

WOLF'S PLUMB BOB NEWS 2009

Issue 07 July 01, 2009

TIDBITS

Editor: Wolfgang Ruecker

www.plumbbob.de

TIDBITS OF CURIOUS INFORMATION ON THE SUBJECT OF PLUMB BOBS

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A INTRODUCTION:

Dear Fellow Collectors,

As you know much of my research on the subject of plumb bobs is powered by the internet. GOOGLE in particular is an incredible tool for uncovering references to plumb bobs, in many types of written matter, some found where you would least expect them. Specifically, www.books.google.com, is the source of much of this month's newsletter, and a resource that I would recommend you explore.

In the course of working at composing a series of newsletters, and organizing my files by subject, I frequently find newsworthy tidbits that are either so singular that they defy assignment by subject, or are interesting but not newsworthy enough, perhaps, to devote an entire newsletter to the subject.

This month's WOLF'S PLUMB BOB NEWS accumulates 19 items from my miscellaneous file for your entertainment. Their sources are widespread and include tidbits from Germany, Switzerland, England, Australia, and the United States. Note in particular some previously unknown shapes that have come to my attention, and some very interesting but unusual uses for the plumb bob are suggested in these pages.

WARNING: The use of plumb bobs as weapons is not condoned by the author!

B 1 ANCIENT PLUMB BOB from a MUSEUM in GENEVA, SWITZERLAND

2. Outils de maçon et de charpentier.

CATALOGUE

DU

MUSÉE FOL

ANTIQUITÉS

Première Partie

CÉRAMIQUE ET PLASTIQUE



GENÈVE

H. GEORG | CHERBULIEZ
LIBRAIRES

1874

Ces outils ont des formes qui, souvent, dérivent de celles d'instruments en pierre plus anciens; du reste, ils sont analogues à ceux de nos jours, avec cette différence qu'on cherchait à unir l'élégance à l'utilité.

1118



1118. Plomb en bronze de fil à plomb, en forme de toupie aplatie en haut; une pointe en-dessous indique le centre, la tête percée de deux trous latéraux qui se réunissent à un trou vertical et central.

H. 5. D. 5.

1119. Id., analogue au précédent le corps plus plein.

H. 4. D. 5.

1120. Id., pareil au précédent, la tête plus courte, le corps plus aplati.

H. 3. D. 5 1/2.

1121. Plomb en bronze de fil à plomb, en forme de petit vase, du reste de construction pareille aux précédents.

H. 2. D. 1 1/2.

Translation from French:

2. Tools for masons and carpenters

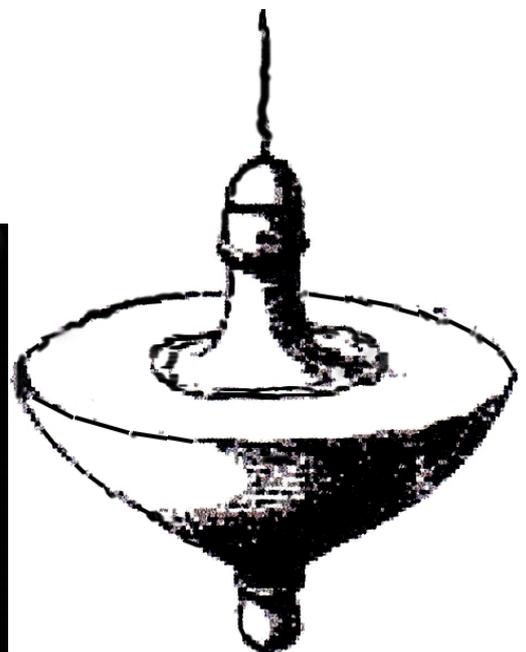
These tool shapes, are often derived from the oldest stone instruments, moreover, they are surprisingly similar to those still in use today. In the early examples, we find elegance and utility combined with a notable trend toward utility in the last century.

1118. Bronze plumb bob shaped like a child's toy, a "top"; the cap has one or two horizontal holes in the neck that intersect a vertical hole aligned with the center of gravity of the body.

Height 4 cm = 1 5/8 inch; Diameter 5 cm = 2 inch.

The other items **1119**, **1120** and **1121** are very similar described.

Right:
2 pictures from
Ebay auctions with
similar shape:



KNIGHT'S
AMERICAN
W. & F. Burdette
MECHANICAL DICTIONARY:

DESCRIPTION OF TOOLS, INSTRUMENTS, MACHINES, PROCESSES, AND
ENGINEERING; HISTORY OF INVENTIONS; GENERAL
TECHNOLOGICAL VOCABULARY;

Digest of Mechanical Appliances in Science and the Arts.

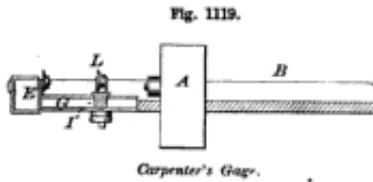
BY
EDWARD H. KNIGHT,
CIVIL AND MECHANICAL ENGINEER, ETC.

Illustrated
WITH UPWARDS OF FIVE THOUSAND ENGRAVINGS.

"Thus Time brings all things, one by one, to light,
And Skill evolves them into perfect light."
Locke, Book V.

