

Oct. 11, 1949.

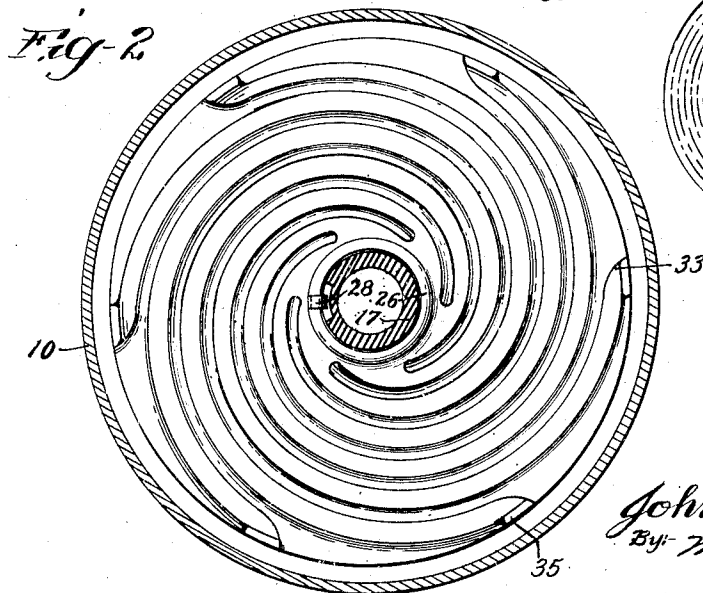
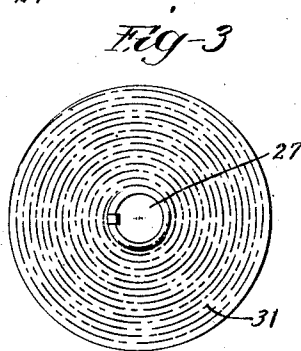
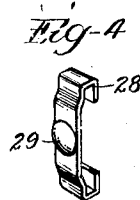
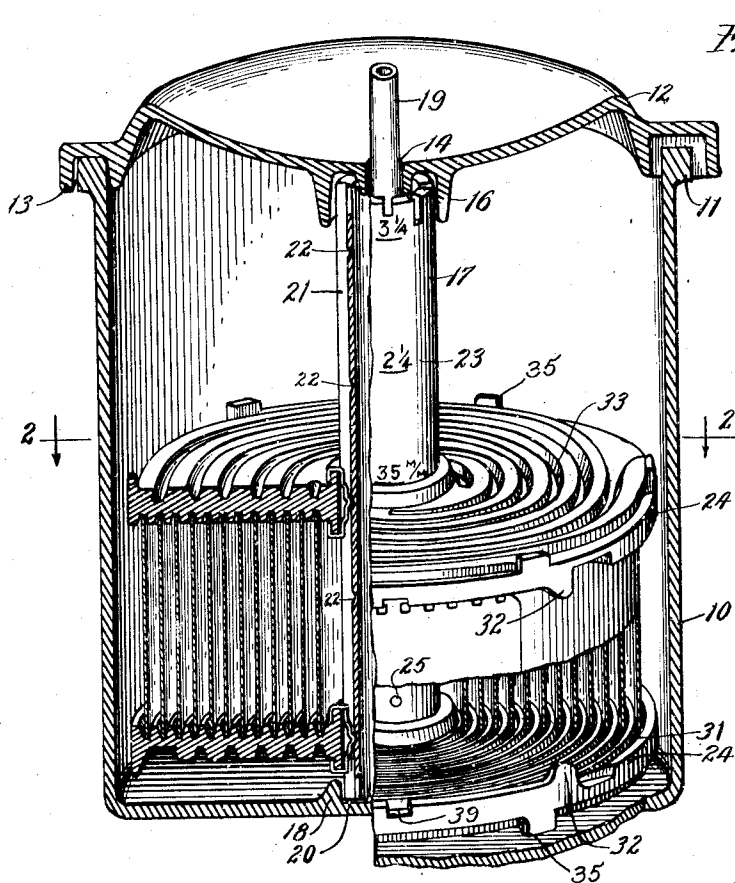
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2,484,341

