(No Model.) 4 Sheets—Sheet 1.

E. D. MELLEN.

MACHINE FOR WRAPPING SOAP.

No. 467,040. Patented Jan. 12, 1892.

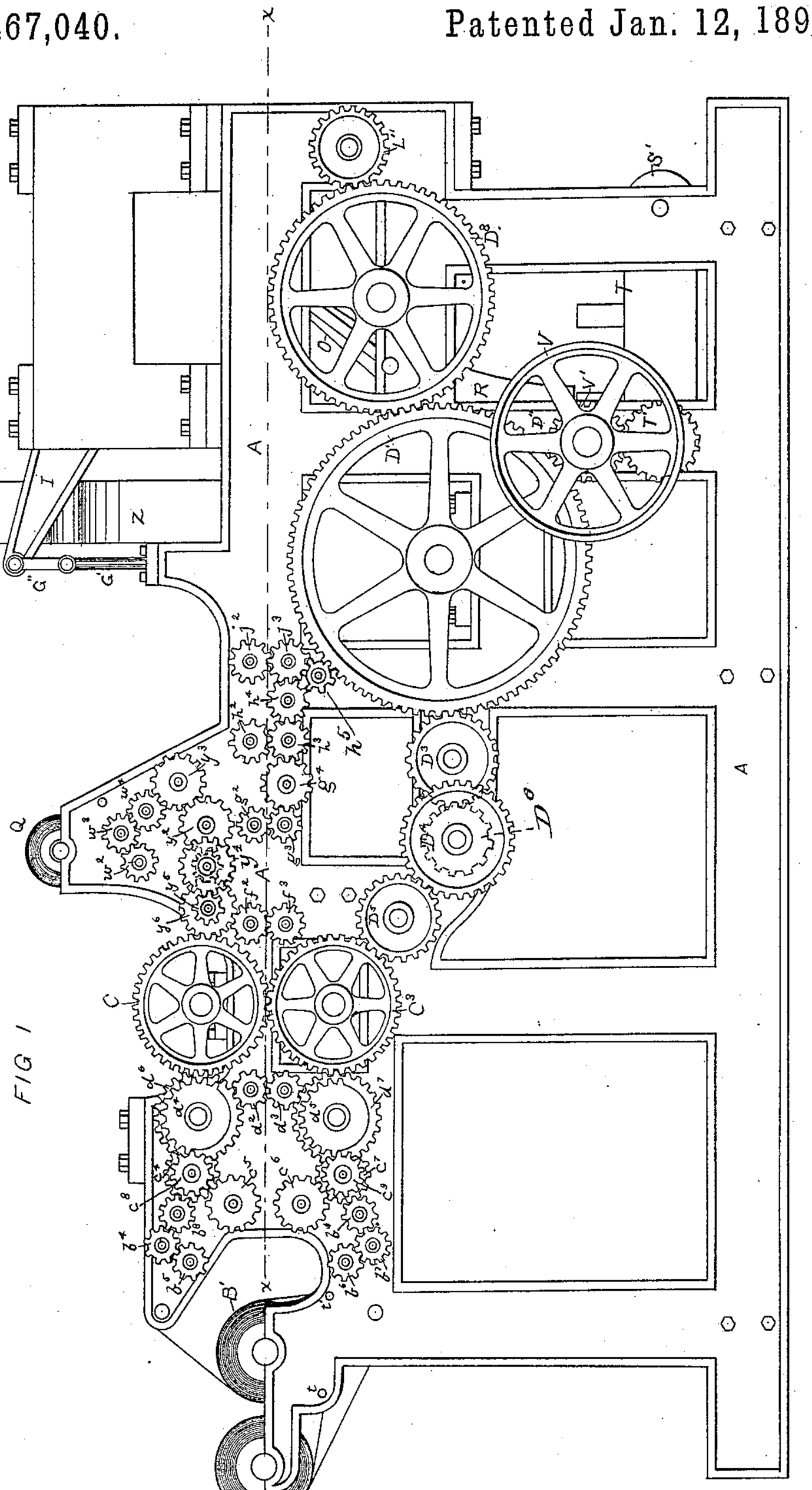

FIG 1

WITNESSES

Albert E. Leach.

M. H. Thompson.

INVENTOR

Edwin D. Mellen

By his Attorney

Wm B. H. Dowse.

