



WR PLUMB BOB NEWS
Information for plumb bob collectors

2008-10
Aug. 31, 2008



Editor: Wolfgang Ruecker

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WOODEN AND METAL SPACERS for plumb bobs

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1. INTRODUCTION

European masons have traditionally enhanced the functionality of their plumb bobs by the addition of a device called a “spacer”. Quite simply this device consists of a shaped piece of metal or wood that has a hole drilled through it, through which the string (plumb line) passes. By knotting the end of the string to prevent the spacer from slipping off, the spacer becomes the third part of the normally two part system, the plumb bob and plumb line.

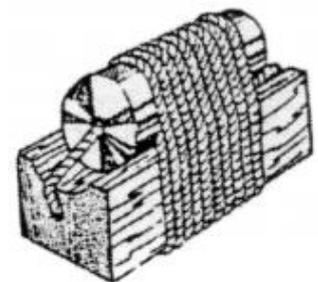
The derivation of this form no doubt arises as a solution to some of the cumbersome aspects of the behaviour of plumb bobs. By definition, the plumb bob relies on its weight and gravity to achieve the ultimate purpose of the tool, that is, to put tension on the plumb line so that it represents absolute verticality. Therefore, it is a tool that needs to be suspended in some imaginative way to perform its function.

In order to build any wall of any material and use a plumb bob and plumb line as a guide, it is necessary to think of setting up the workspace with the plumb line suspended parallel to an imaginary line which is the finished face of the wall to be built. That is to say for a wall to be vertical using a plumb line, the horizontal measured distance from the line to the face of the wall must be the same at the bottom as it is at the top and at many points in between. This is the plumb bob in action as an “offset measuring tool” as opposed to its other function as “a tool that points.”

In construction of walls of wood beams and boards, the construction of the highest part of the wall is typically one of the first steps in construction, thereby providing an element at the top of the finished wall to tie the plumb line. Where the available material to build structures is stone, the material by its nature requires that it be stacked, starting at the ground and working upward stone by stone. This is the problem then, what to tie the plumb line to in order to make the wall plumb?

The plumb bob itself, by definition, is a mass of material that extends outward from the plumb line a significant distance, $\frac{1}{2}$ of the diameter or cross section of the plumb bob being used. Thus, the closest a plumb line could ever be to a wall under construction is that same dimension, or a bit more.

The very early use of the plumb bob and spacer by European stone masons is a testament to their understanding of these subtle principles of geometry. The evolution of the spacer as a wood or metal shape, slightly larger than the plumb, that slides up and down the plumb line, are features that allow their tool to be highly mobile, hung at an infinite number of heights, easy to set up for use, and a “predetermined distance” away from the “imaginary” face of the wall to be built, a distance that is determined by the size of the spacer.



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In the illustration, “One Method of Using a Plumb Bob and Spacer to Build a Stone Wall” (*see next page*) one technique is shown for hanging the bob, that is to use a carefully selected stone or weight around which the plumb line is wound a turn or two, to act as the anchor for the top of the string line. It is significant to the mobility of this setup that a knot is not required to keep the plumb line at a particular height, that different heights can be achieved by moving the weight horizontally or in larger measure by rotating the weight to either wind up or deploy a bit of the line. Simpler yet, with irregular stones if for the mason to simply hold the plumb line in the correct position.

In this illustration, a flat metal square spacer is used, but one of the many spacer shapes that could be employed with similar results. Principally, the mason has a feel for sliding the spacer to a position on the plumb line as it runs over the edge of the stone, to a point of balance so the spacer stays in place against the face of the stone without having to tie a knot; the tension put on the line by the weight of the bob holds the spacer by the friction of the line as it passes through the hole in the spacer. Thus, the plumb and spacer move with the stone being set in a somewhat liquid bed of mortar. In this specific setup the mason can work with both hands free to work with his trowel and hammer to nudge the stone into position. If he holds the plumb line in place he still has one hand free to work the stone into place.

This particular illustration of one methodology of construction relies heavily on the notion of working with refined blocks of stone. Far more prevalent, however, would be construction with stones as found in nature, perhaps accumulated conveniently from the site on which the building is to be constructed. Shall we say, less perfect stones of varying size and irregular surface. These irregular stones, probably did not afford the mason the luxury of having a flat face to perch a weight to hold the plumb line in place. Rather, I think that in the origins of this tool the mason himself, or perhaps a helper might have held the plumb line on the top of the stone long enough to set and adjust the stone in a fresh bed of mortar. The mason, or once again a mason’s helper, would use a measuring stick to determine that the stone is set with the distance between plumb line and the stone below, is more or less the same dimension as the “half dimension” of the spacer. Using this method, repeating it stone after stone as the building rises, and at any place along the length of the wall, a mason could produce a serviceable and “near plumb wall” out of irregular material. These would be economical and common structures for shelter of men, crops and animals by far the most dominant building type. I believe that with smaller stones it was feasible for a mason to work alone. Heavier stones undoubtedly required more hands to set and adjust the stone using the plumb bob and spacer, one man employed specifically to quickly set up and hold the plumb and to take the measurements. If I were the “master mason,” that would be the job for me!

