(Model.) 2 Sheets—Sheet 1.

F. P. SHELDON.

MACHINE FOR FEEDING FRONT SHELLS TO BUTTON MAKING MACHINERY.

No. 245,408. Patented Aug. 9, 1881.

Fig. 1.

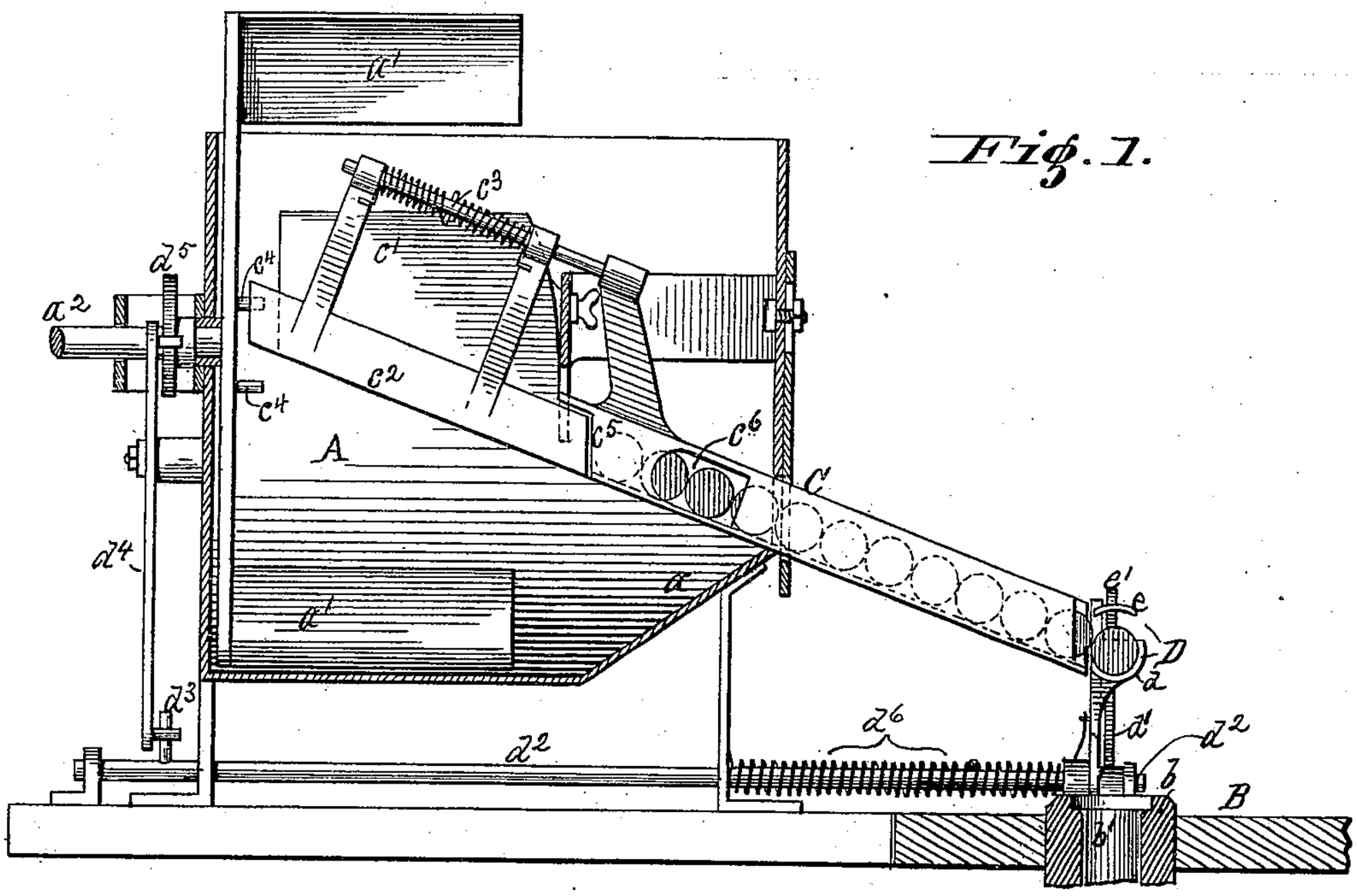


Fig. 2.

