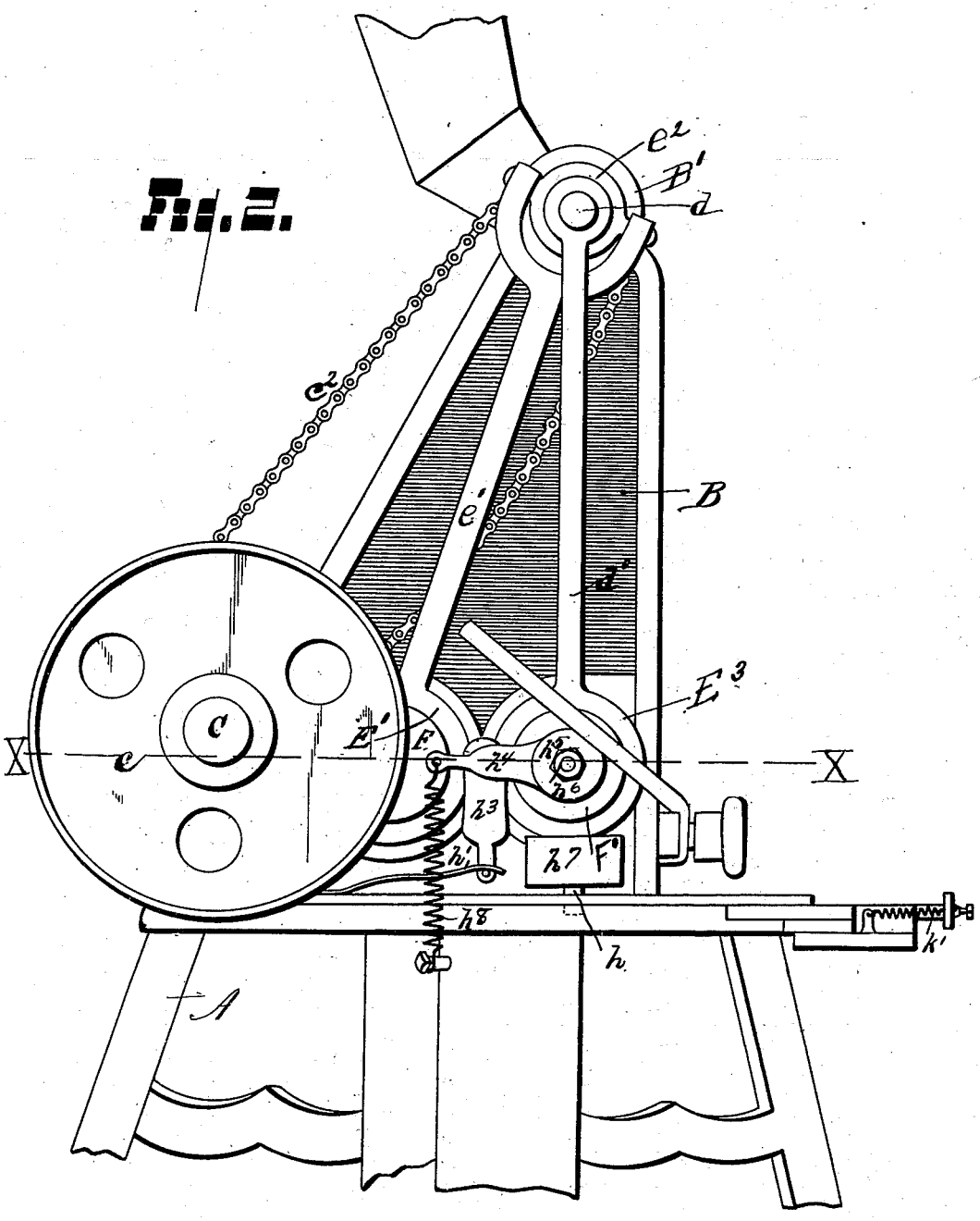
F. C. OSBORN.

DOUBLE SAW FOR CUTTING BUTTON BLANKS.

(No Model.) (Application filed June 29, 1895. Renewed Jan. 15, 1900.)

6 Sheets—Sheet 2.

Fig. 2.



WITNESSES

S. E. Thomas

J. A. Hager

INVENTOR

Francis C. Osborn

No. 650,189. Patented May 22, 1900.

F. C. OSBORN.

DOUBLE SAW FOR CUTTING BUTTON BLANKS.

(Application filed June 29, 1895. Renewed Jan. 15, 1900.)

(No Model.) 6 Sheets—Sheet 3.

Fig. 4.

