

Sept. 26, 1933.

T. J. LITTLE, JR

1,928,065

BATHROOM SCALE

Filed Jan. 9, 1933

2 Sheets-Sheet 1

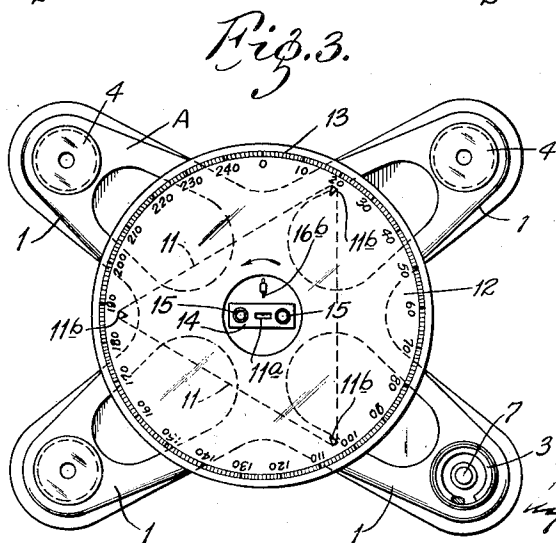
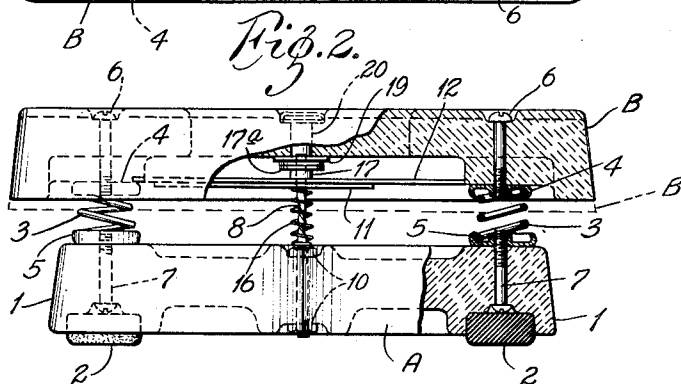
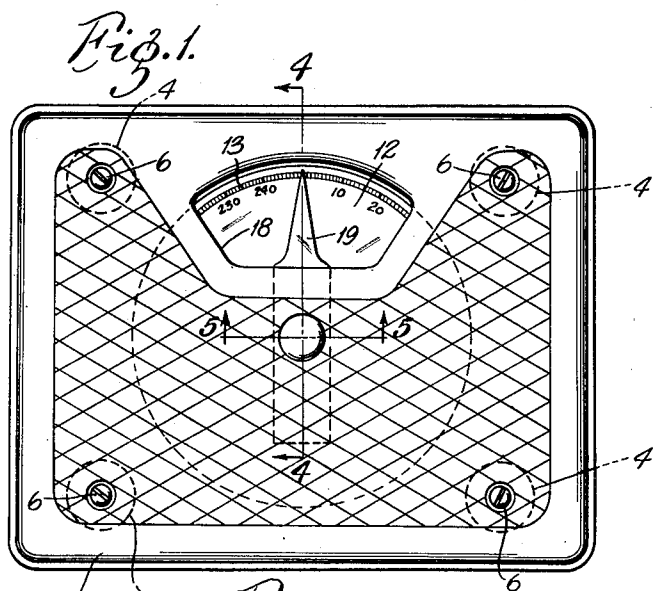


*Fig. 8.*

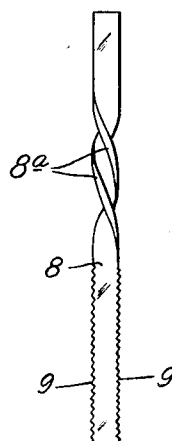
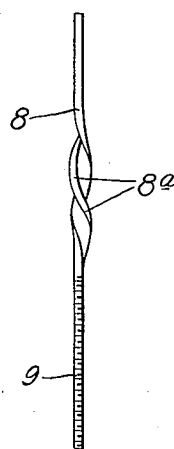


*Fig. 9.*



INVENTOR:  
*Thomas J. Little Jr*  
*by* *Carroll B. Smith*  
 HIS ATTORNEYS.