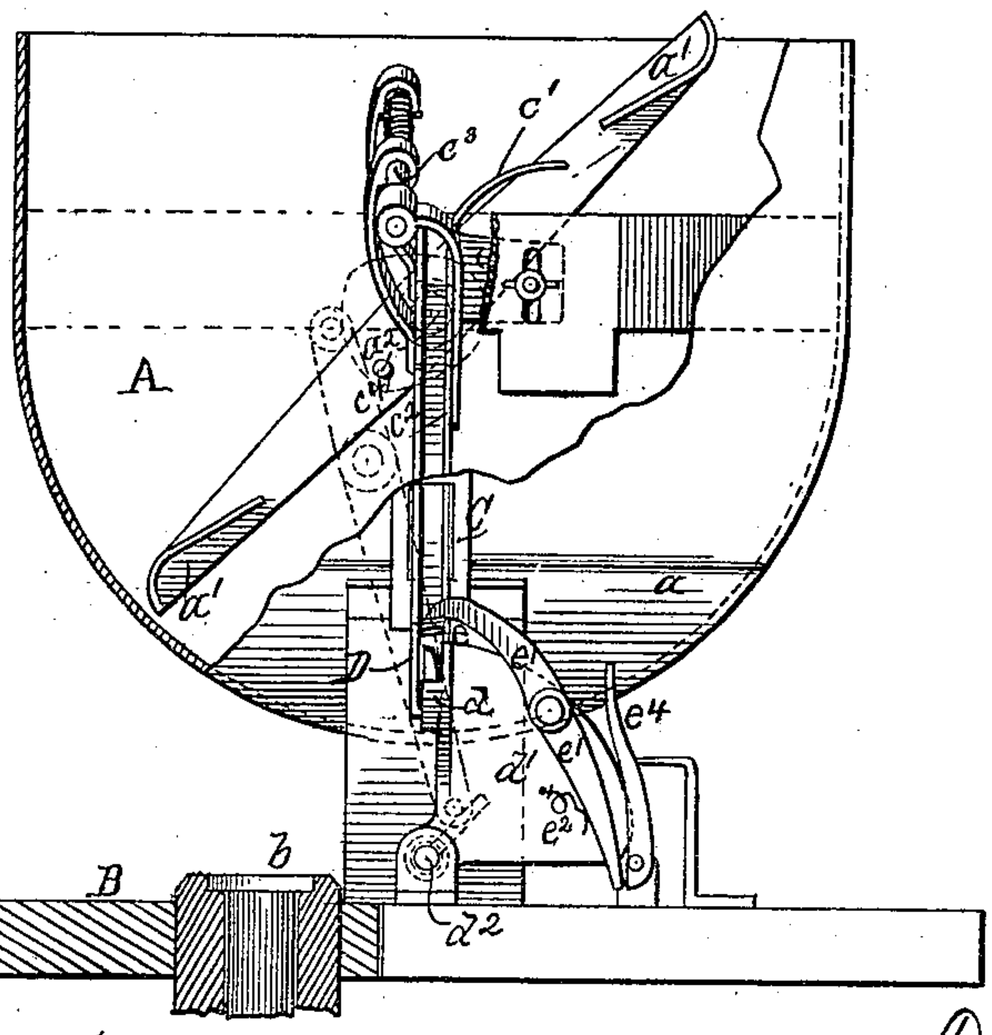


Fig. 3.

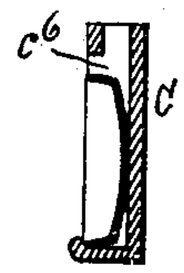
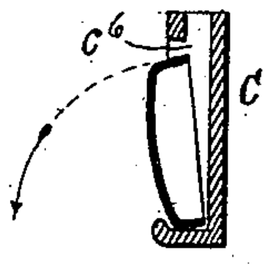


Fig. 4.



Attest:
H. L. Pennie
Philip F. Larner

Inventor.
Frank P. Sheldon.
By. Munn & Wood Atty.

N. PETERS, Photo-Lithographer, Washington, D. C.

(Model.) 2 Sheets—Sheet 2.

F. P. SHELDON.

MACHINE FOR FEEDING FRONT SHELLS TO BUTTON MAKING MACHINERY.

No. 245,408. Patented Aug. 9, 1881.

Fig. 5.