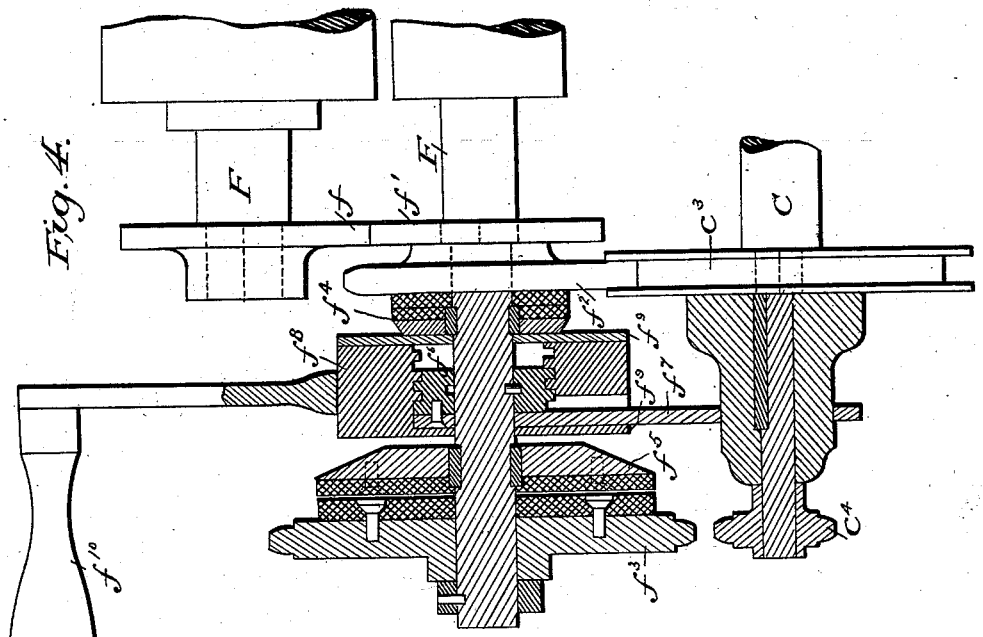
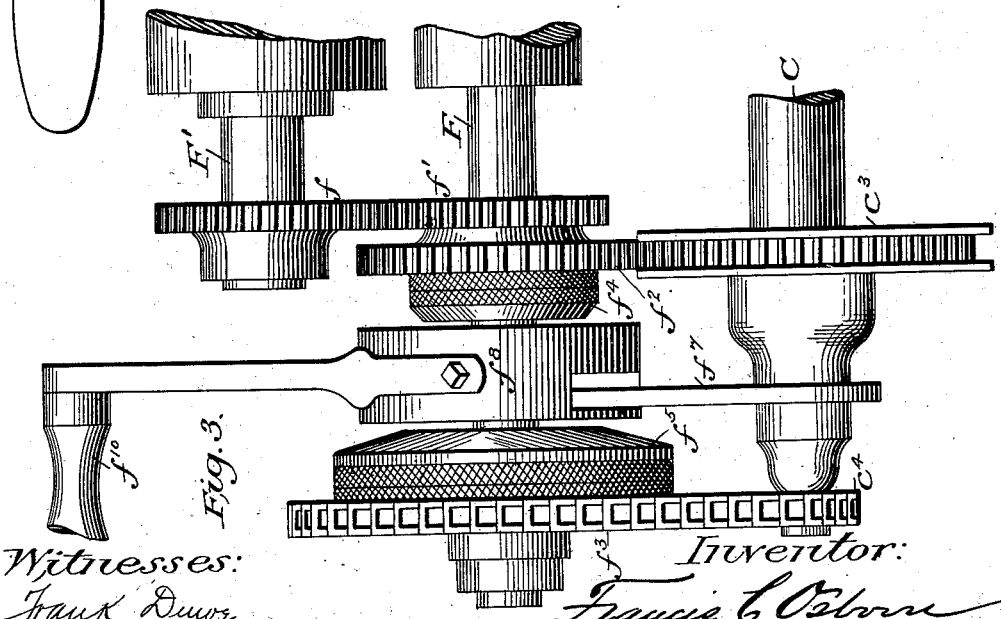


Fig. 3.



Witnesses:
Frank Dwor.
Rose Orr.

Inventor:
Francis C Osborn
By Fisk & Thomas
Attorneys.

No. 650,189. Patented May 22, 1900.

F. C. OSBORN.

DOUBLE SAW FOR CUTTING BUTTON BLANKS.

(Application filed June 29, 1895. Renewed Jan. 15, 1900.)