SPOOL FOR PHOTOGRAPHIC DEVELOPING TANKS

Filed Feb. 21, 1946

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig-5

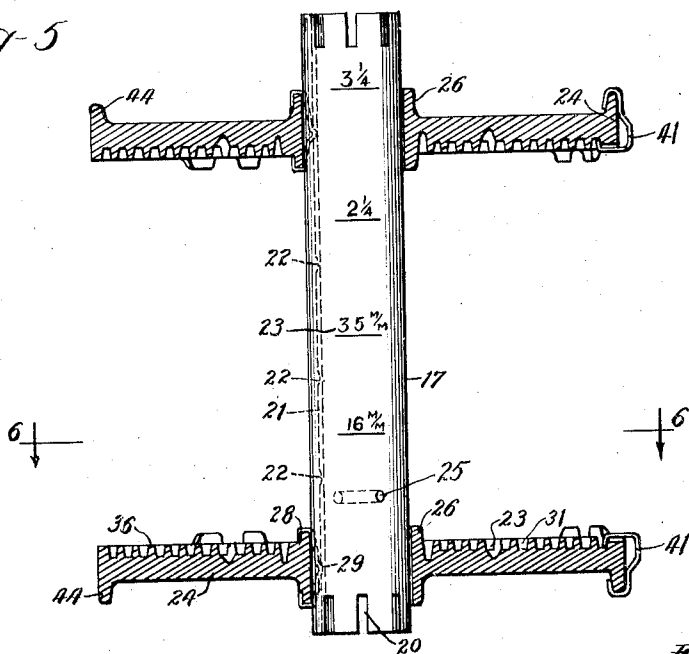


Fig-7

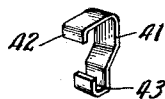
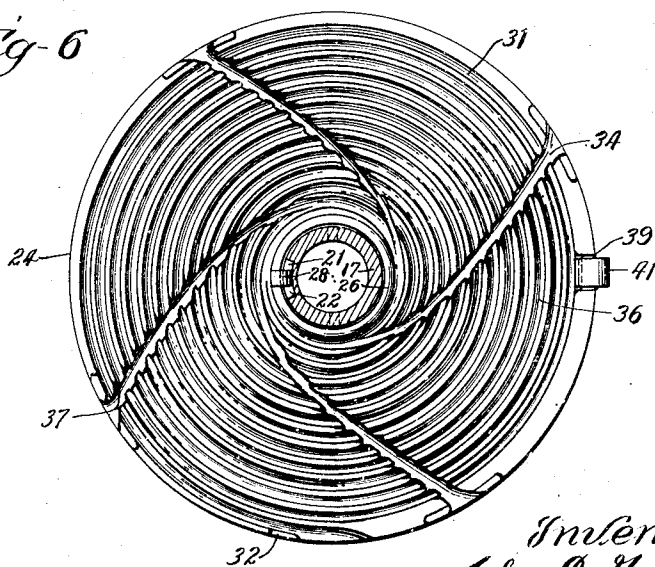


Fig-6



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UNITED STATES PATENT OFFICE

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SPOOL FOR PHOTOGRAPHIC DEVELOPING TANKS

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4 Claims. (Cl. 95—100)

1

My invention pertains to developing tanks suitable for use in the developing of cut or roll photographic film and has as a primary objective the provision of a simple, inexpensive tank of the type described which may be used to develop substantially any type of film commonly encountered.

Further objectives are to provide a daylight film developing tank which can be inexpensively built to provide means for positively inserting film into the developing spool, and to provide for adequate circulation of developing fluids even when the tank is loaded with film to its maximum capacity.

These and other objects will become apparent from the following specification and from the drawings in which

Figure 1 is a partially sectioned elevation of one form of my invention;

Figure 2 is a horizontal section taken along the line 2—2;

Figure 3 is an end view of one of the spool end members;

Figure 4 is a perspective view of an end member detent;

Figure 5 is a partially sectioned elevation of another modification of the spool;

Figure 6 is a sectional view taken along the line 6—6; and

Figure 7 is a perspective view of a film clip.

Developing tanks of the type available today are generally classifiable into two general categories, namely, those adapted for the development of cut film and those adapted for the developing of roll film. While in some instances interchangeable spools are provided, there is no single spool for a developing tank available on the market today which will satisfactorily develop either roll or cut film.