**Sept. 26, 1933.**

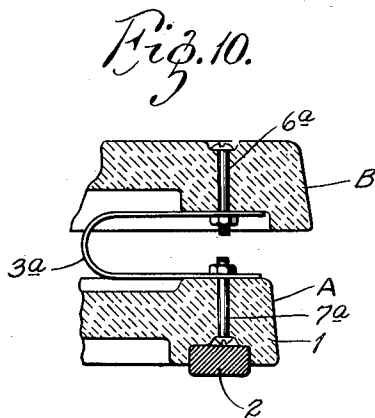
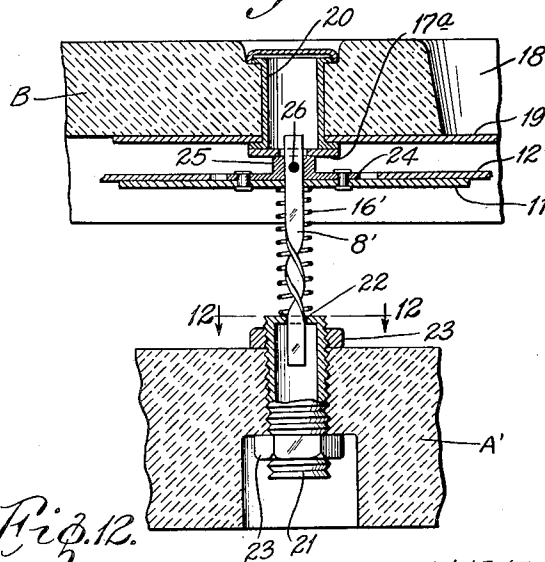
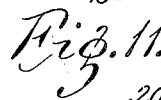
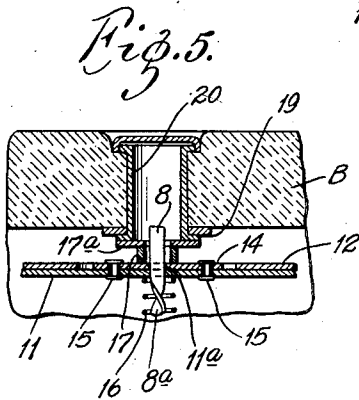
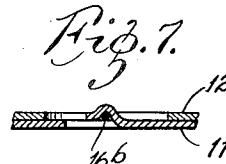
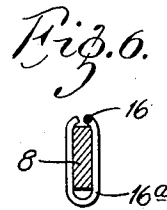
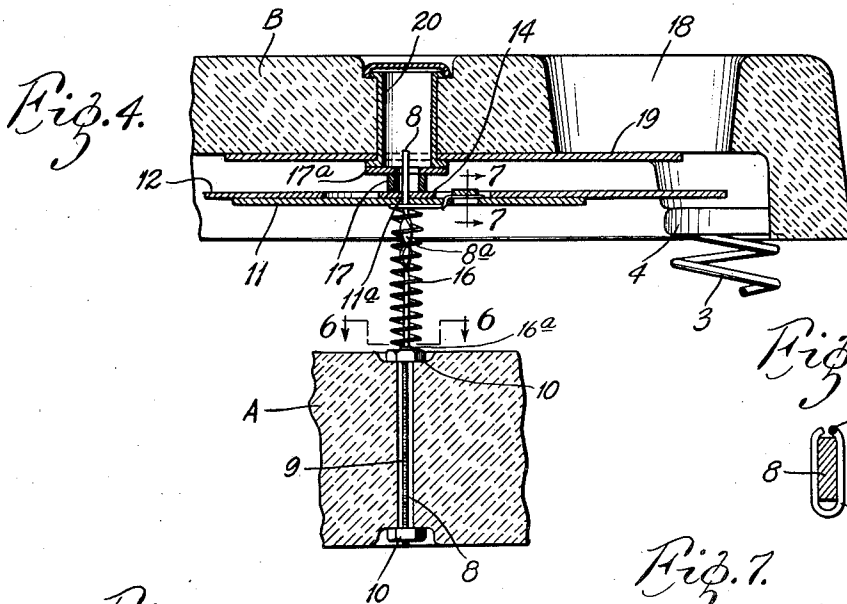
T. J. LITTLE, JR

**1,928,065**

BATHROOM SCALE

Filed Jan. 9, 1933

2 Sheets-Sheet 2



INVENTOR:

Thomas J. Little, Jr

By James A. [unclear]

Travels  
HIS ATTORNEYS

HIS ATTORNEYS.