(No Model.) 6 Sheets—Sheet 4.

Fig. 5.

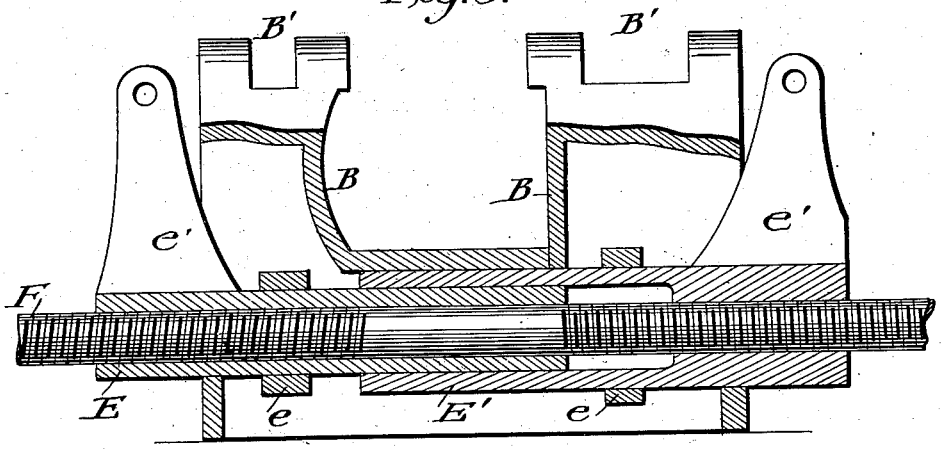
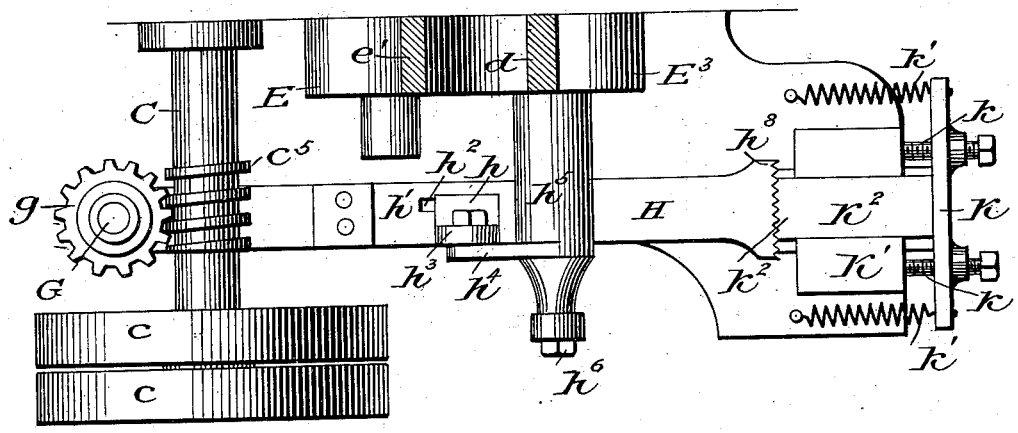


Fig. 6.



Witnesses:
Frank Dwor
Rose Orr

Inventor:
Francis C. Osborn
By Fisk & Thomas
Attorneys

No. 650,189. Patented May 22, 1900.

F. C. OSBORN.

DOUBLE SAW FOR CUTTING BUTTON BLANKS.

(Application filed June 29, 1895. Renewed Jan. 15, 1900.)

(No Model.) 6 Sheets—Sheet 5.

Fig. 7.