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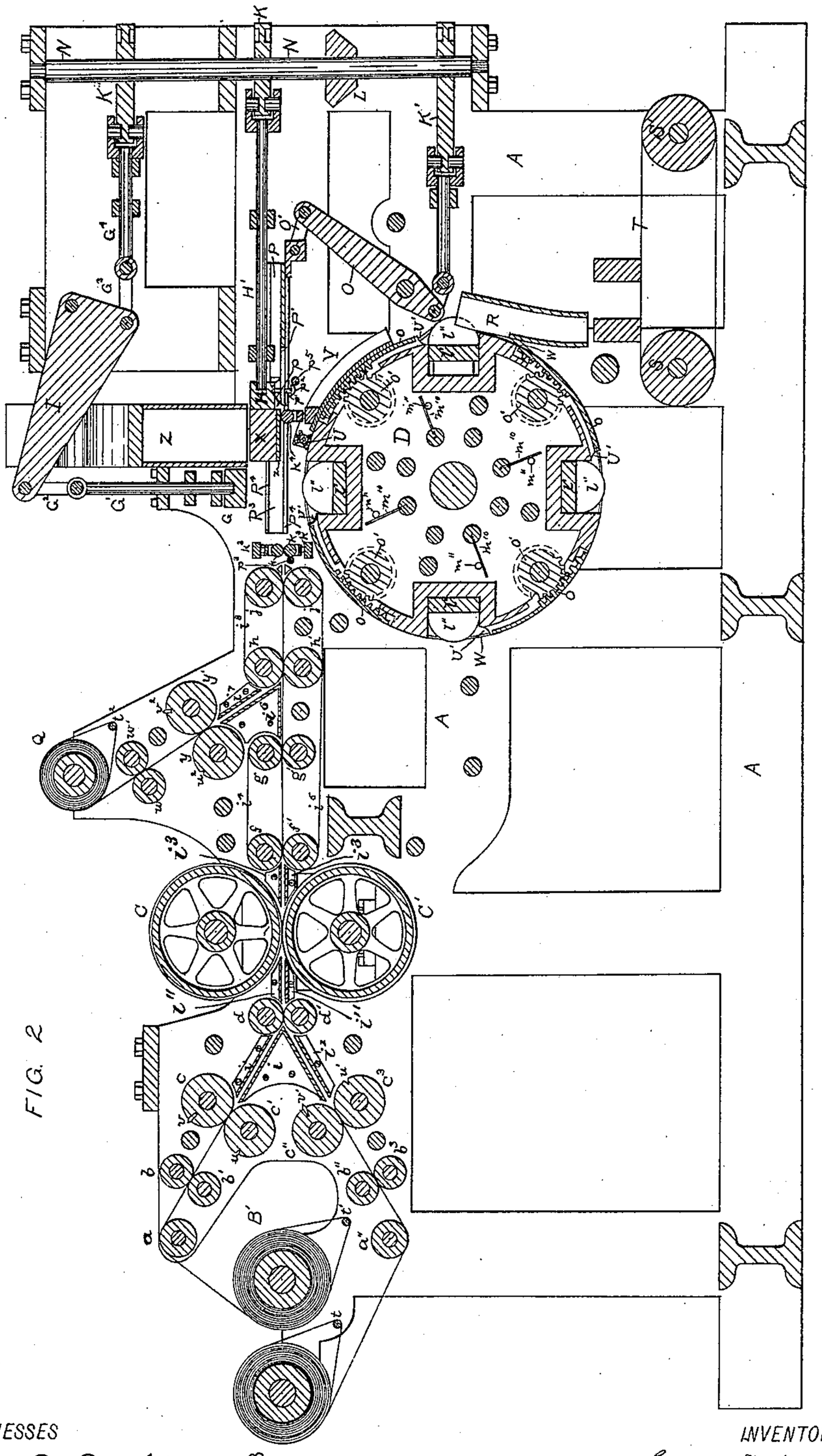

FIG. 2

WITNESSES

Albert E. Leach.