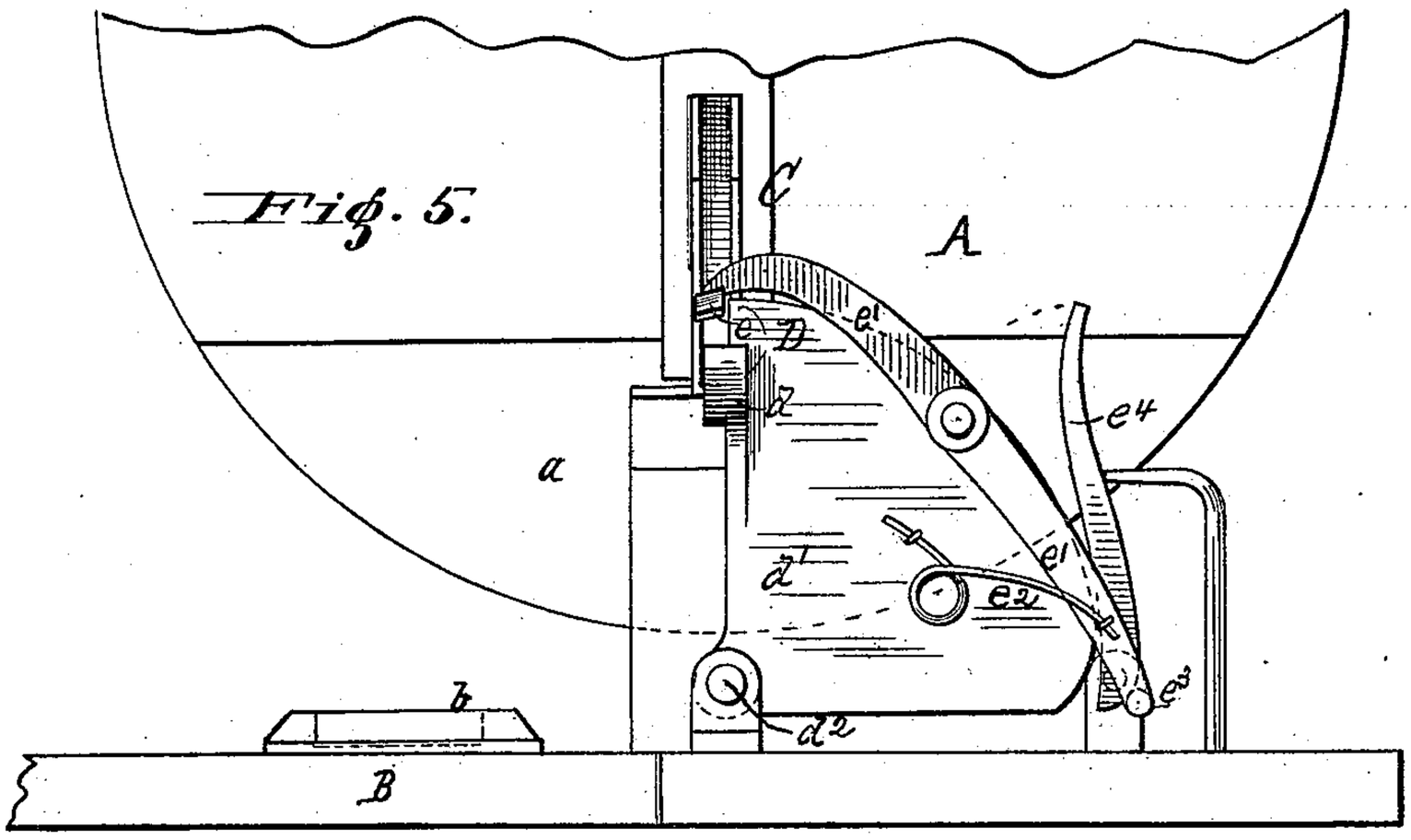


Fig. 6.