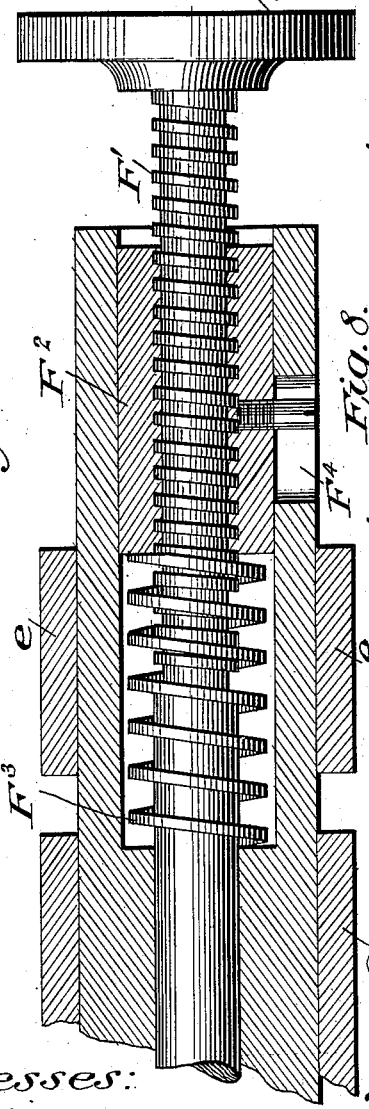
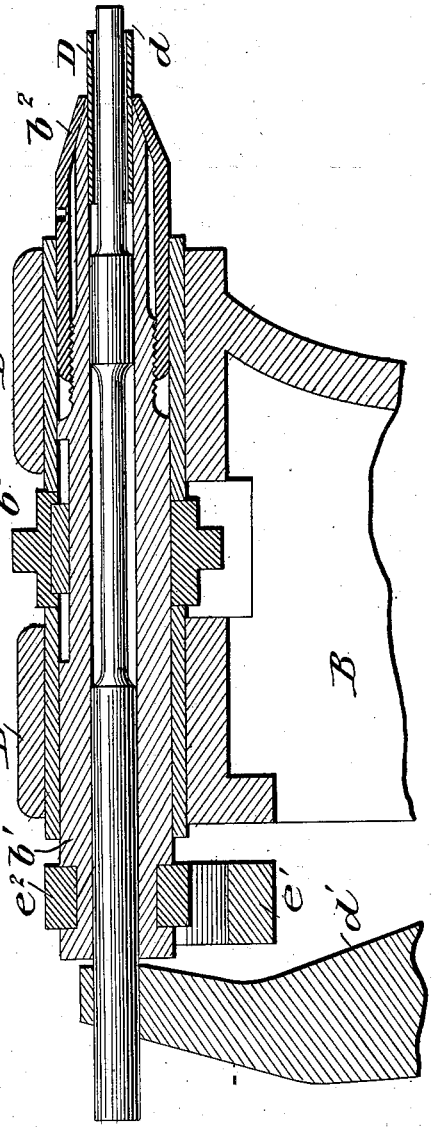


Fig. 8.



Witnesses:
Frank Dwyer
Rose Orr

Inventor:
Francis C. Osborn
By Fisk & Thomas
Attorneys

No. 650,189. Patented May 22, 1900.

F. C. OSBORN.

DOUBLE SAW FOR CUTTING BUTTON BLANKS.

(Application filed June 29, 1895. Renewed Jan. 15, 1900.)

(No Model.) 6 Sheets—Sheet 6.