M. H. Thompson.

INVENTOR

Edwin D. Mellen

By his Attorney

W. B. A. Dowse.

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FIG. 4

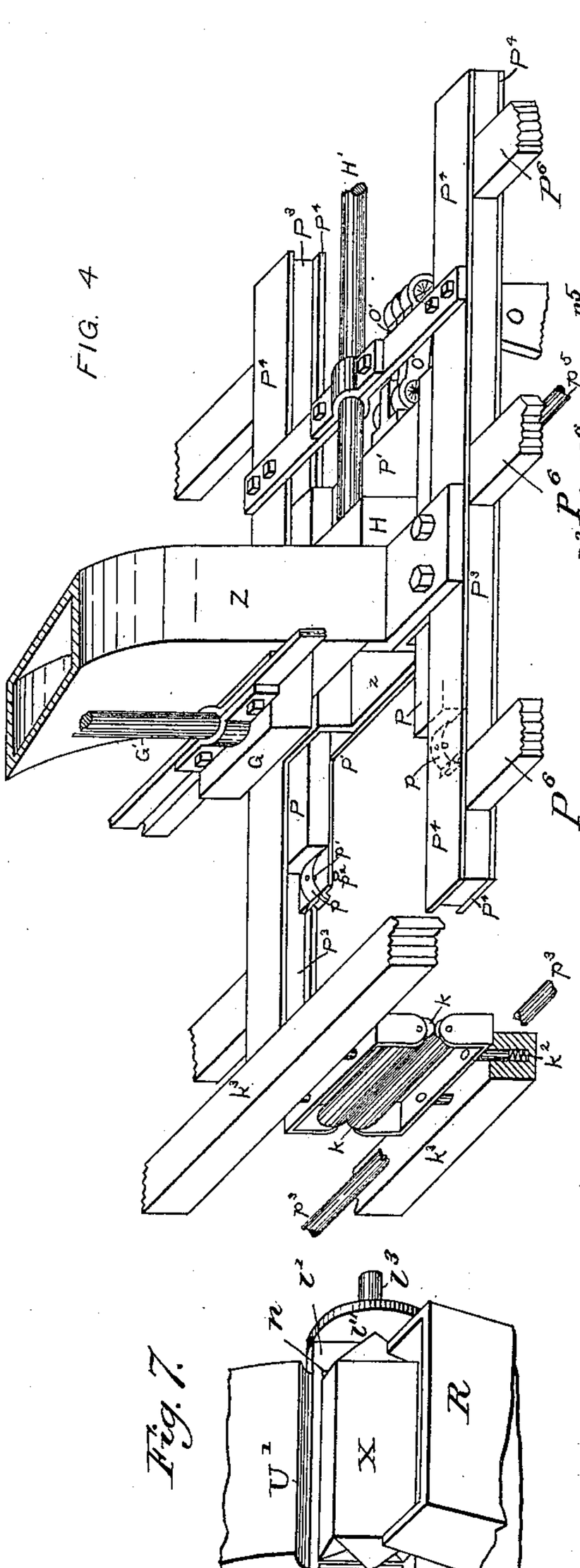

FIG. 3

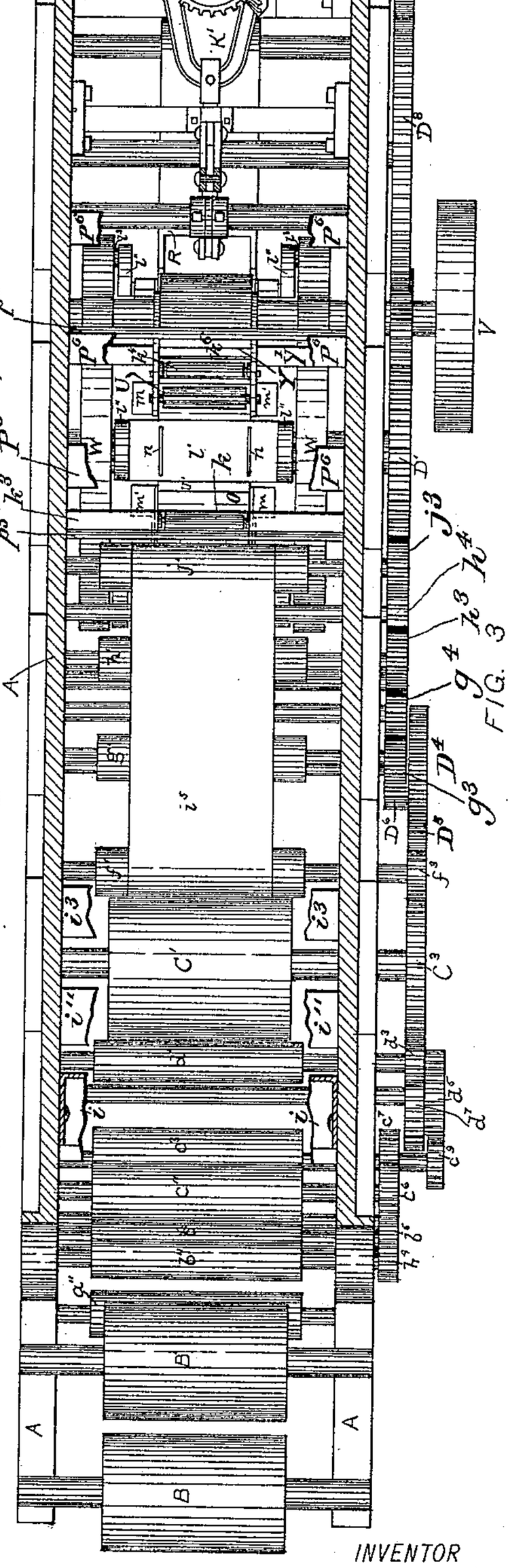

Fig. 7.

WITNESSES

Albert E. Leach.

M. H. Thompson.

INVENTOR

Edwin D. Mellen

By his Attorney

Wm B. K. Dowse

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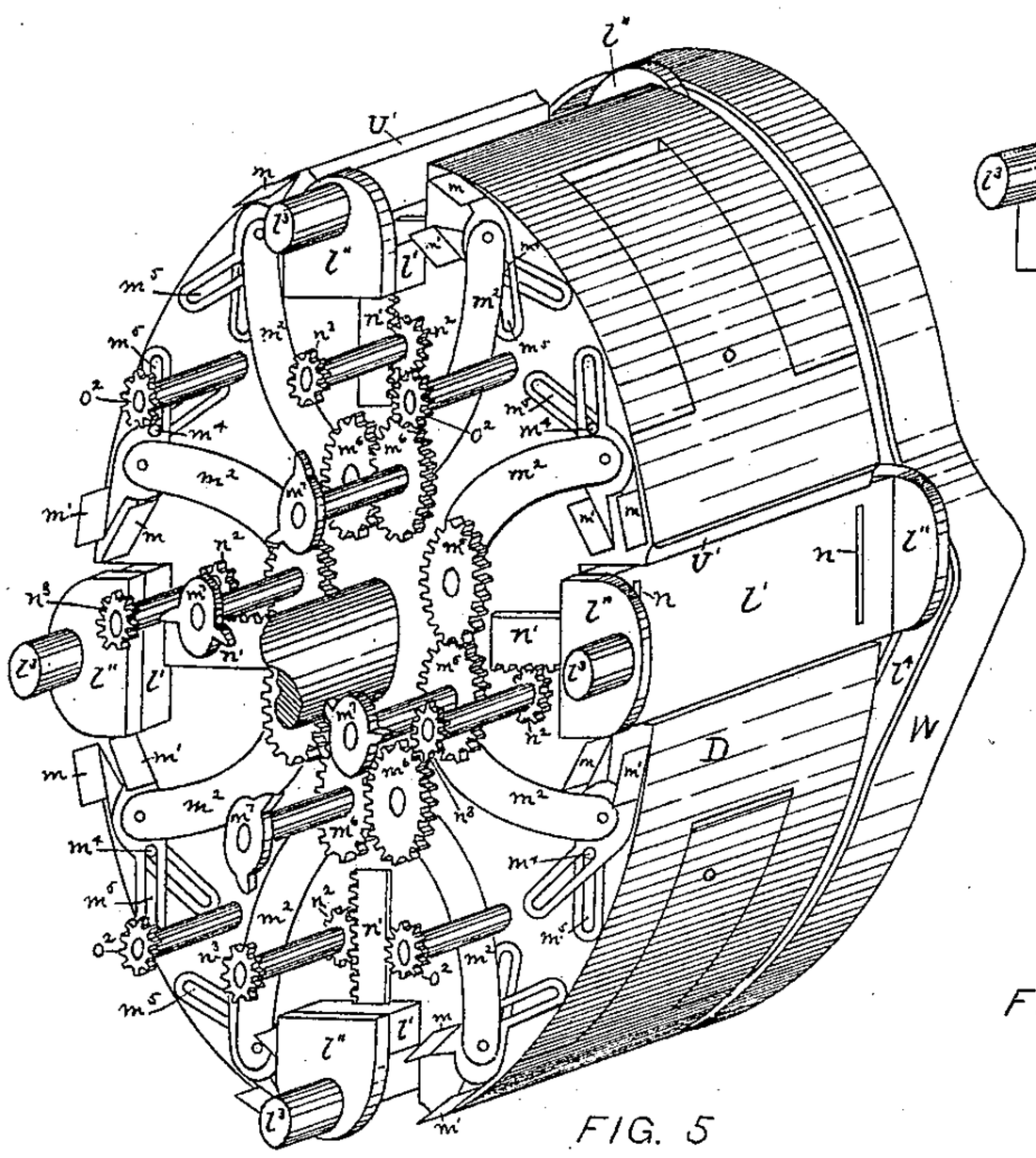