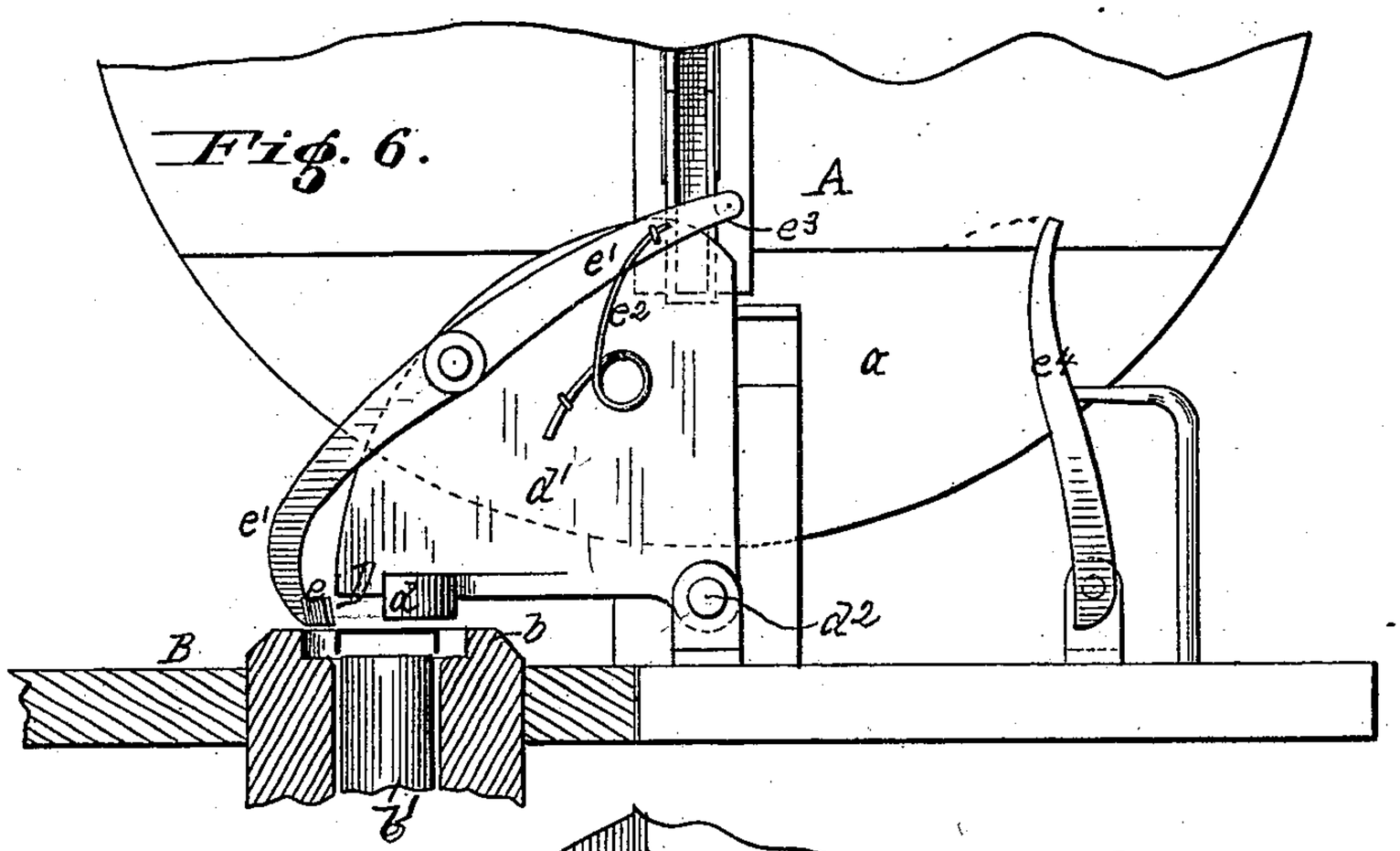
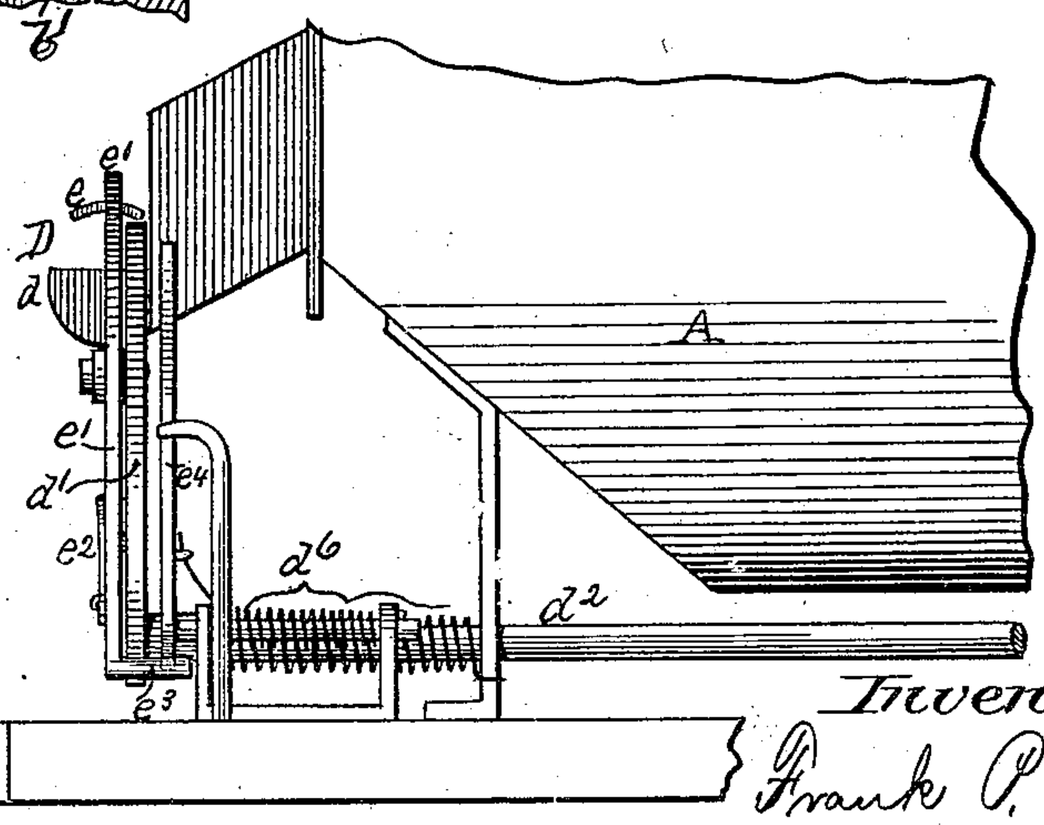