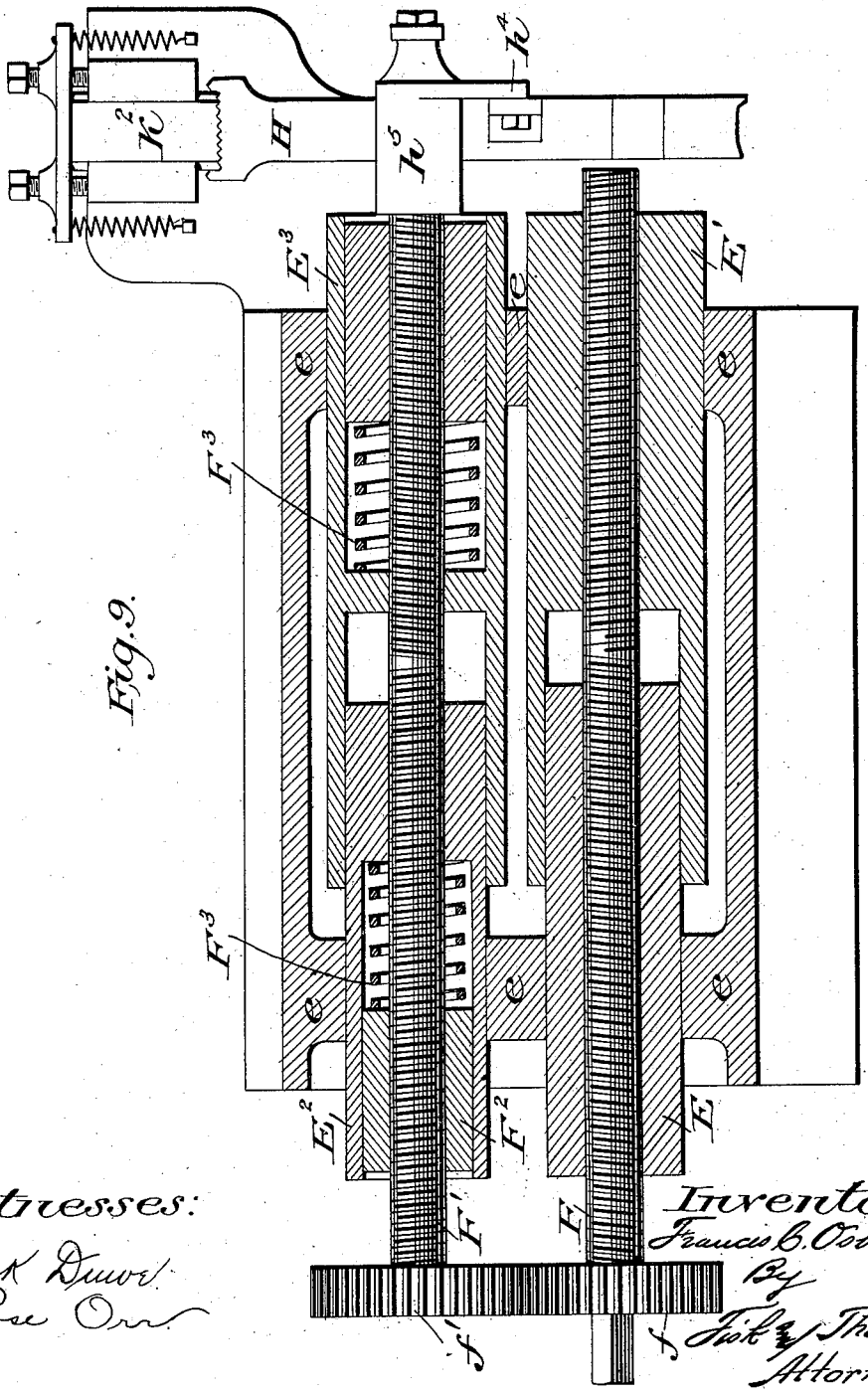


Fig. 9.

Witnesses:
Frank Dunn
Rose Orr

Inventor:
Francis C. Osborn
By
Fisk & Thomas
Attorneys

UNITED STATES PATENT OFFICE.

FRANCIS C. OSBORN, OF DETROIT, MICHIGAN.

DOUBLE SAW FOR CUTTING BUTTON-BLANKS.

SPECIFICATION forming part of Letters Patent No. 650,189, dated May 22, 1900.

Application filed June 29, 1895. Renewed January 15, 1900. Serial No. 1,479. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS C. OSBORN, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Double Saws for Cutting Button-Blanks; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in machines for cutting button-blanks from the shell. Its object is threefold—first, to increase the capacity of a single machine; second, to overcome the tendency of the shell to rotate under the action of the saw or saws, and, third, to provide for starting the saw into the shell.

The cutters now in common use use but one saw, and in using it the operator holds the shell against the tailpiece while the saw or cutter is forced against and through the shell. Owing to the irregular forms of the shells and other causes, it has been found impossible to hold the shell while being acted upon by the saw except by the hand of the operator, and no one but a strong man can hold it. In addition to the expense of the labor due to the strength required to hold the shell there is great waste of material, owing to the fact that the single saw in passing through the shell under the great pressure necessary to make it cut breaks away the back after it has cut nearly through.

I overcome the difficulties above mentioned by using two saws, which cut the shell from opposite sides and rotate in opposite directions.

The use of the two saws accomplishes several much-desired results. The machine will cut nearly if not quite twice as fast as a single saw, and by rotating the saws in opposite directions the action of one saw tending to rotate the shell is balanced by the action of the other and the employment of expensive labor to operate the machine thereby avoided.

In connection with the use of two saws rotating in opposite directions I employ holding devices, which work within the saws for gripping the blanks. The use of these holding devices overcomes any tendency to rotate due to the difference in the force that may be exerted by one saw over the other, and they also serve to hold the shell so that the saws will start their cut. I also employ suitable mechanism for finishing the cut after the saws have approached one another as close as possible while rotating in opposite directions without destroying one another. This mechanism for finishing the cut consists of means for holding the shell in a fixed position until the saws have approached one another to the limit and then moving the shell or saws to one or both sides to finish the cut.

One form of machine in which my invention may be embodied is shown in the accompanying drawings, in which—

Figure 1 is a rear elevation of the machine. Fig. 2 is an end elevation from the right of the machine as viewed in Fig. 1. Fig. 3 is a plan view of the clutch and reversing mechanism shown at the left of Fig. 1. Fig. 4 is a similar view showing parts in section. Fig. 5 is a sectional view showing details of the screw-feed for the saws. Fig. 6 is a plan view of the mechanism shown at the right of Fig. 1. Fig. 7 is a section showing the screw-feed by which the gripping devices are operated. Fig. 8 is a section showing one saw, the clutch, the holding device, and other details. Fig. 9 is a horizontal sectional view on line x x of Fig. 2, showing a plan of some of the parts.

