This invention relates to a device for wrapping up irregularly shaped objects, such for instance as candies, lozenges, sweets and sugar almonds by means of a flexible matrix or former. The term “matrix” is to be understood as describing a relatively rigid wall closely enveloping the object or article pushed through it and which offers a certain amount of yield to the direction of movement of the article. Such a matrix might be formed of a cylinder with brush bristles extending inwardly thereon. The bristles however are of irregular elasticity and do not prove entirely satisfactory in operation.

According to this invention, I form the matrix of rubber, conveniently a piece of rubber tube. The cross section of the matrix preferably corresponds substantially in shape to the contour of the article to be wrapped, but the area of the section is smaller or at most equal to the cross section of the article to be wrapped. The ends of the rubber tube are anchored to rigid frames which are larger in their opening than the cross section of the article which it is intended to wrap. These frames cause the rubber tube to assume the approximate shape of the contour of the article and at the same time are spaced apart so as to tension the rubber to the extent desired. When wrapping up irregularly shaped articles it is advisable to provide resiliently mounted pressure pads acting on the exterior of the rubber tube so as to ensure a more uniform pressure of the matrix all around the contour of the article. When an article such as a piece of candy or other confection is passed, together with a sheet of tin foil or other wrapping material, through a matrix of the kind described by means of pusher, the enveloping material is caused to cling closely around the whole contour of the article, whilst at the same time the pressure exerted is so gentle that sweets, such as those containing a liquor or cream in a surrounding shell of chocolate, can be wrapped without any fear of damaging or bursting the shell.

The articles to be wrapped are received on a table from which they are pushed by the pusher through the resilient matrix and in order to prevent damage from these parts, the pusher may be made of resilient construction or the table may be resilient or resiliently mounted or both these measures may be adopted.

In operation when the enveloping sheet is laid around the article, the edges of the sheet are, by means of the matrix, turned up so as to project over the top surface of the article. The folding over of these edges is preferably effected by three successive operations:

First, a roller or forming surface is employed which is narrower than the object and operates over a part of its width.

Second, two rollers or forming surfaces are employed which pass over the article in opposite directions and at right angles to the first mentioned folding movement, but which only act on side portions which were not folded by the first operation above.

Third, a roller or forming surface is used for folding over the remaining up-turned portions of the wrapping material, conveniently whilst the article is being carried forward by the movement of the carrier in which it is supported.

The carrier may be formed as a roll provided with recesses corresponding to the shape of the articles, the number of recesses in the diameter being even, so that there is always a recess diametrically opposite another recess. Ejector rods may be mounted in the roller and operating in the recesses so that the insertion of an article in an empty recess presses the ejector to cause it to eject another article from the diametrically opposite recess.

Feeding of the articles to the mouth of the matrix is preferably effected by a means of an automatically oscillated gripper or tongs, the fingers of which are also automatically operated. The articles may be brought to the grippers by means of a transporter which carries the articles up to a fixed point from which the grippers carry it to the mouth of the matrix. The transporter may be an intermittently rotated disc, having recesses for the article on its upper surface, said recesses being open ended towards the periphery of the disc. These recesses are shallower than the article. The periodically oscillated gripper may have its resilient gripping fingers operated by a stop located near the end position of the movement of the arm. As the arm moves away from this end position, the gripping fingers leave the stop and close on the article under the action of their spring. In order to provide against difficulties arising from irregularities of the articles, such as lumps or blisters on the
exterior surface, one at least of the resilient gripper fingers is preferably hinged about a longitudinal axis. The invention is illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a section taken on the plane I—I of Fig. 2.

Fig. 2 is a plan with the top cover removed, and Fig. 3 is an enlarged view showing the feeding device in plan.

In carrying the invention into effect according to the form shown, the matrix b is mounted on the cover plate a, and consists of a rubber tube c. The ends of the rubber tube are folded into wire rings or frames d which are bent to a contour corresponding to an enlarged section of the article to be wrapped. Pressure pads e, which are under the action of springs f, operate on the exterior surface of the rubber tube c. The springs f are mounted in pillars g fixed to the bottom surface of the cover plate a. A pusher h conveniently made of wood, is mounted over the upper inlet end of the rubber matrix b and any suitable means may be provided for reciprocating this pusher vertically and synchronously with the operation of the machine. The pusher h is arranged in two parts with a spring h′ interposed so as to give a resilient pressure on the article being pushed into the matrix. The paper or foil k is fed between the guide plates i and is cut off in desired lengths by the knives shown. The feeding and paper cutting devices may be of any well-known type and do not require further description or illustration.