Fig. 7.



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H. L. Penniè
Philip F. Larner

Inventor:
Frank P. Sheldon.
By Wm. C. Wood Atty.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

FRANK P. SHELDON, OF PROVIDENCE, ASSIGNOR TO HENRY B. METCALF, OF PAWTUCKET, R. I., AND WILLIAM McCLEERY, OF BOSTON, MASS.

MACHINE FOR FEEDING FRONT SHELLS TO BUTTON-MAKING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 245,408, dated August 9, 1881.

Application filed November 17, 1880. (Model.)

To all whom it may concern:

Be it known that I, FRANK P. SHELDON, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Machines for Feeding Front Shells to Button-Making Machinery; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part thereof, is a clear, true, and complete description of my invention.

My said improvements relate to the manufacture of that class of buttons composed in part of sheet-metal front shells, which are united by compression in suitable dies with one or more other separate parts, according to the special character of the button; and my said improvements, as a whole, have been devised for the automatic feeding of such front shells to the dies of a button-making machine; but certain portions of my improvements are also of value in connection with mechanism specially devised for automatically feeding "collets."

It is not broadly new to automatically feed cup-shaped shells to the dies of button-machines and other machines more or less analogous; but my invention relates to novel means for assembling the shells in regular succession in uniform positions, and for positively delivering them directly to the proper dies of the button-making machine.

In the manufacture of the ordinary two-part metal buttons the compressing or joining dies are of a less delicate nature, and co-operate with less nicety than the dies essential for the manufacture of buttons embodying two metallic parts, a cloth cover, a cloth "tuck," a shank, and usually a heavy paper filling, and it is for use in connection with the manufacture of this variety of buttons that my present improvements have been specially devised. The fine character of these dies renders them specially liable to injury in case more than one shell be fed at once, or in case a shell should be presented to the dies in a reversed position—*i. e.*, wrong side up—or in case a shell should be improperly located upon or in a die. I have therefore provided special safeguards at various points between the hopper which contains the shells in mass and the dies, which practically assures the correct presentation of the shells and their precise accurate delivery to the dies.

The several devices and combinations of devices believed to be novel will be specified in the claims hereunto annexed; and while I prefer an organization embodying all of said features, I am well aware that some of them may be profitably employed separately in connection with mechanism other than that now disclosed by me.

To particularly describe my invention, I will refer to the accompanying two sheets of drawings, in which—

Figure 1, Sheet 1, is a side view of my feeding mechanism, but having its hopper in central vertical section, and a portion of the die-table and a die of a button-making machine. Fig. 2, Sheet 1, is a front view of the same with the adjacent end of the hopper broken away. Fig. 3, Sheet 1, is a lateral sectional view of the guideway or chute with a shell thereon in proper position to proceed to the dies. Fig. 4, Sheet 1, is a similar view, representing a shell in a reversed position in the act of discharging itself from the chute or guideway. Fig. 5, Sheet 2, is an enlarged front view of the delivering-nippers about to deliver a shell to the die. Fig. 6, Sheet 2, is a similar view of the same having just delivered its shell. Fig. 7, Sheet 2, is a side view of a spring-lever which operates in opening the nippers for receiving a shell.