In the drawings, A represents the frame of the machine.

B B are stationary headpieces, in the upper portion of which are the journal-boxes B′ B′. These boxes are shown in section in Fig. 8. In these bearings are mounted the spindles b and b'. These spindles are provided at the inner end with the chucks b^2 b^2 and at the center with the sprocket-wheels b^3, which run between the bearings.

D D are saws held in the spindles by the chucks b^2.

d d are horizontal rods extending through the spindles, which are bored to provide a bearing for the rods. These rods are turned down at the inner end to allow that portion to pass freely through the saws.

C is the main driving-shaft, mounted in suitable bearings at the rear of the machine and is driven by the pulley *c*.

C′ is a counter-shaft driven from the main shaft by the gears c^6 c^6.

The spindle *b* is driven from the shaft C by the sprocket-chain *c′*, and the spindle *b′* is driven in an opposite direction from the counter-shaft C′ by the sprocket-chain c^2. The spindles *b* and *b′* have an endwise movement which carries the saws to and from one another. The spindles are moved by a right-and-left screw device near the bottom of the frame, the details of which are shown in Fig. 5.

E and E′ are sleeves having a sliding movement in and out in the bearings *e e* and also having a bearing on one another. The outer end of each of these sleeves is provided with an arm *e′*, which extends upward and engages, by a bifurcated connection, with a collar e^2 on trunnions e^3, as shown in Figs. 1 and 2. The collar e^2 runs in an annular groove in the spindle.

F is a shaft provided with a right-and-left screw-thread, the two screws operating in the opposite sleeves. The rotation of this shaft causes the sleeves to move in and out, which movement is transmitted to the spindles *b b′* through the standards *e′* and the saws thereby caused to approach or recede from one another. The screw-shaft F before mentioned is located below and to the rear of the saw-spindle, and the standards *e′* are inclined forward to bring them to the spindles; but directly underneath the spindles is a second shaft F′, driven from the shaft F by means of the gears *f f′*.

E^2 E^3 are sleeves which carry the standards *d′ d′*, by which the rods *d d* are moved to and from each other inside of the saws and independent of them. The sleeves E^2 E^3 are moved to and from one another by the screw F′ acting with a spring-pressure, so that the action of the rods *d d* on material between them is a spring-pressure.

F^2 F^2 are blocks having a sliding connection with the sleeves within the limits allowed by the pin-and-slot connection F^4.

F^3 F^3 are springs strong enough to hold the sleeves and sliding blocks fixed relatively to one another, except when the rods *d d* are against the blanks, when the blocks will move up inside of the sleeve without moving the rods *d d*, but with a continually-increasing pressure on the rods. By these means the gripping device is adapted to act on any thickness of shell and to stop when the rods reach the shell, while the saws are permitted to move forward over the rods and enter the shell.

The screw-shafts F F′, by which the saws and gripping devices are caused to move, are operated at will by the mechanism shown in Figs. 3 and 4. The shafts are rotated simultaneously through the gears *f f′*. As this direct gearing will cause the shafts to rotate in opposite directions, the right-hand thread on one should be opposite the left-hand thread on the other. The shaft C extends through the machine and carries the gear-wheel c^3 and the small sprocket-wheel c^4. The screw-shaft F carries the loose gear f^2, the loose sprocket-wheel f^3, and the friction-disks f^4 f^5. These disks f^4 f^5 have a spline-and-groove connection with the shaft and, while permitted to move along the shaft, cause it to rotate with them. These friction-disks face like disks on the gear f^2 and the sprocket-wheel f^3, respectively.

f^6 is a disk mounted on the shaft F and is kept from rotating therewith by the arm f^7, which extends to the shaft C, which passes through it and is kept from moving endwise on the shaft by a connection consisting of an annular groove on the disk and a pin set in the shaft, which last-named parts may be assembled by drilling a hole through the disk through which the pin is set. The disk f^6 is provided with a thread which meshes with a like thread on the inside of the ring f^8. This ring has face-plates f^9, which normally stand a short distance from the friction-disks. The ring f^8 is rotated by means of the handle f^{10} a part of a revolution in either direction at will and a sufficient distance to carry the face-plates against the friction-disks and force them against their respective friction-surfaces on the gear or the sprocket wheel, thereby causing the driving mechanism of the screw-shaft to rotate in either direction at will.