FIG. 5

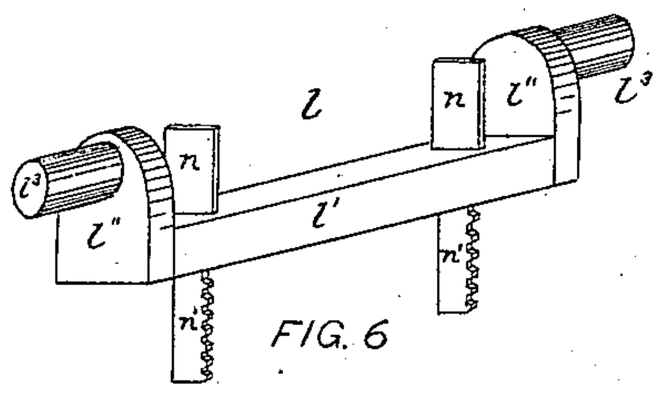

FIG. 6

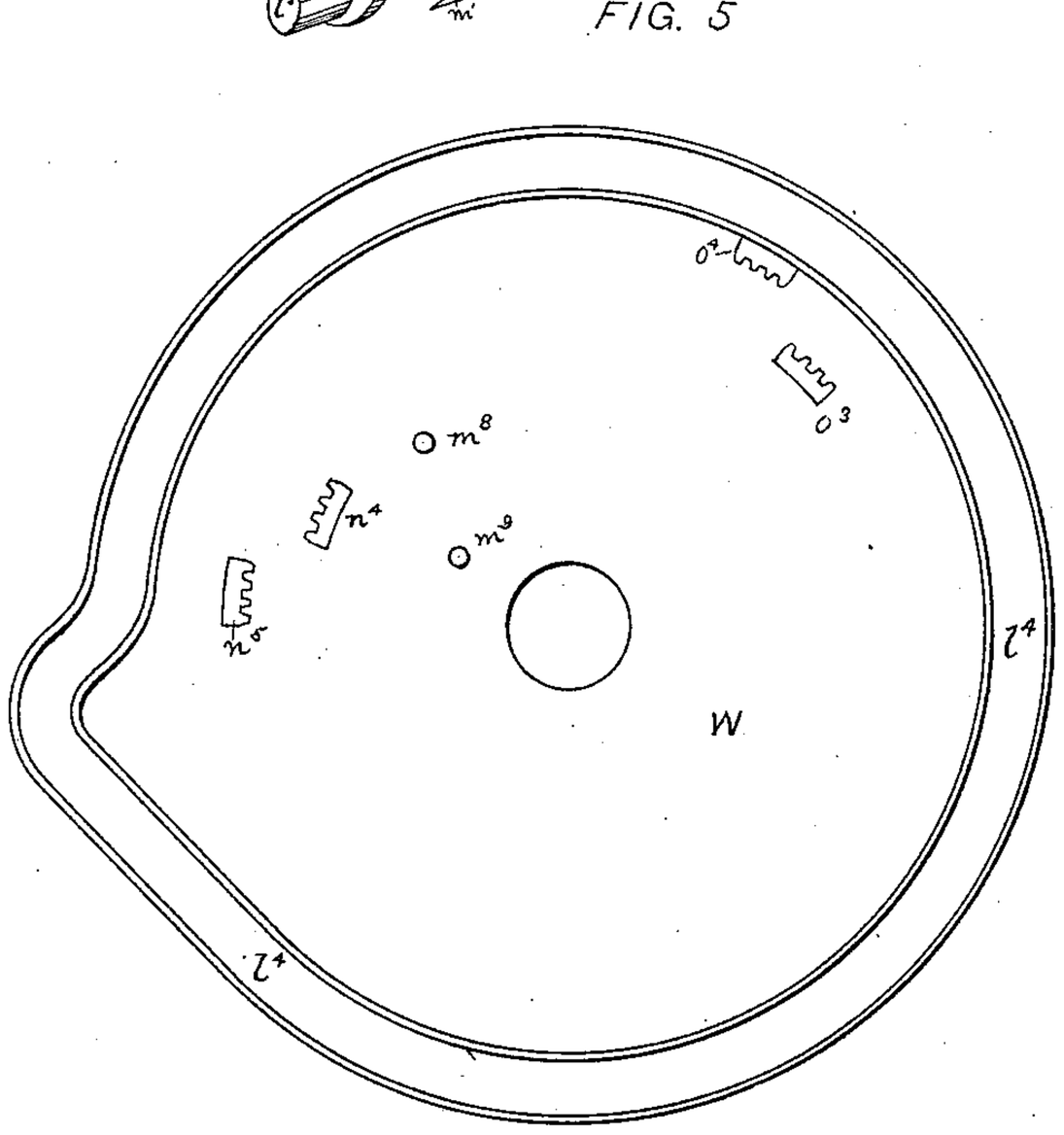

FIG. 8.