In the roll film type of developing tanks, difficulty is often experienced in obtaining a rapid and thorough circulation of the developing fluid which often results in a cloudy, distorted, or improperly developed negative. Many of the prior art devices, in order to eliminate this difficulty, have reduced the amount of film which could reasonably be placed in a developing spool in order to insure better circulation. I have found, however, that this is unnecessary as my spool means will develop either roll or cut film and at the same time obtain adequate circulation of the developing fluid, regardless of the greatly increased density of loading by proper design of the film-receiving grooves formed in the end members of the spool.

2

Referring to Figure 1, I provide a container 10, preferably having an integral bottom and provided with a peripheral flange 11 around its lip. A cover 12 having a grooved periphery 13 is shaped to fit over the peripheral container flange 11 in such manner as to exclude light. The central portion of the cover 12 may be dished inwardly and provided with a centrally disposed opening 14 to admit developing fluid. The inner surface of the cover 12 has a central downwardly extending tubular boss 16 adapted to receive one end of a spool core 17. The inner surface of the bottom of the container 10 is provided with a similar boss 18 to insure vertical alignment of the developing spool.

The core 17 is preferably of generally tubular shape and has formed on the external surface an axially disposed external groove 21 extending partially through the wall. The base of the groove 21 has formed therein a series of cross grooves 22 normal to the axis of the core 17 and extending across the base of the axial groove 21. The interval between the grooves 22 is indicated by numbers 23 embossed on the core adjacent the groove indicating thereby the type of film adapted to be received by the spool when set at the interval indicated. The lower end of the core 17 may be provided with a series of notches or serrations 20 to facilitate the discharge of developing liquid entering through the hollow central section of the core. In operation the bosses 16 and 18 extend inwardly beyond the notches 20 to exclude light. A tube 19 may be provided to extend through the opening 14 in the cover 12 and is slit at one end to engage a cross pin 25 extending diametrically across the core 17 adjacent its lower end to permit rotation of the spool during developing, the opening in the tube being sufficiently large to permit the insertion of a thermometer. A pair of end members, generally designated 24, are provided, each having similar surfaces. The diameter of the end members is such that they will fit loosely within the container 10 without binding and allow adequate space for the free movement of developing fluid between the edges of the end members 24 and the inner wall of the container 10. Each of the end members 24 is provided with a centrally disposed boss 26 through which extends an opening 27 having a diameter slightly larger than the external diameter of the core 17. The upper and lower surfaces of the boss 26 are preferably recessed to receive spring detents 28 which in assembly are aligned with the axial groove 21 and positioned to properly index the end members 24 with respect to

each other. The detent members 28 are formed of spring stock having a width less than the width of the groove 21 and adapted to clip over the boss 28 extending through the opening 27. Each of the detents 28 is provided with a centrally disposed projection 29 which, when properly assembled, will extend into the groove 21 and resiliently engage the grooves 22 thereby removably maintaining the end members 24 at the desired position on the core 17 in a manner well known to the art.

One surface of each of the end members 24 is provided with a low pitch spiral groove 31 to receive roll film. For convenience, the external edge of the end member 24 is provided with an outwardly extending nib 32 adjacent the opening into the spiral groove 31 to assist in guiding the film into the spiral. Nib 32 has a rounded outer edge to enable one to identify the starting point of the low pitch groove by the sense of touch. The other surface of each of the end members is provided with a plurality of high pitch spiral grooves 33 of the type adapted to receive cut film. The openings to these spirals are similarly provided with nibs 32. A square-edged nib 35 adjacent each of the high pitch grooves 33 aids in identifying these grooves and assists in guiding the film into the spiral.

The operator in preparing my improved developing spool for use will therefore determine the type of film to be developed. If cut film is to be employed, the end members of the spool are assembled with the faces having the high pitch spiral grooves 33 facing each other and spaced apart a distance equal to the width of the film being developed. The film may then be inserted in the grooves 33, the spool inserted in the container 18, the cover 12 placed on the container, and the developing fluid admitted through the opening 14.

If on the other hand roll film is to be developed, the end members will be assembled on the core with the faces of the end members containing the low pitch spiral groove 31 facing each other and spaced apart a distance approximately equal to the width of the film. The roll film may then be inserted in the groove 31 and developed in like manner. The same spool may therefore be used for either cut or roll film of substantially any width, provided the width does not exceed the capacity of the spool.

A modified form of my invention is illustrated in Figures 5 and 6 in which reversal of the end members 24 is not necessary. In this modification of my invention the adjacent surfaces of the end members 24 are provided, as previously described, with a low pitch spiral groove 31 having a nib 32 formed adjacent the entrance to the groove. However, in this modification there is superimposed over the low pitch spiral 31 one or more high pitch spiral grooves 34 preferably having a depth slightly greater than the depth of the low pitch spiral groove 31 and adapted to receive cut film.