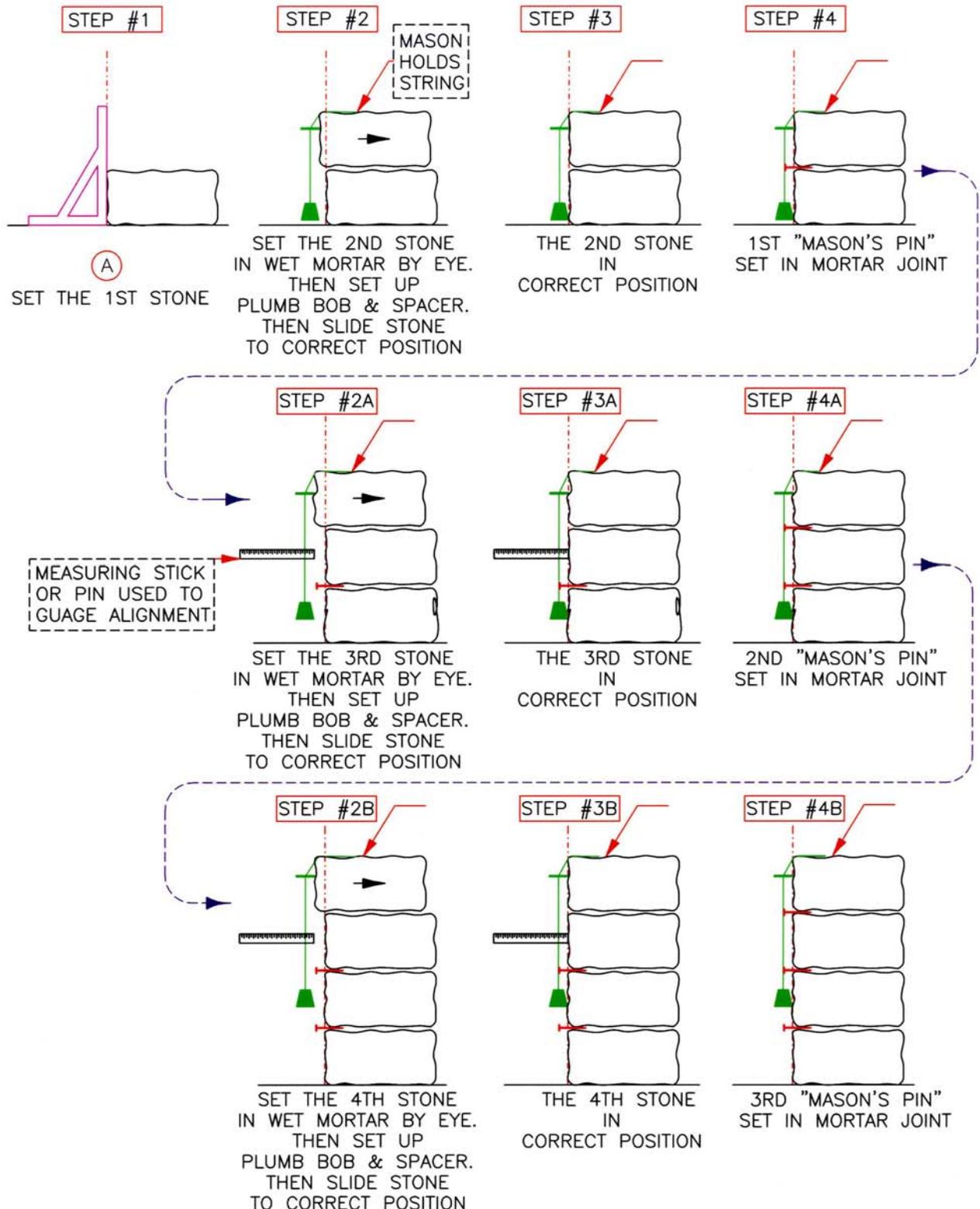
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ONE METHOD OF USING A PLUMB BOB AND SPACER TO BUILD A STONE WALL (“MASON’S PINS” OPTIONAL)



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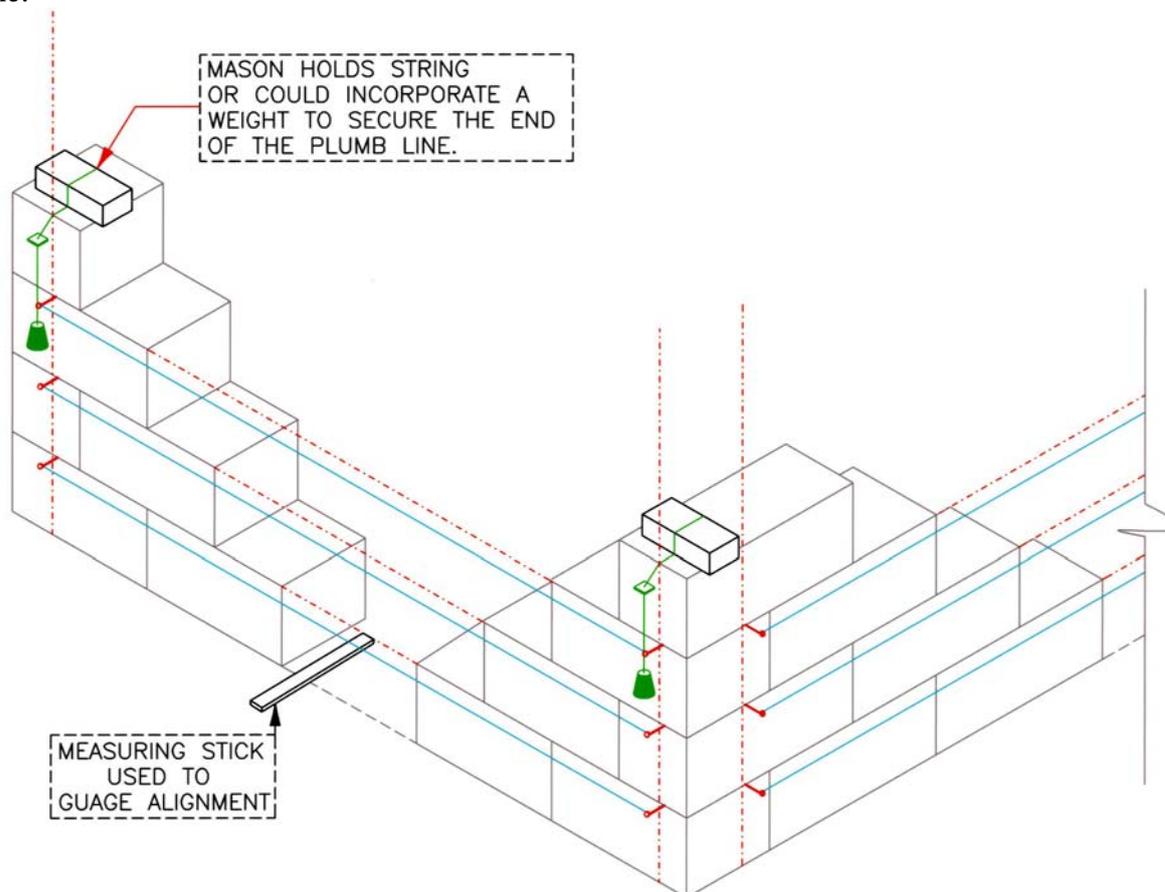
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However, in buildings constructed with more “man refined stone” or very regular flat plates of stone found in nature having a straight face (not uncommon in sedimentary rocks), the plumb bob and spacer can be employed with even more exact and refined technique, by employing a devise that for lack of a better word in English, I will call a “mason’s pin.” (see pictures right)