A roller l having recesses m, corresponding in shape to the articles to be wrapped, is mounted beneath the lower end of the matrix tube b. In the drawings, the articles to be wrapped are illustrated as sugar almonds. A ratchet wheel n and a dial plate o are rigidly mounted on the spindle of the roller l. A pawl carried by the lever p, which is loosely mounted on this spindle engages the ratchet wheel n. The lever p is operated from the cam q through the transmission lever r. The cam q is mounted like the other cams hereinafter described on the timing shaft s.

In the dial plate o which is shown dotted in Fig. 1, grooves are formed corresponding in number and position to the recesses m in the roller l. A roller t mounted on a pivoted lever s, is adapted to engage in the recesses of the dial and thereby hold the roller l in proper position to receive the article emerging from the bottom end of the matrix b. The lever s is adapted to be operated by a cam q against the action of a spring v.

The cam q′ is arranged to operate a roller z carried by a pivoted lever y mounted on the end of the lever x. The lever y trails over a surface, not illustrated in the drawings, serving to prevent the roller z from falling out of operative position relative to the roller l.

Two rollers 7 having their axes at right angles to the axis of the roller z are carried by trailing levers 6 pivoted at the ends of levers 2 and 4 which are mounted on vertical axes. Midway between the axes and the ends of these levers, rollers are mounted, which engage the cam projections 3 and 5 respectively, the levers being pressed against these cams by springs 14 suitably anchored to the side frame of the machine. The roller 7 is narrower than the article to be wrapped and is arranged in what may be termed a position parallel to the longitudinal axis of the article. The rollers 7 are arranged transversally to this axis.

A third roller 8 mounted on a lever 9 is arranged to bear on or near the transport roll t. A further roller 10 mounted on the lever 11, which is under the action of a spring 12, is provided. Pins 15 are slidably mounted in radial holes in the roller 7. The length of the pins 15 is slightly greater than the distance between the bases of diametrically opposite recesses m in the roller l, whereby these pins act as ejectors.

The feeding device is mounted on the cover plate a, see Figs. 1 and 3. A disc 17 (Fig. 3) is mounted to rotate with an axle pin 18 on which there is also mounted a ratchet wheel 19, shown in dotted lines in Fig. 3 and adapted to be given a step-by-step movement by any suitable means, not illustrated. The disc 17 is provided with grooves 19 adapted to receive the articles j to be wrapped, these articles being laid in by hand. The grooves are shallower than the articles so that the latter project above the surface of the disc. A lever 21 is rotatably mounted on a pin 20, supported in the cover plate a. This lever is adapted to be oscillated by means of a rod, not illustrated but engaging in the end 22, so that the lever 21 oscillates in synchronism with the pusher h. A gripping finger 23, hinged at 24, and a second gripping finger 25, hinged at 26, are mounted on the lever 21, whilst both these fingers are connected by a link 27. The gripping piece of the arm 23 is hinged at 28 to this arm, so that it can oscillate about a horizontal axis and thereby accommodate itself to irregularities in the articles. The gripper arm 23 is under the action of a spring 29, anchored on the lever 21, whereby the two gripper pieces tend to move towards one-another.

A stop piece 30 is formed on, the gripper arm 23 and is adapted to strike against a bar stop 31 which is preferably carried by a lever 32 and held up to its position by a
spring, not illustrated, so as to give a certain amount of resiliency or softness to the action of the device. The operation is as follows:—The articles to be wrapped are laid by hand in the grooves 19 of the disc 17. During the upward movement of the pusher \( h \), the lever 21, together with the grippers 23 and 25, is moved away from the position over the open end of the matrix \( b \) towards the end position shown in Fig. 3. In this movement the stop 30 strikes the bar 31 thereby causing the grippers to open. When the lever 21 has reached its end position, the mechanism is so timed that the feed disc 17 makes its forward movement under the action of the ratchet 18, whereby a loaded groove comes into position to enable the grippers to seize an article. The stop pin 31 is then moved from right to left in Fig. 3 by a movement of the lever 22 which is effected by mechanism not illustrated. In this way the grippers 23 and 25 close on the article. The separative movement of the stop 31 may in some cases be dispensed with and the closure of the grippers effected when the lever 21 moves away from the end position illustrated towards the opening of the matrix \( b \). In this movement of the lever 21, the article seized between the grippers 23 and 25 is brought into correct position over the matrix \( b \) and during this movement of the lever the paper or foil feeding device has fed a portion of paper or foil between the foil guides \( i \) and this foil is then cut by the knives illustrated in Fig. 1.