The hopper A may be variously formed; but to co-operate properly with the lifting mechanism shown it should be concave at the bottom from side to side, as shown, and should have at its lower front end inside an inclined surface, as at *a*, for causing such blanks as are improperly proceeding toward the dies to be thrown rearward, when dropped thereon, to join the mass of blanks, so as to be again within range of the lifting mechanism.

The hopper may be located more or less close to the die-table B of the button-making machine, the inclined chute C being of greater or lesser length, its delivery end terminating

sufficiently near the die *b* for the interposition of the nippers D.

The hopper contains a two-armed revolving scoop, *a'*, having pans, which lift up masses of shells and pour them toward the center of the hopper. Said scoop is mounted upon a revolving shaft, a^2, to which power is applied from any convenient source.

The shells may be variously lifted from the mass and poured toward the center of the hopper; and although I show a rotary scoop as a convenient and effective device, I do not limit myself thereto, for I am well aware that vertically-reciprocating lifters of various forms may be as well employed in that connection.

The portion of the chute C which is within the hopper is complex in its construction. At its inner end there is a wide flaring plate, *c'*, constituting one side of the chute, upon which the shells are poured by the scoop during its revolution and directed downward into the chute in an irregular mass, facing in all directions, cupped into each other, &c. Only such shells as singly fall into the chute on their edges can roll down its inclined bottom, and to dispose of those which lie crosswise, &c., and are piled upon each other, the side and bottom c^2 of the chute is made movable by being hung from a rod, c^3, on pendent arms, which are so controlled by a spiral spring as to cause the movable side and bottom c^2 to occupy normally the same position as if fixed to the opposite side of the chute. As the scoop *a'* revolves two bent studs, c^4, on its arms engage with the pendent arms of the movable side and bottom c^2 and swing the latter outward for dropping back into the hopper all the shells which could not enter the fixed portion of the chute at c^5.

The entrance to the chute at c^5 is of such width as will only admit a single shell at a time, and although the shells (because their rims flare but little) seldom get inside of each other, they cannot enter the chute if so connected together, but they are dropped back into the hopper, as before described. The two sides of the chute, especially at its entrance, should be made adjustable with reference to each other, to provide for the proper reception of shells having wide or narrow rims.

The concavo-convex backs of the shells invariably cause them to fall backward if placed edgewise on their rims, and I avail myself of this fact in providing for the delivery into the lower end of the chute of shells facing in one direction only.

In Figs. 3 and 4 I have shown in section a portion of the chute (within the hopper) which has an opening, c^6, cut in one side of the chute and extending nearly to the bottom thereof.

In Fig. 3 a shell in proper position is shown with its back against the adjacent inner side of the chute and on its way to the lower end thereof.

In Fig. 4 a shell in a reversed position is shown in the act of falling backward or sidewise through the opening c^6, from which it falls upon the inclined portion *a* of the bottom of the hopper and mingles with the mass of shells.

The length of the chute from the opening to to its extreme lower or delivery end may be indefinitely varied according to circumstances, and the operation of the scoop is such that the number of shells delivered by it to the chute will be always largely in excess of their actual delivery to the dies, so that the chute between the lower end and the opening c^6 will be almost always full, and at such times some of the shells in proper position will be discharged through said openings, as well as those which are reversed in position.

While it is obviously preferable to employ with the chute a hopper and shell-lifting mechanism, it will be seen that one person may supply the chutes of several machines with a large reserve of shells, even if each shell has to be placed therein by hand, and that considerable economy in attendance would result therefrom.

The delivery of the shells from the lower end of the chute in the manufacture of this class of buttons should, as before herein stated, be much more accurately performed than in machines adapted to the manufacture of buttons which are not covered with cloth.