Returning to the illustrations (page 3 and below), the construction of a more refined wall would start by building up the corners or the ends of the walls first, checking with extreme regularity the position of each course using the plumb bob and spacer. As each course is laid, a “masons pin” is set in the damp mortar, projecting perpendicular to the wall, so the head of this “nail like” piece of hardware is set in very close proximity to the plumb line (but not quite touching the line).

Thus, as courses rise, and pins are added that become firmly imbedded as the mortar cures, they become anchors for stretching and tying off horizontal strings parallel to the face of the wall to be built. Thus, a ruler could be used to set the stones between the corners parallel to the string line without having to use the plumb bob and spacer on every stone.



ADVANCED SETUP TECHNIQUE OF
PLUMB BOBS, PLUMB LINES AND SPACERS
SHOWING "MASON'S PINS" AND
HORIZONTAL OFFSET STRINGS

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Employing this more advanced technique it is significant that the spacers used at either end of the wall are the same dimension. Minimally, plumb bobs and spacers used in this working mode, are used as a pair of working instruments. In building a large building, when many wall segments might be under construction simultaneously, I believe it to be true, that there might have been many plumb bobs in use with identical spacers. This would allow the masons to switch to any working position in the construction of a building without confusion.

As collectors I think we tend to think of our examples as single tools, which the simplest and earliest types may well have been. However, as the need for more refined structures demanded, a number of bobs with identical spacers would be employed on a job site.

Thus, the spacer is a refinement of the plumb bob which when employed establishes a uniform offset distance from the plumb line to the face of a wall. The brilliance of the spacer is that it is infinitely mobile, can be set up by the mason very quickly, can stabilize the plumb line and plumb bob as the stone is shifted into alignment, and allows the mason to deploy an adequate amount of plumb line while holding the plumb line in place with one hand.

Another feature of the mason manually holding the plumb line in place is that it is not necessary to extend the plumb to the full height of the wall to take a reading. Because the mason can initially position his stone in relation to the stone immediately below it, only a relatively small length plumb line need be extended to adjust the stone to a "very near to absolute position." Because of the short line length and because the swaying bob comes to rest against the lower stone as the new stone is shifted into position, the plumb bob's swing is dampened, that is to say, ceases to be free swinging. Thus the plumb bob and line come to rest very quickly. Only then can the placement of the stone be checked with the measuring stick.

I believe that the careful mason working without pins, would extend the bob and line down several courses if not to the base of the wall, before the fresh mortar "sets." This would allow the "master mason" to perform a final check on the overall direction the wall is taking. The repeated checking and rechecking the wall with the plumb line is a speedy way to build an acceptably vertical wall.

The use of mason's pins would enhance the verticality of the wall, especially if the stone face was highly irregular. It would be interesting to look back into time to know if the use of "mason's pins" dates back to the origins of the spacer.

Thanks to Nelson Denny for this introduction and the AUTOCAD illustrations.

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Jan. 28, 1930.

**2. PATENTS; PICTURES;
CATALOGUES**

THE PLUMB LINE CONTINUUM a publication of the United States does not take up the subject of spacers. If it were not for Ebay, most American tool collectors would not be acquainted with spacers.

Early illustrations of plumb bobs in books and catalogues clearly depict spacers. You see the worker using the spacer to verify the already built wall. They press the spacer against the wall and let the plumb bob on the line up and down through the hole in the spacer.

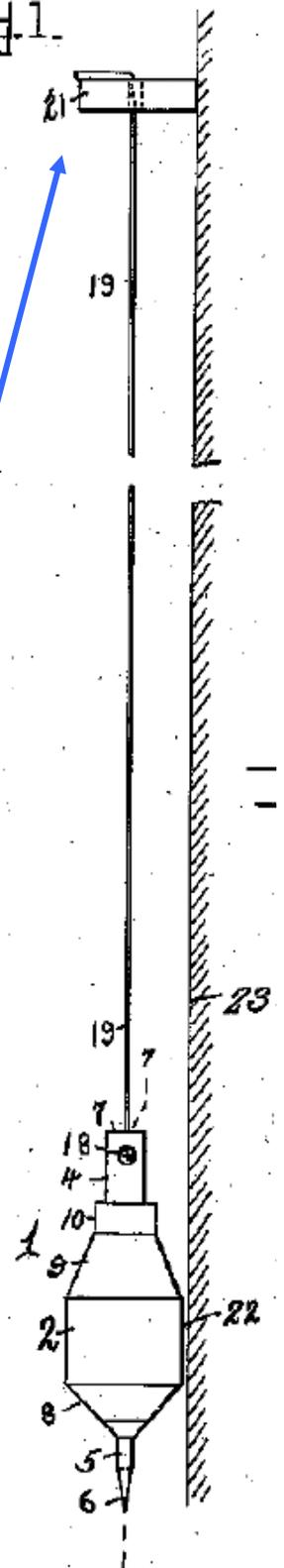
Examples of plumb bob spacer are found in Portugal, Spain, France, Belgium, Holland, Germany, Italy, Turkey and on the other side of the globe, in Asia.