The pusher \( h \) now descends and presses the article from between the grippers 23 and 25 into the matrix \( b \) and through this matrix to the recess \( m \) in the transporting roll \( l \). By this movement the paper or foil is closely wrapped around the contour of the article and the free ends of the wrapping material project above the upper surface of the article. If an article is already located in the groove diametrically opposite that which has just received the article from the gripper as described above, the pressure of the incoming article on the pin 15 will move said ejector pin downwards and throw out the already wrapped article in the lower-most groove or recess of the transporting roll \( l \). The ejected article falls on a delivery plate \( s \) by means of which it is guided to a suitable receptacle.

The upwardly projecting edges of the wrapping material are folded over in three stages, the timing of the operation being effected from the cams in the timing shaft \( q \). The cam \( q \) first moves the roller \( z \) from left to right, so that it folds over the upturned edge nearest to it but leaves the side edges and those on the opposite side of the article still upturned. Immediately after the retreat of the roller \( z \), the rollers \( 7 \) are simultaneously moved forward in a direction at right angles of the roller \( z \) and thereby fold over the upturned side portions, leaving only the edges on the right-hand side of the article in Fig. 2 now upturned. As soon as the rollers \( 7 \) return, the transporting roll \( l \) is rotated through 90 degrees by the pawl on the lever \( p \) and the ratchet wheel \( m \). In this movement the roller 8 folds over the remaining upturned edge of the wrapping material whilst on further movement the folded over edges are subjected to the resilient pressure of the large flattening roll 10 whereby the wrapping operation is completed and the article ready for ejection at the next step in the movement of the transporting roll \( l \).

I claim:—

1. In a wrapping machine having means for passing the article to be wrapped, together with a wrapper through a matrix, a matrix consisting of an open tube having continuous wall of elastic material, said tube being normally smaller in cross-section than the cross-section of the article to be wrapped.

2. The device of claim 1 in which the tube is provided with open frame elements adjacent each end thereof for holding the ends open.

3. In a wrapping appliance, a matrix consisting of an open rubber tube, said tube being normally smaller in cross-section than the cross-section of the article to be wrapped, the article to be wrapped, together with wrapping material being passed through said tube.

4. A matrix for a wrapping machine comprising, rigid frame parts, a rubber tube stretched by and having its ends held in said frame parts and resiliently mounted pressure parts operating on the exterior of said rubber matrix.

5. In a wrapping appliance, a matrix consisting of an open rubber tube, said tube being normally smaller in cross-section than the cross-section of the article to be wrapped, an open frame element larger than the articles to be wrapped for holding open an end of said tube, the articles to be wrapped, together with wrapping material, being passed through said frame element and said tube.

6. Means for wrapping foil, paper and the like around articles comprising a resilient walled matrix and resiliently mounted pressure pads operating externally on said matrix and tending to preserve the normal shape of the matrix against the influence of articles passed therethrough.

7. A wrapping machine for articles comprising, a resilient walled matrix, means for feeding articles to said matrix, a guide for wrapping material over the inlet end of said matrix, a pusher operable over and through said matrix, means for folding in the up-
turned ends of said wrapping material, comprising a roller movable to fold one side, two rollers subsequently movable to fold the sides at right angles to said first mentioned roller, a transporting roll for the articles and a roller operable during the movement of said transporting roll to fold in the remaining side of the wrapping material.

8. In a machine for wrapping articles such as candies, a resilient walled matrix and means for feeding the articles singly to said matrix, comprising a periodically oscillatable lever, gripper parts hinged to said lever and resiliently held in gripping position, and stop mechanism operable on said gripper parts at the end of the oscillating movement of their carrying lever to open said grippers.

9. In a machine for wrapping articles such as candies, a resilient walled matrix and means for feeding articles singly to said matrix, comprising a periodically oscillatable lever, gripper parts articulated together and resiliently held in gripping position, a transporting plate adapted to transport single articles and present them to said grippers, stop mechanism adapted to open said grippers in position to receive said presented articles, said grippers closing on a presented article upon a relative displacement of said lever and said stop mechanism.

10. In a machine for wrapping articles such as candies, a resilient walled matrix and means for feeding articles singly to said matrix, comprising an oscillatable lever, gripper levers mounted on said lever, and a compensating gripper element hinged to one of said gripper levers.

In testimony whereof I affix my signature.

OTTO LAUENSTEIN.