At the juncture of grooves 31 and 34 the ends of the solid section or lands 36 formed in the face of the end member 24 by cutting the groove 31 are beveled as at 37 to permit roll film to be inserted in the groove 31 and across the groove 34 without difficulty. The end members 24 in this modification are, as in the previously described form, movable with respect to each other and except for the described differences, similar in structure.

It may be seen that the necessity for reversing

the end members has been eliminated in this modification since by spacing the end members 24 the proper distance apart, either cut or roll film may be inserted in the suitable grooves. It is not essential that the groove 34 be deeper than the groove 31, however, I prefer to employ the structure described since the deeper groove 34 serves as a developing liquid distributing channel when roll film is inserted.

The outer edge of the end members 24 is notched at 39 adjacent the groove entrance to receive spring clips 41. The clips 41 are provided with a tongue 42 extending downwardly into the low pitch spiral groove 31 and only partially filling the groove. The other end of the clip 41 may be riveted or otherwise secured to the bottom of the end member 24 or formed with a hook 43 shaped to receive a flange 44 which may be formed on the opposite surface of the end member. The clip 41 is turned outwardly away from the edge of the end member 24 to permit the tongue 42 to be forced inwardly by the application of pressure to the clip 41 a distance sufficient to bring the tongue 42 in contact with the opposite side of the groove 31. The purpose of these clips is to act as vises or jaws to assist in the insertion of roll film in the assembled spool.

Since the width of the groove 21 is greater than the width of the spring detent 28, a certain amount of relative movement about the axis of the core 17 is permitted. If the roll film should become difficult to insert, the clip 41 on either end member 24 may be depressed by one thumb thereby gripping one edge of the film. If pressure is not applied to the clip on the other end member, the end members may be rotated by the hands in opposite directions thereby forcing the film a short distance into the groove 31. Pressure may then be released on the one clip 41 and applied to the other clip 41, repeating the process, but rotating the end members in opposite directions thereby gradually working the film into the spool. Since the groove 31 is relatively narrow, there is little chance of the film buckling unless a major obstruction occurs in the path of the film.

I do not wish to limit myself to the precise form of clip shown since there are many possible variations; for example, a wedge-shaped or other suitable beveled member may be pivotally or resiliently supported above the groove in a normally inoperative position, and when depressed by the thumb, project into the groove, wedging the film between the clip and the wall of the groove. While I may provide a similar pair of clips for each of the cut film grooves, the need for them is less likely to arise.

The parts of my device may be formed of any material that is resistant to the action of developing liquids to which it will be subjected. Hard rubber constitutes a suitable material as do many thermosetting and thermoplastic materials currently available. A high degree of economy is effected in manufacture since all of the parts, with the exception of the clips 41 and the detent 28, can be formed by pressing or molding and the metal members can be rapidly formed on automatic forming machines such as punch presses.

In accordance with the requirements of R. S. 4888, I have herein described a preferred form of my invention but I do not wish to be specifically limited to the precise materials or details herein described except in so far as specifically incorporated in the appended claims.

I claim:

1. A developing spool comprising a pair of end

5

members having aligned openings, a core extending through said openings, and means for positioning the end members on the core a predetermined distance apart, each of the end members having a low pitch spiral groove to receive roll film and a plurality of high pitch spiral grooves to receive cut film whereby either type of film may be supported for developing by the same spool.

2. An end member for use in a developing spool, said end member having a single low pitch spiral groove to receive roll film and a plurality of high pitch spiral grooves to receive cut film.

3. An end member for use in a developing spool, said end member having a single low pitch spiral groove formed in one face thereof and a plurality of high pitch spiral grooves formed in the other face thereof.

4. A developing spool comprising a core, end members on the core, each of said end members having a high pitch and a low pitch spiral groove formed therein, means for maintaining the end members a predetermined distance apart on the core, said means providing relative rotation of said end members, and clip means on each of the end members, a portion of each clip being adapted to extend into low pitch spiral groove and, in re-

6

sponse to pressure on the clip, wedge a film strip between a wall of said low pitch groove and said clip whereby the film strip may be driven into the spool by alternately rotating the end members and actuating the said clip means.

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