The English no doubt used the principle of a spacer. But they were not strung onto the plumb line.

Similarly, in America, spacers are not found in catalogues although US1745027 granted to Oxford 1928 in the USA (see drawing right) and a patent US4300290 from 1981 (see page 7) given to Zalewski from Connecticut, used spacers.

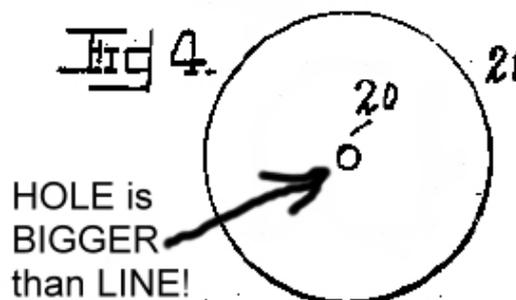
Perhaps one or both imported this European idea as immigrants.

Fig. 1.



J. T. OXFORD 1,745,027
PLUMB BOB
Filed Sept. 25, 1927

Fig. 4.

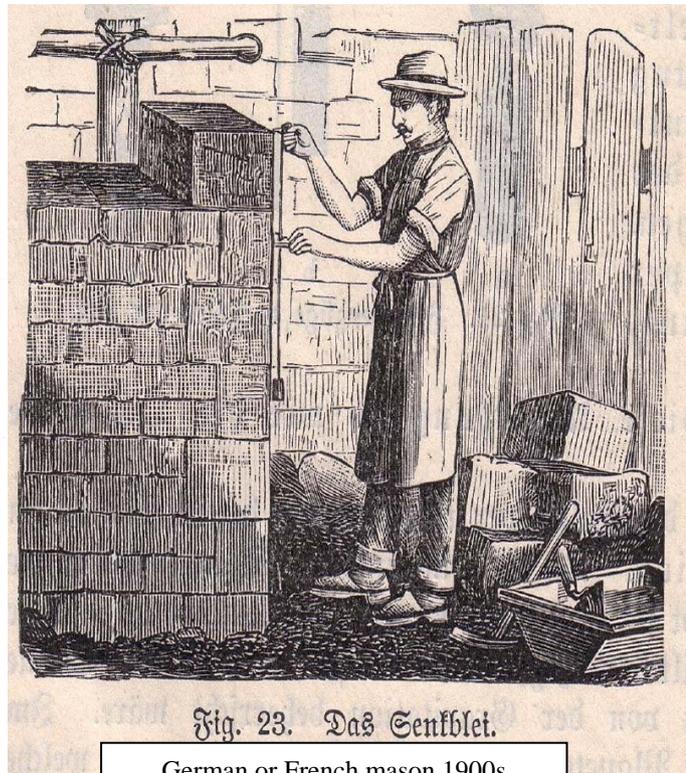
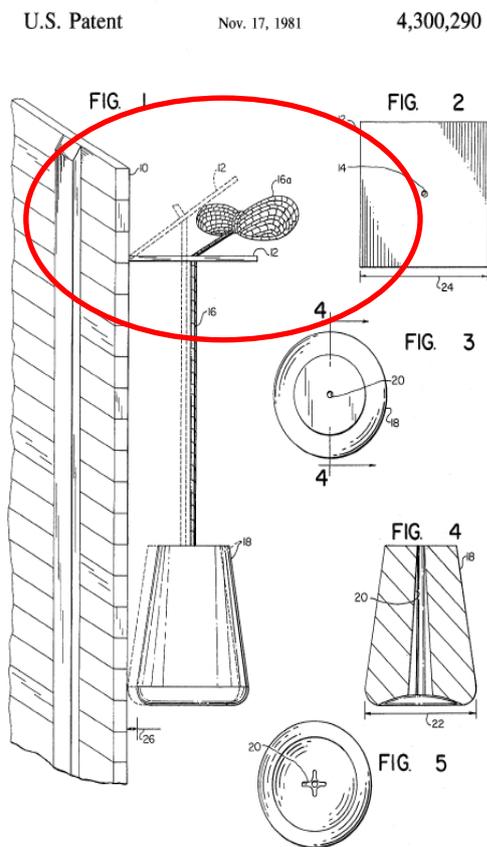


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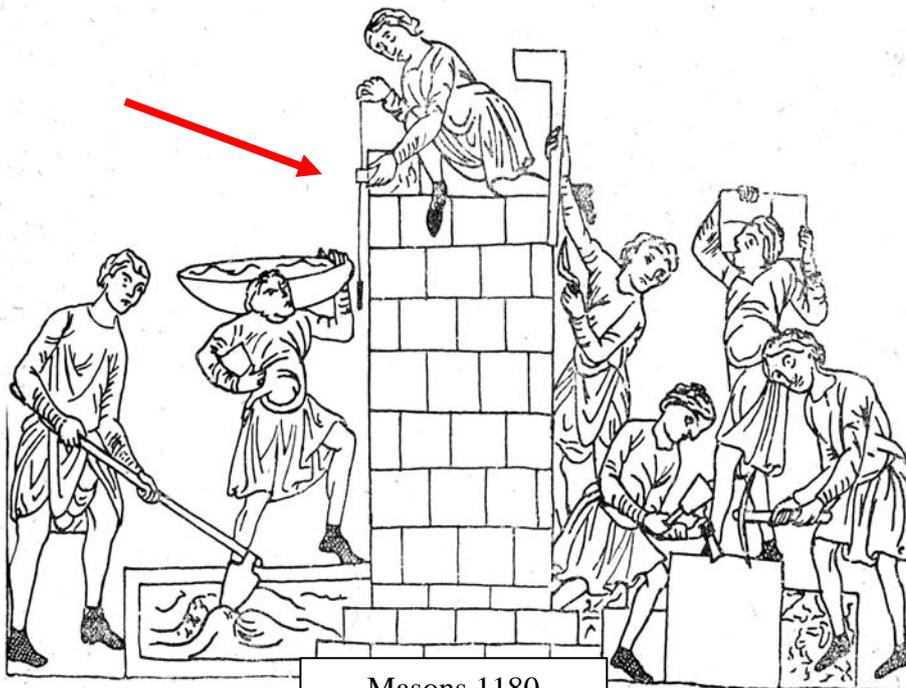
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German or French mason 1900s