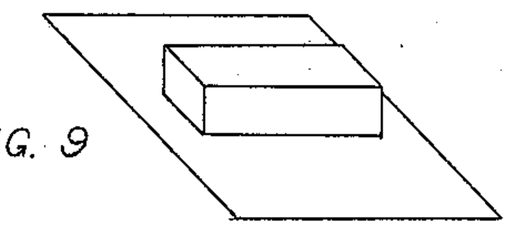

FIG. 9

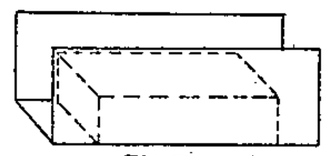

FIG. 10

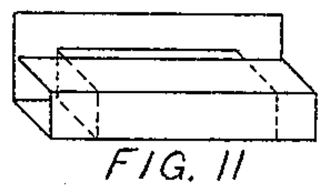

FIG. 11

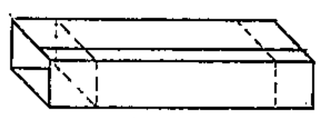

FIG. 12

FIG. 13

FIG. 14

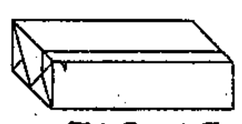

FIG. 15

WITNESSES

Albert E. Leach.

M. H. Thompson.

INVENTOR

Edwin D. Mellen

By his Attorney

W. B. H. Dowse.

UNITED STATES PATENT OFFICE.

EDWIN D. MELLEN, OF CAMBRIDGE, MASSACHUSETTS.

MACHINE FOR WRAPPING SOAP.

SPECIFICATION forming part of Letters Patent No. 467,040, dated January 12, 1892.

Application filed August 1, 1887. Serial No. 245,834. (No model.)

To all whom it may concern:

Be it known that I, EDWIN D. MELLEN, a citizen of the United States, residing in Cambridge, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Machines for Wrapping Soap and other Articles, of which the following is a specification.

My invention consists of the mechanism hereinafter described.

In wrapping cakes of soap I preferably use double wrappers consisting of an inner layer of thin or tissue paper and an outer printed wrapper of heavy paper. To deliver the wrapped cakes in a convenient manner for packing in a box or case the paper is first fed from rolls into the machine, then cut into the proper lengths, and in the case of the outer wrapper printed. While the form of mechanism here illustrated is adapted to wrap the cakes of soap alternately in wrappers of two different colors, the operation of wrapping would obviously be the same if only one color were used. Packages when wrapped with alternate colors may be easily placed checker-board or other fashion in the case or box.

Figure 1 of the accompanying drawings is a side elevation of a machine embodying my invention. Fig. 2 is a sectional elevation near the longitudinal axis of the machine. Fig. 3 is a sectional plan on the line *x x* in Fig. 1. Fig. 4 is a perspective view of the gripper device, plungers, and adjacent parts. Fig. 5 shows in perspective the wrapping-cylinder with its fittings. Fig. 6 shows in perspective a receiving-frame with its vertical folding-blades. Fig. 7 shows how the last operation of folding the wrapper is performed. Fig. 8 is a view of one of the cylinder-cams; and Figs. 9 to 15, inclusive, show the soap in the various stages of the wrapping process.

A A A A is the frame of the machine.

B B′ are the rolls of heavier paper of the two kinds with which the soap is to be wrapped. Let us suppose, for convenience, that B contains paper for red and B′ for yellow wrappers.

t and *t′* are rods over which the paper passes from rolls B and B′, respectively, to return upon itself over the rolls, thus insuring an even unfolding of the paper from the rolls. The paper first passes from roll B′ over the roller *a*, then between the two pairs of rollers *b b′* and *c c′*, the two latter being of such a size that the circumference is just equal to the length of the wrapper required. In the surface of the roller *c* is a knife *v*, and in the surface of roller *c′* a longitudinal slot *u*, into which the knife passes once every revolution, thus cutting the paper into the proper lengths for wrappers.

*a″ b″ b*³ and *c″ c*³ are corresponding rollers for the red paper, *c″* and *c*³ being provided with the knife *v′* and the slot *u′* for cutting the wrappers. From the two pairs of rollers *c c′* and *c″ c*³ the wrappers are fed alternately between the pair *d d′*, the motion of the rollers *b b′ c c′* and *b″ b*³ *c″ c*³ being intermittent, as will be hereinafter explained.

i i′ i′ and *i″ i″* are suitable guides, made, preferably, of thin metal, for insuring the transmission of the wrapper from the cutting-rolls to the cylinders C C′, between which the wrapper is printed. Thence passing between suitable guides *i*³ *i*³ the wrapper is carried along between guiding-belts *i*⁴ *i*⁵ *i*⁸, running over the rollers *f f′ g g′ h h′ j j′*, as is shown in Fig. 2.

Q is a roll of tissue-paper to form the inner wrapper. After passing over the rod *t*² this paper passes between the pairs of rollers *w w′* and *y y′*, the circumferences of the two last being equal to the length of wrapper required. *y* and *y′* are furnished, respectively, with a slot *u*² and a corresponding knife *v*², the edge of the knife being serrated so as to perforate the thin wrapper along the proper line, but does not sever it entirely. It should be noted that the printed wrappers do not follow one directly after another, but that a short space intervenes between them to allow for the time consumed in wrapping. The tissue wrapper passes from the rollers *y y′* between guides *i*⁶ *i*⁷ and enters between the rollers *h h′* at the same instant as the printed wrapper, being superimposed upon the latter, and the two are then fed forward between the belts *i*⁵ *i*⁸ and emerge between the rollers *j j′*. The motion of the printed wrappers being intermittent, as just explained, the proper interval of space is secured between the tissue wrappers by having the surface speed of the rollers *w w′* and *y y′* considerably less than that of *h h′*, which is the same as that of all

the other rollers in the system which feeds the printed wrappers, viz., *b b' c c' d d'*, &c. Consequently when the tissue wrapper passes between *h* and *h'*, the speed of which is greater than that of *y y'*, it is torn apart along the perforated line.