## UNITED STATES PATENT OFFICE

1,928,065

## BATHROOM SCALE

Thomas J. Little, Jr., Birmingham, Mich.

Application January 9, 1933. Serial No. 650,808

17 Claims. (Cl. 265—68)

My invention relates to weighing scales and particularly to scales of the type commonly known as bathroom scales. The principal objects of the invention are to devise a construction of great firmness, strength and stability, and low heat conductivity, which will be low, simple and inexpensive, substantially free from hunting and friction, and at the same time reliable in its measurements. It consists in the parts and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings wherein like characters refer to like parts wherever they occur.

Fig. 1 is a plan view of a bathroom scale embodying my invention.

Fig. 2 is a front elevation of the scale partly in vertical section.

Fig. 3 is a plan view of the scale with the platform removed.

Fig. 4 is an enlarged vertical fragmentary section on the line 4—4 in Fig. 1.

Fig. 5 is a fragmentary vertical section on the line 5—5 in Fig. 1.

Fig. 6 is a horizontal section on the line 6—6 in Fig. 4.

Fig. 7 is a vertical section through the dial on the line 7—7 in Fig. 4.

Fig. 8 is a side view of a helical ribbon or post.

Fig. 9 is an edge view of said ribbon or post.

Fig. 10 is a vertical section, showing a modified form of spring for supporting the platform.

Fig. 11 is a central vertical section illustrating a modified construction wherein the helical ribbon is fixed to the dial for vertical and rotary movement therewith relative to the base; and

Fig. 12 is a horizontal section on the line 12—12 in Fig. 11.

The base A of my device is preferably made of baked clay or other ceramic in the form of an X, that is, with reentrant angles in its sides which form outwardly extending legs 1 that have sufficient spread to afford stability. Preferably each leg 1 is provided on its bottom with a rubber block or cushion 2. On the ends of the respective legs 1 are springs upon which rests the platform. Preferably these springs are vertically disposed helical springs 3 whose upper and lower ends are provided with caps 4 and 5, respectively. In such case, the platform B of the device is secured in place by means of screws 6 that extend through vertical holes provided therefor in said platform and work in threads provided for them in the upper caps 4 of the springs 3. The caps 5 on the lower ends of the springs 3 are likewise threaded and are secured to the base A by screws

7 extending upwardly through holes provided therefor in the ends of the legs 1 of said base. Preferably, the caps 4 and 5 are disk-like members with a marginal flange of very slightly greater diameter than the springs and with the edge of the flange bent slightly inwardly to hold them in position on the flat endmost coils of the springs.

The base A has a central vertical hole there-through on which is mounted a stiff steel post or ribbon 8 made preferably of flat wire. The edges of the lower portion of this post or ribbon 8 has teeth 9 formed therein to cooperate with threaded nuts 10; one of said nuts being above the base and another nut being below the base. By this arrangement, the post or ribbon 8 may be adjusted vertically and held in adjusted position by tightening the nuts 10 against the top and bottom of the base A or against washers interposed between them.

A portion of the post or ribbon 8 near the top thereof is twisted to convert its edges into two accurate helical threads 8a. The upper end of the post or ribbon fits freely in a guide hole 11a provided therefor in a metal member 11, preferably of triangular shape, which carries a circular dial or disk 12 on whose upper margin is a graduated scale 13. For reasons of convenience and economy, it is desirable to make the dial 12 of paper card board waterproofed and to mount it on the triangular piece of sheet metal 11 whose sharp corners 11b are bent to pierce the waterproofed paper dial and afterwards bent back to grip it. At the center of the dial 12, a small steel plate 14 is secured to the triangular metal sheet 11, as by striking up hollow rivets 15 upon said sheet, extending through holes provided therefor in the small steel plate and clenching them at the back thereof. The guide hole 11a for cooperation with the helical post or ribbon 8 is formed in the small steel plate 14 and correctly positioned with respect to the center of the dial.