Masons 1180

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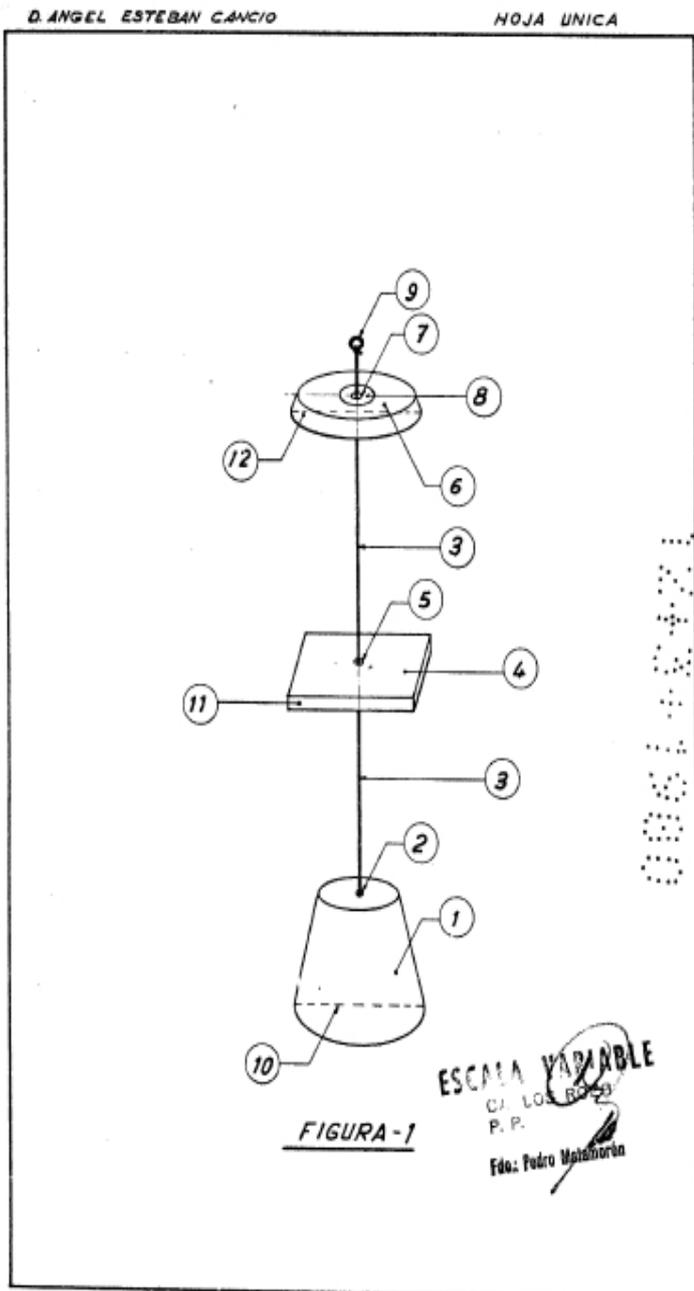
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From the 1980s I found patents from Spain and Belgium.

In the Belgian patent drawing you can see clearly the rubber shock absorber (bumper). They protect the wooden spacer when it slides down the plumb line to the metal plumb bob. The wooden block is carved out to fit the plumb bob. By wrapping the string around the spacer and plumb bob, and handy bundle of components, goes into the tool apron or tool box.

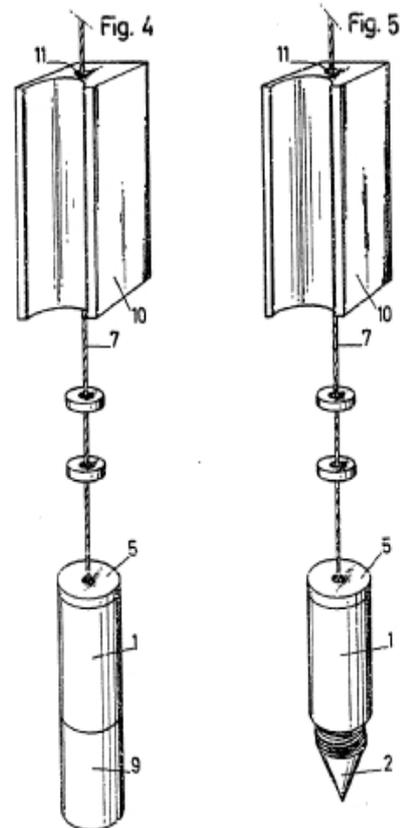


L 88613

V 337320 881379

DB 72467

Josef Verschoren en Willem Plug



BRUSSEL, 28 januari 1980

Bij volmacht van Josef Verschoren en Willem Plug

Bij volmacht van Bureau GEVERS

[Handwritten signature]