The automatic delivery of shells has heretofore been effected in button-machines by a plunger operating at right angles to and through the base of the chute, for entering the interior of a shell and forcing it backwise directly into a die. This mode of operation is not practicable in machines which involve the system of complex dies essential for the manufacture of cloth-covered buttons requiring the shell to be delivered to a die rimwise preparatory to the receipt by the same die of a cloth disk overlying the back of the shell. The same is also true of a prior system of delivery from the bottom of a chute, involving the employment of a sliding plate perforated to receive the lowest shell in the chute and to move it above and upon a revolving feed-wheel correspondingly perforated, so as to drop the shell into the holes of the feed-wheel, from which holes the shell is forced by a plunger into the dies whenever the holes in the feed-wheel are placed coincidently with the dies. This reliance upon gravity in dropping the shells to either a feed-wheel or to dies is far too precarious for an automatic feed in machines for making covered buttons, and therefore the delivery is effected by me with means which securely hold the shells in their proper position during their transit from the chute into the die, and by which they are actually forced upon the usual plunger within the die. Such a plunger is shown at *b'*, and it will be readily seen that the shell must be truly placed thereon, after the manner of a cap, and that if it were merely dropped thereon it would be liable to be dropped too far to the one side or the other to enable said plunger to properly co-operate upon the shell with certain other dies (not shown) which are

essentially involved in the manufacture of cloth-covered buttons.

I attain an accurate delivery of the shell from the chute to the die by means of automatic nippers which have curved jaws, and therefore grasp the shell circumferentially, and which move in the arc of a circle directly to and into the die, forcing the shell upon the plunger in said die.

The nippers D have two jaws, *d* and *e*. These jaws are preferably made adjustable for working with shells of various sizes, or readily detachable, so that they may be removed and others applied when desired. The jaw *d* is fixed with relation to jaw *e*, and is integral with a vibrating segmental plate, d', on which the movable jaw *e* is also pivotally mounted. The segmental plate is pivotally mounted by being firmly attached to a rock-shaft, d^2, which extends beneath the hopper to the opposite end, at which point it has a stud or pin, d^3, which projects at right angles therefrom, for enabling it to be partially rotated by means of the pendent lever d^4, which is vibrated by cam d^5 on the scoop-shaft a^2. The said cam at each revolution of its shaft swings the nippers and the segmental plate upward from the die and maintains it in that position during about one-half of the revolution.

At the rear of the segmental plate, and encircling the rock-shaft d^2, is a spiral spring, d^6, so set as to force the segmental plate and nippers toward the dies when permitted to do so by the cam d^5, which occurs during about one-quarter of the revolution of the latter.

The movable nipper-jaw *e* is located upon the end of a curved lever, e', pivoted to the segmental plate, and maintained in its grasping position by a spring, e^2, secured at one end to the side of the segmental plate, and having a free bearing upon the lever at the rear of its pivotal fulcrum. The rear end of the lever e' has a rectangular projection, e^3, which performs an important part in the opening of the nippers.

The opening of the nippers to receive a shell from the chute is effected by means of a curved vertical spring arm or lever, e^4, pivoted near its lower end to the bed-plate of the machine, and free to vibrate forward toward the nippers, but rigid as to its rearward movement. The spring-lever is so located with reference to the path of the projection e^3 on lever e' during the backward movement of the segmental plate that said projection will slide downward along the edge of the vertical spring-lever e^4, which thereby forces that end of lever e' downward faster than the lever is being moved bodily with the segmental plate, thus opening the nippers. When the segmental plate has completed its backward movement the projection e^3 on lever e' passes below the spring-lever e^4, thereby permitting the nipper-spring e^2 to act for closing the nippers. The next forward movement of the segmental plate carries the lever e' and its projection e^3 forward into its normal position, the vertical spring-lever e^4 freely yielding forwardly to allow the projection e^3 to pass over it. When the nippers have well entered the die the projection e^3, by a sliding contact with the outer side of the lower end of the chute C, depresses the rear end of lever e' and causes an opening movement of the nippers, whereupon the nippers are returned to their receiving position at the lower end of the chute. The function performed by the side of the chute in moving the jaw-lever for releasing a shell is that of a cam-surface acting against the projection e^3 on lever e', and this function is in nowise dependent upon the chute as such, for a separate plate or vertical rod would perform the same service.

The release of the shell from the nippers, being dependent upon the movement of the nippers themselves, is an important feature, because the grasp upon the shell is firmly maintained by the nippers until just preceding the termination of their rapid downward movement, and therefore the accurate delivery of the shell to the die is assured.

The segmental plate, in addition to its function as a nipper-carrier, operates as a guard for the delivery-aperture of the chute during the absence of the nippers therefrom, its rear side being in close contact with and across the lower end of the chute during its entire movement, and preventing the escape of shells, except when the nippers are in position to receive one.