The dial is supported and pressed upwardly by an elongated helical spring 16 which loosely surrounds the helical post 8. This spring is under compression endwise, with its lower end bearing against the base A and with its upper end bearing against the metal supporting member 11 of the dial 12. Above this supporting member is a short bushing 17 slidable on the helical post; and above the bushing is a washer 17a of somewhat greater diameter than the hole 11a in the plate 14. By this arrangement, the dial 12 is made to move vertically with the platform B but is still free to rotate on its own axis due to its

engagement with the helical ribbon 8 and, by reason of the small pressure of the supporting spring 16 and the slight area of contact between the disk and the bushing 17, such movements involve a minimum of friction.

The parts are so related that in all positions of the platform B throughout its range of movement vertically the steel guide plate 14 engages the helical portion 8a of the post or ribbon 8; that is, those parts are in engagement throughout the range of the scale from no load to the limit of its capacity. As there must be a free fit between the helical portion 8a of the post or ribbon 8 and the guide plate 14, provision is made to overcome the backlash and hunting that would otherwise occur and which have the effect of delaying the reading of the scale 13. To avoid such backlash and hunting, the light helical spring 16 mounted around the post or ribbon 8 has its lower end secured to said post, as by having its lowermost coil flattened, as at 16a, against said post, or secured to the base; and the upper end 16b of said spring is secured to the dial carrying member. When the parts are being assembled, the coil of this spring is tightened enough to give the dial 12 a bias or tendency to turn in the opposite direction to that caused by weight on the platform B. By this arrangement the backlash and hunting due to looseness of the guide plate 14 is dampened and the measurement more quickly and accurately ascertained.

As stated above, the top side of the dial 12 has on its upper face a graduated scale 13 arranged in a circular arc concentric with the vertical post or ribbon 8. The dial 12 is located below the platform B, a hole 18 is provided in the platform in line with the scale 13 so that the scale can be read from above. A pointer 19 is also mounted on the underside of the platform. The pointer 19 illustrated in the drawings comprises a pointed strip of sheet metal having a hole therein through which extends a grommet or hollow rivet 20 which also extends through a central vertical hole provided therefor in the platform B. The ends of the grommet 20 are clenched above and below the platform B to bind the pointer 19 firmly enough to the platform to stay in any position of adjustment but lightly enough to permit the pointer to be shifted when occasion requires. Usually the pointer 19 is set to zero of the scale 13, but the simplicity of its adjustment facilitates testing and calibration of the scale.

The operation of my device is as follows:

While the parts are being assembled, the coil spring 16 is set to place the dial 12 under an initial bias tending to turn it in opposition to the direction that it turns under load. While the platform B is free from load, the pointer 19 is set at the zero point of the scale 13. When load is applied to the scale, it causes a lowering thereof and a consequent turning of the dial 12 due to the guide plate 14 thereof riding along the helical ribbon 8, which itself remains stationary. The extent of the downward movement of the platform B depends, of course, on the resistance of the main springs 3. In practice, I have found it advantageous to use helical springs of such strength that a pressure of 75 pounds on each of them is required to shorten it three-eighths of an inch. By using four such springs, the scale will weigh a load of 300 pounds with a vertical movement of three-eighths of an inch. This relatively short vertical movement is amply sufficient to permit the scale to be graduated at intervals of one

pound; and enables the platform to be located quite close to the floor. At the same time, such short vertical movement, in connection with the very low center of gravity of the device, so greatly increases the firmness of the platform B against rocking, tilting and shifting that it is unnecessary to make other provisions against such movements, such as lateral supports and guideways. Consequently, the friction occasioned by the use of such supports and guideways is eliminated. Besides, such springs are not only commercially available at small cost but are very reliable in action.

It is noted as an important feature of my invention that the use of a plurality of springs tends to minimize the effect of deviations of the individual springs from the required strength. For instance, while it is desirable to have every one of the four springs of such strength that each will require exactly 75 pounds pressure to shorten it exactly three-eighths of an inch, almost the same degree of precision of measurement will be obtained if the respective springs require 73, 74, 76 and 77 pounds pressure, that is to say, an average of 75 pounds.

Another advantage arising from the use in my device of four or more springs widely spaced apart in connection with a rigid platform is that the location of the load on the platform becomes almost insignificant. In practice, I prefer to make the platform B of burnt clay left unglazed. This material is not only very strong, very rigid and very cheap but it will not rust or deteriorate, is very much lighter than metal of the same rigidity and has the important advantages that it is a very poor conductor of heat and therefore does not feel cold to the bare feet and is well adapted to take any paint which may harmonize with its surroundings.