Through the operation of the mechanism just described the screw-shafts can be rotated in either direction at the will of the operator by transmitting the motion of the driving-shaft C through the gears c^3 and f^2 or through the sprocket-gears and chain. When the power is transmitted to the screw-shafts through the gearing, the speed given to the screw-shafts is greater than when it is transmitted through the sprocket-chain, the object being to provide means for feeding the saws slowly to the work and then withdrawing them rapidly when the machine is reversed.

The operator sits in front of the machine with the handle f^{10} at his right hand. He places the shell between the saws and then moves the handle so as to throw the friction-disk f^5 against the sprocket-wheel, when the saws and feeding devices move up against the shell, the holding devices first coming in contact with the shell. The holding-rods *d d* are held against the shell with the force of the springs F^3. As the feeding mechanism continues to advance the saws and rods the grip of the holding-rods increases as the saws enter the shell. As the shell is held firmly between these rods and the saws advance directly over them, the saws cannot slip over the surface of the shell, but must enter it. As the saws advance they cut the blank from the shell, with the exception of a thin web. This web I cut by moving the shell to one or both sides against the saws. I will now describe the mechanism by which that movement is accomplished.

G, Figs. 1 and 6, is a short vertical shaft which carries at the upper end the worm-wheel g, which gear meshes in the worm c^5 on the shaft C.

H is a lever having an eccentric connection with the shaft G at g', by which that end of the lever is given a slight vibratory movement.

h' is a spring bolted to the lever H, as shown in elevation in Fig. 2, and is provided with a slot h^2 near its free end, through which passes the lower end of the hanger h^3. The spring is held in engagement with the hanger by a pin through the lower end of the hanger below the spring. The hanger h^3 is pivoted at the upper end to an arm h^4, that extends out from the sleeve h^5. This sleeve h^5 is provided with an interior thread that fits a thread on the end of the screw F'. As the screw rotates the sleeve h^5 runs onto it until the end of the screw-shaft comes against the set-screw h^6, when for a portion of a revolution the sleeve is caused to rotate with the screw-shaft, thereby lifting the lever H until the teeth on the outer end of it come into engagement with the teeth on the plate K^2.

K' is a fixed plate into which the plate K^2 is dovetailed. K is a plate supported on the rods k k. This plate under the action of the springs k' k' forces the slide K^2 to the inner extremity of its movement. Until such time as the lever H is raised by the operation of the sleeve h^5 its end vibrates under the plate K^2. Its adjustment is such, however, that when it is raised and carried by the eccentric g' to the limit of its backward movement the teeth on the lever will register with and slip up between the teeth on the plate K^2. If the sleeve h^5 moves before the lever is in position to register the teeth, it will move against the action of the spring h' until such time as the lever gets into the proper position, when the spring will draw it up. The lever after it has engaged with the plate K^2 has a rotating and vibrating movement, the plate K^2 receding against the action of the springs k' k' to allow an endwise movement, but preventing any side movement. As soon as the lever H engages with the plate K^2 the lever is held fixed at this end, while it is caused to vibrate at the opposite end by the eccentric connection, giving the center of the lever a vibratory movement. This vibratory movement is transmitted to the sleeve h^5 through the connecting-arm and link, which allow no side swing or movement. This vibration of the lever H shakes the sleeve h^5, the screw-shaft F', the rods d d, and the shell held between them. This shaking movement throws the uncut portion of the shell alternately against the opposite saws and finishes the cut. To hold the sleeve h^5 against rotation until it is locked to the shaft, I use the spring h^8.

The set-screw h^6 is the adjustment employed to limit the movement of the saws toward each other. As soon as the sleeve h^5 runs against the set-screw and lifts the lever H to the limit of its upward movement both the screw-shafts are stopped and with them the feeding mechanism. For this purpose the friction driving devices are provided.

What I claim is—

1. In a sawing-machine, the combination of two tubular saws oppositely arranged, means for rotating and feeding the saws, and holding-rods extending through the saws for gripping and holding the blank, substantially as described.

2. In a sawing-machine, the combination of two tubular saws and means for rotating the saws in opposite directions, whereby the force of the saws tending to rotate the shell is neutralized one by the other, substantially as described.

3. In a sawing-machine, the combination of two tubular saws means for rotating the saws in opposite directions and holding-rods extending through the saws to grip and hold the blanks whereby any unequal action of the saws tending to rotate the shell, is neutralized and the saws caused to enter the shell without slipping, substantially as described.