In Fig. 4 is shown the sliding gripper-frame consisting of two bars P P, fastened down upon the plate P', to the back and under portion of which is pivotally attached the two connecting-bars O' O', which are in turn attached to the upper end of the lever O. An intermittent reciprocating motion is given to the gripper-frame by means of the lever O and the cam K' on the revolving vertical shaft N, as shown Fig. 2. The gripper-frame slides back and forth between guides formed by two parallel bars P^3 P^3, attached by means of the supporting-bars P^6 P^6 to the frame of the machine. On the top and bottom of the said bars P^3 P^3 are thin plates P^4 P^4, projecting over the sides of the bars.

The gripper-frame is furnished at the end of the two bars P P with spring-grippers *p p*, as seen in Figs. 2 and 4. These springs have struck-up ends, as shown, and are so placed with reference to the struck-down ends of the plate P' as to form jaws, which are opened by the upward pressure of the pins *p'*. When the double wrapper is about to emerge from between the rollers *j j'*, the gripper-frame is carried forward and the spring gripper-jaws are opened by the inclined head p^2 of the pin *p* coming against the stationary rod p^3. The ends of the superimposed wrappers are fed into the jaws of the gripper, the frame of which at the right instant starts on its return course, thus closing the gripper-jaws upon the paper and carrying the latter forward. The bars P P in their motion pass outside of two rollers *k k*, which are pressed together with springs (one of which is shown at k^2) held in the bars k^3 k^3, the said bars k^3 k^3 and the rod p^3 being secured at each end to the machine-frame. When the gripper-frame returns, carrying forward the double wrapper, the latter passes between the two rollers *k k*, where it is held by the spring-pressure when the rear end of the wrapper has emerged from the rollers *j j'*. Another roller k^4, Fig. 2, similar in construction to the rollers *k k*, is held in the bar k^5, attached to the bottom of the sheath Y, and is pressed upward by a spring similar to those employed in the rollers *k k*, so that when the gripper-frame is in position to receive the wrapper into its jaws, the roller k^4 presses against the bottom of the plate P'; but when the said frame has reached the end of its return motion the forward end of the wrapper is held by spring-pressure between the roller k^4 and the bottom of the plate *z*. At the same time the inclined pin-heads p^2 are raised by coming in contact with the rod p^5, which acts in like manner to the rod p^3, thus opening the gripper-jaws and releasing the wrapper. The wrapper is now held in suspension immediately over the revolving wrapper-drum D. This drum (best shown in Fig. 5) is furnished with four rectangular cavities cut through the entire thickness of the drum and at equal distances along its periphery. Into these cavities fit the receiving-frames *l l l l*, Fig. 6, formed of a bottom portion *l'* and two end pieces *l'' l''*, to which are fastened pins l^3 l^3. Two stationary cams W W are placed one on each side of the revolving drum, and by means directly to be described give motion to the various folding devices on the drum D. The path l^4, in which the pin l^3 travels, is circular, except throughout a short portion, where it deviates in such a way as to quickly lift the frame *l* from the bottom of the cavity till the upper surface of *l'* is on a level with the surface of the drum. This happens when the cavity has passed a little more than a quarter-revolution from its uppermost position.

The cakes of soap to be wrapped are piled up in the box Z, which is preferably kept constantly full. At the instant the grippers *p* release the wrapper from their grasp the horizontal plunger H is carried forward by means of the cam K^2 and the rod H', thus pushing the undermost cake of soap X from the bed-plate *z* upon the wrapper, the latter being being held by spring-pressure, as heretofore described. This motion is so timed that at its end a cavity in the revolving drum D comes immediately under the soap, which is then in the stage shown in Fig. 9. At this moment the vertical plunger G is carried downward by means of the bell-crank lever I, the rods G' G^2 G^3 G^4 and the cam K^3 forcing the soap into the cavity of the drum then uppermost and onto the receiving-frame *l*, the sides of the cavity thereby folding the wrapper over the sides of the soap in the position shown in Fig. 10.

Along the periphery of the drum D are four segmental strips *o o o o*, having teeth along a portion of their inner side and operated by the pinions *o' o' o' o'* to move backward and forward, motion being imparted to the pinion at the proper time by means hereinafter described. As soon as the cake of soap has been deposited upon the movable frame *l*, the top of the soap being on nearly the same level as the top of the cavity, the strip *o* is moved quickly forward from the direction in which the drum revolves, folding down one side of the wrapper, as in Fig. 11. The other side is folded down over the same in the position shown in Fig. 12 by the revolving drum, carrying the soap under the stationary sheath Y, the protruding side of the wrapper being folded over by coming in contact with a fluted roller U at the upper end of the sheath Y. This roller is pressed downward by light spring-pressure and comes in contact with the upper forward edge of the piece of soap. After making the first fold, the segmental strip *o* is withdrawn. The next step in the process is to fold in the ends of the wrapper, as shown in Fig. 13. This is accomplished by

the shear-shaped folders m m', of which there are eight pairs on either face of the drum, every cavity having a pair on each side, those on one face being clearly shown in place in Fig. 5. Each pair of folders is composed of two metal pieces m' m' of the shape shown, having struck-up blades and slots m^5, the blade being struck up, preferably, at right angles to the slotted portion of the folder, as shown in Fig. 5. Each pair is pivoted to one end of a supporting-arm m^2, which is rigidly attached at its inner end to the gear-wheel m^6. It will thus be seen that there are four pairs of gear-wheels m^6 on each face of the drum, one pair for each cavity.