Fig. 10 illustrates a modification of my device wherein the corner springs 3a are made in the form of flat strips bent backwardly and having the end of the upper part secured to the platform by means of bolts 6a and having the ends of the lower parts secured to the base by means of bolts 7a. Obviously, the corner springs may be made of other forms and other materials such as rubber.

Figs. 11 and 12 illustrate a further modification of my device wherein the helical ribbon 8' is fixed to the dial 12' for vertical and rotary movement therewith relative to the base A' of the scale. In this construction, the base A' has a central vertical opening therethrough in which is mounted an exteriorly threaded hollow guide stud 21 that is provided in its top with a rectangular hole 22 adapted to receive the threaded lower end portion of the helical ribbon 8'. The hollow guide stud 21 is adjustably supported in the opening provided therefor in the base by means of nuts 23; one of said nuts bearing against the upper surface of said base and the other nut bearing against the underside of a shoulder provide therefor in said opening. Riveted or otherwise secured to the top of the dial 12 is a plate 24 having an upstanding collar 25 thereon that is held against the underside of the washer 17a by means of the dial supporting spring 16' which is sleeved on the ribbon 8' between the dial and the hollow guide stud 21. The upper end of the ribbon 8' extends through the collar 25 of the plate 24 and is rigidly secured to said collar by means of a pin 26. By this arrangement, when the load is applied to the scale, it causes the ribbon to move downwardly through the opening 22 in the stud 21 and a consequent turning of the ribbon and dial due to the movement of the helical portion of the post through

said opening. When the load is removed, the coil spring 16' serves to cause the dial and the ribbon attached thereto to move upwardly with the platform.

Obviously, the construction hereinbefore described admits of considerable variation without departing from my invention and I do not wish to be limited to the details of such constructions.

What I claim is:

10 1. A scale comprising a base, a platform, several widely spaced springs interposed between the base and the platform, a helical post vertically disposed on the base and a dial movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby.

15 2. A scale comprising a base, a platform, several widely spaced helical springs interposed between the base and the platform, a helical post vertically disposed on the base and a dial movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby.

20 3. A scale comprising a base, a platform, several spaced springs interposed between the base and the platform, a helical post vertically disposed on the base and an arcuately graduated dial below but movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby, a spring yieldably supporting said dial, said platform having an opening through which the dial scale is visible and a pointer opposite said scale.

25 4. A scale comprising a base, a platform, several helical springs interposed between the base and the platform, a helical post vertically disposed on the base and an arcuately graduated dial below but movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby, a spring yieldably supporting said dial, said platform having an opening through which the dial scale is visible and a pointer opposite said scale.

30 5. A scale comprising a base, a platform, several springs interposed between the base and the platform, a helical post vertically disposed on the base and an arcuately graduated dial below but movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby, a spring yieldably supporting said dial, said platform having an opening through which the dial scale is visible, and a pointer adjustably mounted on said platform opposite said scale.

35 6. A scale comprising a base, a platform, several helical springs interposed between the base and the platform, a helical post vertically disposed on the base and an arcuately graduated dial below but movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby, a spring yieldably supporting said dial, said platform having an opening through which the dial scale is visible and a pointer adjustably mounted on said platform opposite said scale.

40 7. A scale comprising a base, a platform, several widely spaced helical springs interposed between the base and the platform, a helical post vertically disposed on the base and a dial below but movable vertically with the platform and having a guide plate loosely fitting said post to turn thereon, said dial having a graduated arcuate scale, and said platform having an opening above said graduated scale.

45 8. A scale comprising a base, a platform, several widely spaced springs interposed between the base and the platform, a helical post vertically disposed on the base and a dial below but movable verti-

cally with the platform and having a guide plate loosely fitting said post to turn thereon, said dial having a graduated arcuate scale, and said platform having an opening above said graduated scale.

9. A scale comprising a base, a platform, several springs interposed between the base and the platform, a helical ribbon vertically disposed on the base, a dial movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby, a helical spring surrounding said post and bearing against the underside of said dial, a washer surrounding said post and bearing against the underside of said platform, and a spacing bushing between said dial and said washer.