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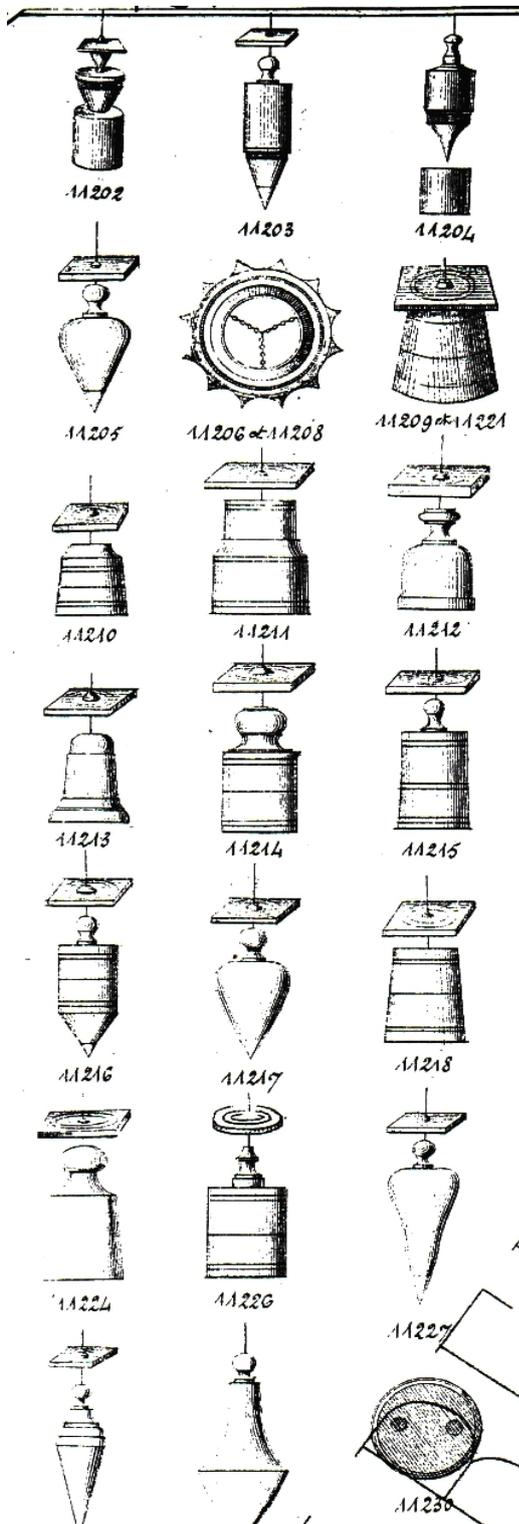
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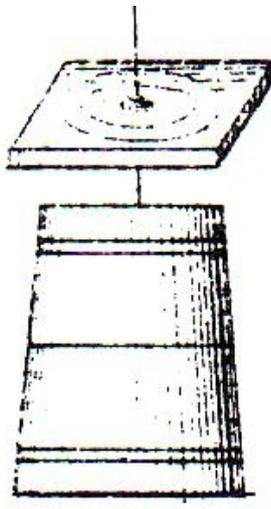
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Some catalogue pages and drawing from French, Israeli and Spanish books.

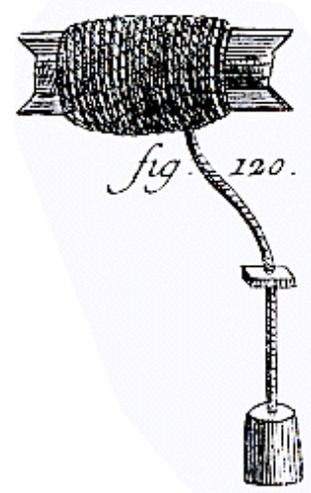
For more information see my article „WR PATENT NEWS 2007-06 Flat bottom + spacer“ and „2007-06 Flat spacer“ about patented plumb bobs with spacers.



REBATTET F M Paris date unknown



11218
REBATTET F M Paris
SQUARE SPACER



Diderot + d Alembert
1768 fil a plomb



(המשקולה מבחושות) 355

Ottoman plumb bob
ISRAEL with spacer



ARTE DE ALBANILERIA
1827 DETAIL P B 7

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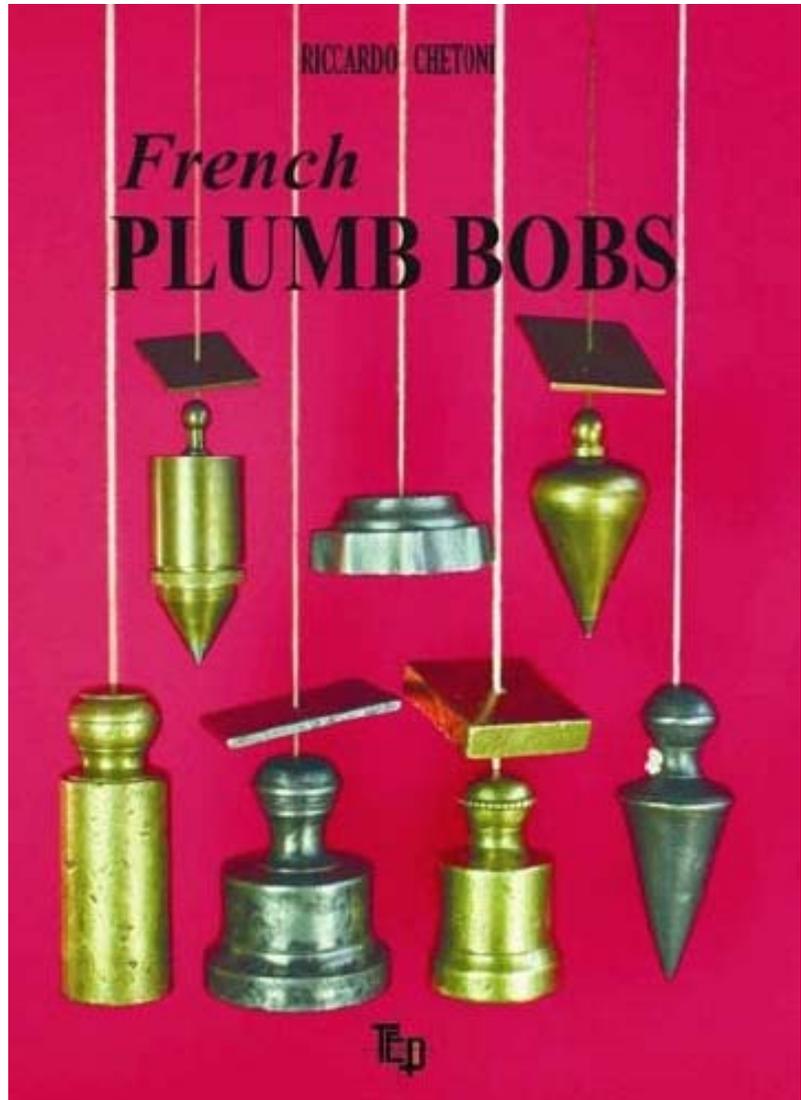
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3. COLLECTION RICCARDO CHETONI