4. In a sawing-machine, the combination of two tubular saws means for rotating the saws in opposite directions, means for feeding the saws toward one another, and means for moving the shell or material to finish the cut, substantially as described.

5. In a sawing-machine, the combination of two tubular saws arranged to cut toward each other, means for feeding the saws and means for moving the shell or material to finish the cut, substantially as described.

6. In a sawing-machine, the combination of two tubular saws cutting in opposition to each other, means for holding the shell or material between the saws, and means for feeding the saws and holding devices simultaneously, substantially as described.

7. In a sawing-machine, the combination of two tubular saws right and left screw-threaded rods for feeding the two saws simultaneously, holding-rods moving within the saws, a right and left screw-threaded rod for feeding the holding-rods simultaneously, gearing connecting the screw-threaded rods and a clutch mechanism, substantially as and for the purpose described.

8. In a sawing-machine, the combination of two screw-threaded rods for feeding the saws and holding devices respectively, and means for rotating said rods slowly in one direction and faster in the opposite direction, substantially as described.

9. In a sawing-machine, the combination of two tubular saws means for rotating and feeding the saws, a stop for limiting the feeding action of the saws, said means for feeding the saws operated by friction mechanism, whereby the movement of the saws toward one another is stopped at a safe distance without reversing the feeding mechanism, substantially as described.

10. In a sawing-machine, the combination of two tubular saws and a feeding-rod provided with a right-and-left screw for feeding both saws at the same time, substantially as described.

11. In a button-sawing machine, the combination of a saw or saws, a screw-threaded rod for feeding the saw or saws, a main driving-shaft, the gear c^3, on the main driving-shaft, and the loose gear f^2, on the feeding-shaft adapted to driving the feeding-shaft in one direction when the gear f^2, is clutched to the shaft, the small sprocket-wheel c^4, the large sprocket-wheel f^3, and the sprocket-chain adapted to driving the feeding-shaft in the opposite direction, and means for locking the sprocket-wheel f^3, or the gear-wheel f^2, to the feeding-rod at the will of the operator, substantially as described.

12. In a button-cutting machine the combination of the hollow, revolving spindles, the cutting-tools, non-rotatable rods extending through them and through the cutting-tools, said rods provided with grips or jaws at their inner ends, substantially as described.

13. In a button-cutting machine, the combination of the frame, revolving spindles, the cutting-tools, feeding-spindles mounted in the frame parallel to said revolving spindles and a connecting-arm between said rotatable spindles and feeding-spindles, substantially as described.

14. The combination of the frame, the revolving spindles, the cutting-tools, the feeding-spindles, the arms connecting the rotatable spindles and feeding-spindles and means for moving the feeding-spindles to and from one another, substantially as described.

15. The combination of the frame, the revolving spindles, the cutting-tools, the holding-rods, the feeding-spindles, the arms connecting one set of feeding-spindles and the revolving spindles, the arms connecting the other set of feeding-spindles with the holding-rods and means for moving the feeding-spindles simultaneously, substantially as described.

16. The combination of the frame, the hollow revolving spindles, the cutting-tools operated by the spindles, the holding-rods extending through the hollow spindles, the feeding-spindles arms connecting the feeding-spindles with the holding-rods, and means for operating said feeding-spindles with a spring-pressure, substantially as described.

17. The combination of the frame, the revolving spindles, the cutting-tools, the holding-rods, feeding-spindles, means connecting the feeding-spindles and the revolving spindles, and means for operating the feeding-spindles with greater speed on the return than on the forward movement, substantially as described.

18. The combination of the frame, the hollow revolving spindles the cutting-tools operated by the hollow spindles, the holding-rods extending through the hollow spindles, the feeding-spindles, means connecting the feeding-spindles and the holding-rods and means for operating the feeding-spindles, substantially as described.

19. The combination of the frame, the revolving spindles, the cutting-tools, the holding-rods, the several feeding-spindles means connecting one set of the feeding-spindles with the revolving spindles, means connecting the other set of feeding-spindles with the holding-rods, and means for operating the feeding-spindles, substantially as described.

20. The combination of the frame, the revolving spindle, the cutting-tools, the holding-rods, and automatic means for feeding the revolving spindles and holding-rods, substantially as described.

21. The combination of the frame, the revolving spindles, the cutting-tools, the holding-rods, means for feeding the revolving spindles and holding-rods, and means for adjustably connecting the feeding means with the revolving spindles and holding-rods, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

FRANCIS C. OSBORN.

Witnesses:
C. H. FISK,
G. M. DAVIS.