10. A scale comprising a base, a platform, several helical springs interposed between the base and the platform, a helical post vertically disposed on the base, a dial movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby, a helical spring surrounding said ribbon and bearing against the underside of said dial, a washer surrounding said ribbon and bearing against the underside of said platform, and a bushing between said dial and said washer.

11. A scale comprising a base, a platform, several springs interposed between the base and the platform, a helical post vertically disposed on the base, a dial movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby, and means for giving said dial a tendency to turn in the opposite direction to that caused by load on the platform.

12. A scale comprising a base, a platform, several springs interposed between the base and the platform, a helical post vertically disposed on the base, a dial movable vertically with the platform and having a guide plate loosely fitting said post to be turned thereby, a washer surrounding said post and bearing against the underside of said platform, a bushing between said dial and said washer, and means for giving said dial a tendency to turn in the opposite direction to that caused by load on the platform.

13. A scale comprising a base, a platform, several helical springs interposed between the base and the platform, a helical post vertically disposed on the base, a dial movable vertically with the platform and having a guide plate loosely fitting said post to turn thereby, a helical spring surrounding said post and bearing against the underside of said dial, a washer surrounding said post and bearing against the underside of said platform and a spacing bushing between said dial and said washer, said last mentioned spring being secured to said dial and being under slight initial torsional stress in the opposite direction to that caused by load on the platform.

14. A bathroom scale comprising a base, a platform resiliently supported thereby, a helical post supported by said base and vertically adjustable thereon, a resiliently supported dial having a central slot in which said ribbon fits freely, whereby said dial is movable vertically with said platform and simultaneously turns on its axis and whereby also said post may be adjusted vertically to shift the scale circumferentially.

15. A bathroom scale comprising a base, a platform resiliently supported thereby, a dial, a helical post supported by said base and vertically adjustable thereon, a helical spring surrounding said post with its lower end fixed and its upper end pressing against the underside of the dial,

|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| said dial having a central slot in which said ribbon fits freely, spacing means between the underside of the platform and the top of the dial and having a relatively small area of contact with said dial, whereby said dial is movable vertically with said platform and simultaneously turns on its axis and whereby also said post may be adjusted vertically to shift the scale circumferentially. | a member having a slot therein and a helical ribbon extending through and movable relative to said slot, one of them being secured to the base and the other being secured to the dial.                                                                                                                                                                                                           |
| 16. A scale comprising a base, a platform, springs interposed between said base and said platform, a dial movable vertically with said platform, and means for causing said dial to turn when it moves vertically, said means comprising                                                                                                                                                                | 17. A scale comprising a base, a platform, springs interposed between said base and said platform, a dial movable vertically with said platform, and means for causing said dial to turn when it moves vertically, said means comprising a member secured to said base and having a slot therein and a helical ribbon fixed to said dial and extending through and movable relative to said slot. |
|                                                                                                                                                                                                                                                                                                                                                                                                         | THOMAS J. LITTLE, JR.                                                                                                                                                                                                                                                                                                                                                                             |
| 15                                                                                                                                                                                                                                                                                                                                                                                                      | 90                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 20                                                                                                                                                                                                                                                                                                                                                                                                      | 95                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 25                                                                                                                                                                                                                                                                                                                                                                                                      | 100                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 30                                                                                                                                                                                                                                                                                                                                                                                                      | 105                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 35                                                                                                                                                                                                                                                                                                                                                                                                      | 110                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 40                                                                                                                                                                                                                                                                                                                                                                                                      | 115                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 45                                                                                                                                                                                                                                                                                                                                                                                                      | 120                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 50                                                                                                                                                                                                                                                                                                                                                                                                      | 125                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 55                                                                                                                                                                                                                                                                                                                                                                                                      | 130                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 60                                                                                                                                                                                                                                                                                                                                                                                                      | 135                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 65                                                                                                                                                                                                                                                                                                                                                                                                      | 140                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 70                                                                                                                                                                                                                                                                                                                                                                                                      | 145                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                   |
| 75                                                                                                                                                                                                                                                                                                                                                                                                      | 150                                                                                                                                                                                                                                                                                                                                                                                               |