My friend Riccardo Chetoni in Pisa Italy presented in his book about French Plumb Bobs some examples of the spacers used in France, square plates made in brass or iron.

The book (95 pages) is available in French or in English for 45 €+ shipping.

Email: rcheton@tin.it



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Riccardo also showed us some very nice samples of spacers in his presentation about Italian plumb bobs, presented at The 1st International Plumb Bob Collectors meeting in Istanbul 2006.

Some samples of spacers with “handles” perpendicular to the plumb line and an ornate cylindrical spacer, a handy bobbin on which to store the line.



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4. OTHER COLLECTIONS

Here are some pictures from collections of friends and from ebay auctions:



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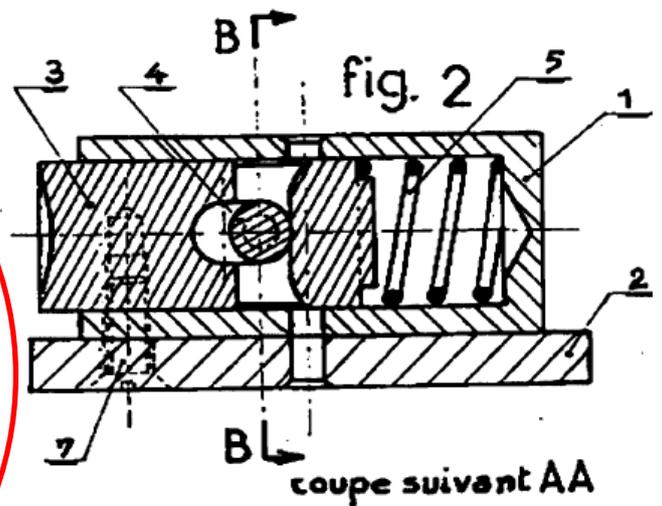
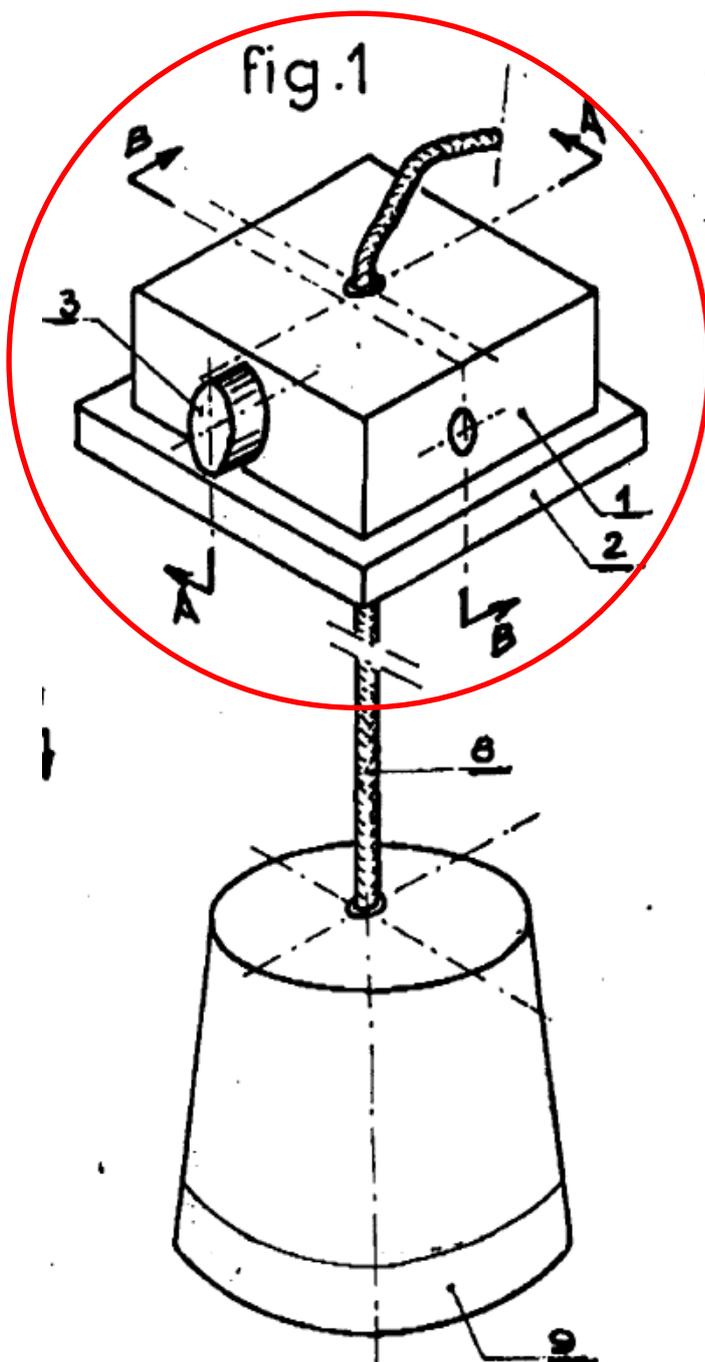
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5. FRENCH PATENT