For simplicity the action of the shear-shaped folders on one side of the drum only is described, that on the other being precisely similar. In every case the pair uppermost in position on the drum is the pair in action at the moment, the operation of which is as follows: Motion being imparted to one gear m^6 of the pair in question by means hereinafter described, the supporting-arms m^2 m^2, and with them the pairs of folders at their outer ends, are caused to approach each other, so that the ends of the folding blades of one pair nearly touch those of the pair on the other side of the cavity, between the side piece l'' of the receiving-frame and the plane of the face of the drum, in which space lies the loose side of the wrapper protruding beyond the cake of soap. At the same time by means of the pin m^4 and the slots m^5 in the two pieces constituting the pair, the ends of the blades of each pair shut together during the approaching motion of the arms m^2, so as to present a narrow edge to the loose ends of the wrapper, thereby folding them in neatly without the crumpling or tearing of the paper that would result were the blades to approach without thus closing together. The blades immediately open out again in the position shown in Fig. 5 on the receding of the arms m^2. At the right moment the folders are brought quickly together and separated again, thus folding in the ends, as in Fig. 13. The next stage is accomplished by the vertical folding-blades n, made preferably of thin metal and each attached to a rack n'. These blades play up and down in suitable slots made in the bottom of the receiving-frame l, and the distance between the two slots is about the same as the length of the cake of soap. After the shear-shaped folders have returned to their normal position the vertical folders at the bottom of the cavity in question quickly rise, and the soap is in the stage shown in Fig. 14. All of these folding operations have been performed while the drum has been making about a quarter revolution or while the cavity in which the soap was deposited has traveled through a quadrant from the topmost position. As soon as the vertical blades n have done their work the receiving-frame containing the soap is lifted bodily from the cavity, as shown, until the surface on which the soap rests is on a level with the top of the cavity, the soap being pressed into the upper part of the chute R, which is a four-sided box open at the top and bottom, the upper portion of the face nearest the drum being cut away for some distance down and is tangent to the drum. During this motion the projecting V-shaped portion of the ends of the wrapper, coming in contact with the sides of the chute, as shown in Fig. 7, are folded down, as in Fig. 15, and when the receiving-frame has reached the top of the cavity of the drum, which takes place when the drum has made somewhat more than a quarter-revolution from the time the soap was received, the cake of soap wrapped falls by gravity through the chute and is delivered upon the endless belt T, running over the two pulleys S S'. Meanwhile the cavity next behind has come into a vertical position under the plunger G and the same operations are repeated in order, four cakes being wrapped in each revolution of the drum.

V is the driving-pulley, on the same shaft with which is the gear V', which transmits motion through gear-wheel T' to the delivering-belt T and through the gear D' to the wrapping-drum D. From D' the motion is transmitted to the various parts of the machine, as seen in Figs. 1 and 3. Through the train D^3 D^4 D^5 D^6 the gears C'' C^3, fixed on the same shafts as the printing-cylinders C C', are driven, and from these motion is imparted to the rollers feeding the paper from the rolls.

The intermittent motion of the two sets of rollers feeding in alternately wrappers of two different colors or kinds is brought about by the employment of intermittent gears, as shown in Fig. 1. Each of the two sets of rollers thus moving alternately derive their motion primarily from the pair of gears C'' C^3. The wheel C'' engages directly with d^6, thus giving motion to gears d^2 and d^3, which are fixed on the same shaft as the rollers d and d'. Integral with the wheel d^6 is the intermittent gear d^4, having teeth along a portion of its rim only, but a sufficient portion being toothed to turn gear-wheel c^4, which gears with it, one revolution.

c^8 is a pinion integral with c^4, which transmits the motion of the rest of the train b^8, b^4, and b^5, thus causing the rollers b b', feeding the paper from the first roll B', to revolve only when the rollers c c' are in motion. The train of gears actuating the lower set of rollers, which feed the paper from the second roll B, is similar to the upper train and has the intermittent gear d^5, the whole being so designed that while the lower set of rollers is in motion the upper set is at rest, and vice versa. The gear D' on the shaft with the wrapping-drum drives through the wheel D^8 the smaller spur-wheel L'', which makes four revolutions to one of the drum D. On the same shaft with L'' is the bevel-gear L', which engages with the corresponding wheel L, thus driving the vertical shaft N with the three cams K, K',

and K². Motion is imparted to the rollers feeding in the tissue-paper by means of the gears y^6 y^5 y^4 y^2 y^3 and w^1 w^3 w^2, which are driven by the gear C″. The train of gears g^2 g^3 g^4 h^2 h^3 h^4 and j^2 j^3 which drive the rollers g g' h h' j j' derive their motion through h^5 from the large wheel D′, while the gears f^2 f^3, driving the rollers f f' are themselves driven by y^6.

The motion of the various folding devices on the drum D are imparted by one of the stationary cams W. The spindles upon which the pinions o' are mounted project on one side beyond the face of the drum D, and are provided with gear-wheels o^2, which at the proper time in the revolution of the drum, engage with the short segmental annular gear o^3 in the same cam W, of such a length as to carry the toothed strip o forward the requisite distance, after which, by engaging with the section of gear o^4, the rack is drawn back to its normal position. In like manner the spindle bearing the pinion n^2, which actuates the vertical folder n through the rack n', is furnished at its end with the toothed wheel n^3, which receives its motion back and forth by means of sections of teeth n^4 n^5 upon the cam-face. So, also, one of each pair of toothed wheels m^6, bearing the supporting-arms m^2, has its spindle elongated, and on its end a disk m^7 having two teeth, which bear against pins m^8 m^9 in the cam W, so situated that when one tooth of m^7 has slipped by the pin m^8 the second tooth begins its contact with the pin m^9. In this manner the folders m m' are given a backward and forward motion.