I am aware that in cork-tapering machines as heretofore constructed a pivoted box having a movable side automatically operated has been located midway in a chute between the hopper and the delivery end of the chute for changing the position of corks singly from a vertical to a horizontal position and delivering them on their sides to a lower portion of the chute preparatory to delivery therefrom, and that with such box a segmental plate has been employed for guarding the lower end of the upper portion of the chute during the movements of the box; but said mechanism would not be applicable to feeding shells to button-machine dies, because incapable of firmly grasping a shell circumferentially or delivering it flatwise into dies.

The jaws of the nippers are curved, so as to firmly grasp the shell; but the inner side of the lower or fixed jaw, *d*, is shorter than the outer side, so that a shell can roll readily from the chute into said lower jaw preparatory to the fall of the upper jaw in circumferentially grasping the shell, all of which is clearly illustrated in Fig. 1.

The operation of the several parts having been described in connection with the detailed description of the separate devices, it will not be necessary to further refer thereto.

Although I have specially devised the mechanism shown and described for feeding the main or front shells of buttons, I am aware that the entire organization may be employed

for feeding collets whenever in form they so far approximate to the form of the shells shown as to be capable of control in the same manner as the shells; but as the collets are usually lighter and have more flaring rims of less width, I have preference for mechanism specially arranged therefor. The nippers, however, with only such modifications in the shape of the interior of their jaws as will enable them to better grasp a collet, are used by me in connection with a chute differing only in its proportions from that now shown by me, in combination with collet lifting and arranging mechanism which I have specially devised as an accompaniment for this or similar shell-feeding mechanism upon the same class of button-making machines.

The same chute, hopper, and scoop may also be employed for arranging and presenting to the dies the heavy paper disks employed as fillings for buttons of this class, and nippers like those shown may also be employed therewith for delivering the fillings to the dies, although I have specially devised delivery mechanism for performing that particular service which I deem preferable.

I consider it of practical advantage to so lift the shells in mass as to admit of their being poured downward into a chute located partially within the hopper, or in such relation thereto as will admit of the automatic delivery of the surplus shells lifted back into the hopper to be again lifted, instead of requiring said surplusage to be returned by hand to the hopper from time to time, as would be necessary if the discharge of surplus shells was effected outside of the hopper.

Having thus described my invention, I claim—

1. The combination, substantially as hereinbefore described, of the die-table B and its dies, a chute for containing button-shells in position ready for delivery, and the nippers having curved jaws, and constructed, arranged, and operating, substantially as described, to receive a shell rolling from the chute, to grasp it circumferentially, and to carry and force it into a die and leave it there, as set forth.

2. The combination, substantially as hereinbefore described, of the hopper, lifting mechanism, chute, and the nippers having curved jaws and adapted to receive a shell rolling from the chute, to grasp it circumferentially, and to carry and force it into a button-machine die.

3. The combination of the chute, the nippers having curved jaws, and the segmental plate, operating as a guard across the delivery end of the chute during the absence of the nippers therefrom, substantially as described.

4. The combination of the chute, the curved-jaw nippers, the vibrating segmental plate, and the vertical spring-lever for opening the nippers to receive a shell from the chute, substantially as described.

5. The combination of the nippers having a fixed curved jaw and a movable curved jaw, the lever on which the movable jaw is mounted, and the fixed surface at or near the side of the chute for moving the jaw-lever in opening the nippers to release a shell therefrom, substantially as described.

6. The chute C, provided with a side opening, c^6, substantially as described, whereby, when shells are improperly entered and rolling down said chute, they will tip laterally and fall through said opening, as set forth.

7. The combination, with the hopper and automatic shell lifting and pouring mechanism, of the inclined chute C, located partially within the hopper, and constructed to receive the shells edgewise thereon and to discharge the surplus shells back into the hopper, substantially as described.

8. The combination, substantially as hereinbefore described, of a hopper, lifting mechanism, and the chute having a movable side and bottom which is vibrated at intervals for discharging shells back into the hopper, except when properly delivered from the lifting mechanism.

9. The combination, substantially as hereinbefore described, of the hopper, the lifting-scoop, and the chute having the side opening therein for discharging from the chute shells which are proceeding therein in an improper position.

10. The combination, with the chute having the side opening, of the revolving scoop and the hopper having an inclined bottom below the opening in the chute, substantially as described.

11. The combination, substantially as hereinbefore described, of the nippers and the spring which throws them forward with a shell and the cam which moves the nippers backward and causes them to rest in an opened position in front of the chute for allowing a shell to roll into the jaws of the nippers.

FRANK P. SHELDON.

Witnesses:
LEMUEL H. FOSTER,
DEXTER B. POTTER.