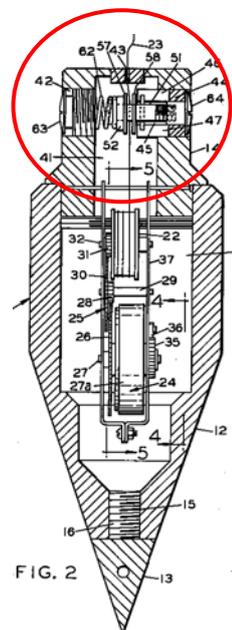
In France was granted June 18, 1997a patent FR 2743627 to Bastard Rosset FIRMIN „FIL A PLOMB AUTOBLOQUANT“ „Self blockage plumb bob“

An illustration of a spacer that can lock the spacer to the plumb line, or when button is depressed, allow the line to pass through the spacer feely.

Has anyone seen a real example of a spacer built like this?



Similar, mechanisms to “trap” the plumb line appear in several American patents i.e. US3027977 KNAUS from 1962
 (See WR PATENT NEWS 2007-46)



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6. COLLECTION ERIC KLIMP (part 1)

From our Fellow collector Eric Klimp from Holland, new information and pictures about the type of (wooden) spacer that is used in Holland and Belgium.

These are the typical Dutch flat bottom brass plumb bobs with wooden spacers. The iron plumb bobs have square iron plates.

The bands around these plumb bobs and the circular motifs on the spacers are decorative elements, with no functional purpose.



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7. COLLECTION WOLFGANG RUECKER

From my own collection, some of my "beauties."



France: number 7



Portugal



Produced for South America



German mason 2004



Italy ?



German mason

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Afghanistan



Afghanistan with round brass spacer



Germany special spacer



Germany: Spacer adapted to the plumb bob



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8. OTTOMAN PLUMB BOBS with spacer.

Although we see on page 8 a distance holder (spacer) with a plumb bob OTTOMAN TYPE 2, I don't know much about Ottoman spacers. However, in the collection of Jean-Paul in Paris, a number of old Ottoman shapes are illustrated, Type 2's according to the classification system used by Dogan Basak and myself. It is unclear if the one bob with a spacer represents a common theme in the Ottoman types, or was put together by just one individual, as his own personal adaptation to his plumb bob.



OTTOMAN plumb bobs type 2 from the coll. of Jean-Paul in Paris/France

In the course of collecting information, there is interesting information that relates to the Type 1 style Ottomans.

Elias from ATHENS/GREECE wrote me some times ago about this theme:

“Some comments on the form of the Ottoman plumb bob (Şakül)

The Ottoman plumb bob has two distinct characteristics, which together make its form unique among the plumb bobs of the world: the slender, shuttle-like body and the “hat” on top of the head of the tool.

First, the small diameter of the body, I believe, is due to the fact it was used with the pointer finger as a “spacer”. Judging from the specimens I own and I have seen, I concluded that the diameter of the ottoman plumb bob is roughly double the width of a man's pointer finger. Using the finger as a spacer does not give a very accurate measurement, but it was adequate for stone-construction. When higher accuracy was demanded, a spacer was added, but this led to the enlargement of the plumb bob diameter for practical reasons: the spacer had to be large enough to be handled by builders. I am aware that Dutch plumb bobs, being of small diameter, have their spacers, but there is no evidence that something like that existed for ottoman plumb bobs type 1.

Type 2, 3, and 4 plumb bobs must have had spacers. (See attached photo of plumb bob type 4).



OTTOMAN plumb bob type 4 with spacer



Ottoman type 1

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In Greece, builders use two types of (modern) plumb bobs. The bricklayers' plumb bob has a tip, which is used to point on the plan lines drawn on the floor (x, y coordinates) and raise them toward the ceiling (z coordinate). The plasterer's plumb bob is cylindrical with flat bottom, because it is used only for checking perpendicular surfaces.

A further detail is that the line of the plasterer's plumb bob is a short length of rope or cordon, which is less prone to tangle than a thin, long string.

Based on the above, I conclude that, at least, plumb bob type 4 was intended for checking vertical surfaces, while type 1 was for mixed use."

Personally, I find this idea to be entirely probable. High precision is not necessarily the hallmark of working with irregular stone as a building material and I think that the breadth of a finger and the variation in different fingers is well within an acceptable tolerance for construction of certain types of walls.

Let's say, if it wasn't common to do it this way, I believe it is a great idea!

To better understand what Elias explained, I took a photo of this use.(see right)

Remark: Because of the weight of this plumb bob (500 Grams / 16 oz) the line strangulated my finder.

Who knows more about this?



Ottoman type 1
with
„finger-spacer“

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9. COLLECTION ERIC KLIMP (part 2)

Last minute (I did already put the stamp on the email ☺) arrived some pictures from Eric in Holland (that is the “mother country” of flat bottom brass plumb bobs with wooden long spacers). These pictures tell so much about the hard live and the beauty of spacers, that I decided to change last minute my issue and added 2 pages of pictures.



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**In the next issue I will write about
“THE INTERNATIONAL HISTORY OF THE CHALK LINE / SNAP LINE”
in relation to the plumb bob.**