Suitable means are used for keeping the shear-shaped folders normally apart, so that they may not loosely swing back and forth during the revolution of the drum excepting at the proper time when actuated by the pins m^8 and m^9. To this end I have inserted in the spindle of one of each pair of gears m^6 a little spring m^{10}, Fig. 2, bearing against a pin m'' inserted in the inner face of the drum.

Two or more wrapping-drums may be employed side by side in one machine, each drum furnished with a full set of folding devices, rolls of paper, delivering-chute, &c., as described above in the case of a single drum.

What I claim as my invention is—

1. In a wrapping-machine, a revolving wrapper-drum provided with receiving-cavities along its circumference, end folders at each end of each of said cavities connected with said drum, and rack-and-pinion-operated segmental top folders sliding along the circumference of the drum, in combination with a stationary cam operating the folding devices, substantially as described.

2. In a machine for wrapping soap and other articles, a wrapper-drum having along its circumference package-folding cavities, each of which is provided with a receiving-frame, a segmental upper folder, shear-shaped end folders, and vertical folding-blades, substantially as described.

3. In a wrapping-machine, a frame l, consisting of a bottom portion l' and end pieces l'', in combination with a chute R, whereby a cake of soap is lifted from the bottom of a package-folding cavity and pressed into said chute, the sides of which complete the folding, substantially as described.

4. In a package-wrapping machine, a revolving wrapper-drum having one or more cavities along its circumference, each of which is provided with a receiving-frame, in combination with one or more segmental reciprocating folders o, a roller U, pressing against the surface of the drum, a stationary sheath Y, shear-shaped reciprocating end folders m m', vertical reciprocating folding-blades n, and a chute R, all arranged and operated substantially as described.

5. In a wrapping-machine, a revolving wrapper-drum provided with package-folding cavities, in combination with soap-receiving frames working in said cavities, and a chute having the face toward the drum tangential thereto and cut down for some distance, whereby when the soap is carried by said frame into said chute the ends are folded down by the sides of the chute, substantially as described.

6. In a wrapping-machine, the reciprocating shear-shaped folders m m', arranged in pairs, each folder being provided with a slot m^5, in combination with the pin m^4, substantially as described.

7. In a package-wrapping machine, a revolving wrapper-drum, in combination with a vertical plunger, a horizontal plunger, a sliding gripper-frame, whereby the wrapper is fed over a cavity in the drum, and spring-rollers whereby the wrapper is held in position, all arranged substantially as set forth.

8. In a wrapping-machine, two sets of rollers acting intermittingly and alternately, each set being provided with a cutting device, substantially as described, whereby two strips of paper are fed alternately from rolls and cut into the proper lengths for wrappers, in combination with a wrapper-drum with folding devices, substantially as described.

9. In a machine for wrapping packages, in combination, two sets of rollers acting intermittingly and alternately, each set being provided with a cutting mechanism, substantially as described, whereby two strips of paper are fed alternately from rolls and cut into the proper lengths for wrappers, substantially as set forth.

10. In a package-wrapping machine, two systems of rollers acting intermittingly and alternately, each system being provided with cutting mechanism, substantially as described, whereby paper of two different colors is alternately fed from rolls and cut into the proper length for outer wrappers, in combination with a third set of rollers, provided with cutting mechanism, substantially as described, whereby thin or tissue paper is fed from a roll, cut into the proper lengths, and superimposed

upon the outer wrapper, substantially as and for the purposes described.

11. In a wrapping-machine, a wrapper-drum and folding devices, substantially as described, in combination with two systems of rollers acting intermittingly and alternately for alternately feeding outer wrappers of different colors, and a set of rollers for feeding inner wrappers, whereby the inner are superimposed upon the outer wrappers, substantially as set forth.

12. In a wrapping-machine, the combination of a wrapping-drum and folding devices, substantially as described, with two systems of rollers acting intermittingly and alternately for alternately feeding outer wrappers of different colors, a set of rollers for feeding inner wrappers, superimposing the same upon the outer wrappers and printing-cylinders, whereby the outer wrappers are printed previous to coming in contact with the inner, substantially as and for the purposes described.

13. In a machine for wrapping packages, the combination of a wrapper-feeding device, substantially as described, a reciprocating gripper-frame provided with spring-grippers, a horizontal plunger, a vertical plunger, spring-rollers whereby the wrapper is held in suspension under the said vertical plunger, a revolving wrapper-drum provided with folding devices substantially as described, and a chute, all arranged and operated substantially as and for the purposes described.

14. In a machine for wrapping packages in printed wrappers, the combination of rollers for feeding outer wrappers, printing-cylinders for printing the same, a set of rollers for feeding inner wrappers, superimposing the inner upon the outer wrappers, a reciprocating gripper-frame, a horizontal plunger, a vertical plunger, spring-rollers whereby the double wrapper is held in suspension under said vertical plunger, a wrapper-drum provided with one or more cavities along its circumference, receiving-frames, segmental upper folders, shear-shaped end folders and vertical folding-blades, a spring-roller attached to a sheath, a cam operating the receiving-frame and giving motion to the various folding devices on the wrapper-drum, and a chute, all arranged and operated substantially as and for the purposes described.

In witness whereof I have hereunto set my hand.

EDWIN D. MELLEN.

Witnesses:
WM. B. H. DOWSE,
A. E. LEACH.