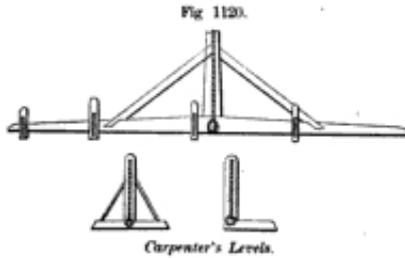


NEW YORK:
J. B. FORD AND COMPANY.
1874.



screw. In the example, revolving rollers with sharp edges are used instead of marking points, and the roller *L* is adjustable towards and from the roller *E* for making two parallel scribes at a determinate distance from the fence *A*.

Carpenter's Level. An implement for determining horizontality and verticality. It has a base piece, standard, and plumb-line, and



is used by builders and road-makers in testing surfaces, to ascertain whether they are level.

The feet may be so adjusted, to suit the required grade or pitch, that the level becomes a means of determining a slope.

Carpenter's Plane. Carpenter's planes are of various descriptions, adapted to the different kinds of work they are intended to perform, — as, the jack-plane, for rough-dressing a surface; the smoothing-plane, for finishing it off; and grooving and molding planes, some of which have special names, for making grooves or elevations of various forms. See PLANE.

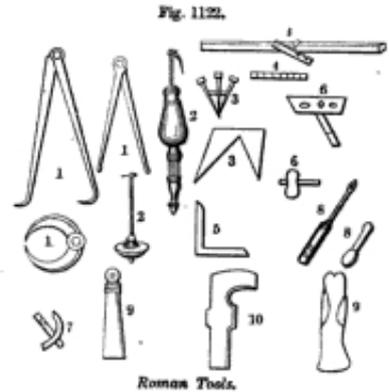
Carpenter's Plow. A plane for making a groove in the edge of a board, to be occupied by the matching tongue of another board, or by the edge of a panel.

Carpenter's Rule. Ordinarily, a two-foot rule, jointed in the middle and divided to eighths or sixteenths of an inch.

That shown in the figure has a pointed swinging arm, and also a curved scale and pointed index, so that the instrument may serve the purposes of a level, square, and bevel, any angle of inclination being noted by the pointer upon said scale.

Carpenter's Square. An L-shaped steel rule having two arms meeting at a right angle, and graduated to feet, inches, and fractions. It is used by carpenters and other mechanics for laying off perpendiculars to a line or surface, and setting off the distances thereon at the same time. See TRY-SQUARE.

Carpenter's Tools. In the reign of Henry II. of England, the whole stock of a carpenter's



tools was valued at one shilling, and consisted of a broadaxe, an adze, a square, and a spoke-shave. The number has largely increased since. See specific index, WOODWORKING.

Fig. 1122 shows a variety of old Roman implements of this kind, as represented on existing monuments.

- 1 1 1, compasses and calipers.
- 2 2, plumb-bobs.
- 3 3 5, templet and squares.
- 4 4, single and jointed rules.
- 6 6, mallets.
- 7, adze.
- 8 8, scriber and soldering-tool.
- 9 9, chisels.
- 10, hatchet.

Carpenter's Vise. A device with a stationary jaw attached to the bench, and a movable jaw operated by a screw, used for clamping a board or timber while being operated on by the plane or chisel.

Carpentry. See under the following heads:—

- | | |
|-------------------|---------------|
| Abat-jour. | Architrave. |
| Abat-voix. | Arris. |
| Abutment. | Arris-fillet. |
| Accouplement. | Arris-gutter. |
| Ajambe. | Ashlring. |
| Ambe. | Astragal. |
| Angle-bar. | Attic. |
| Angle-tier. | Awning. |
| Ante-venno. | Badigeon. |
| Apron. | Balk. |
| Apron-piece. | Baluster. |
| Arched-beam roof. | Barge-board. |

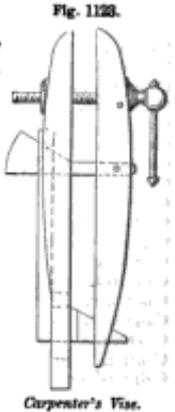
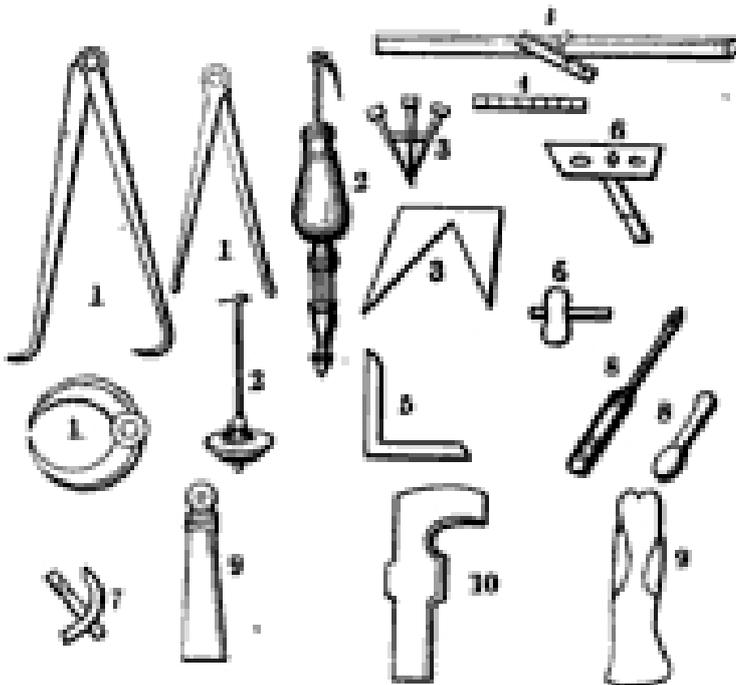
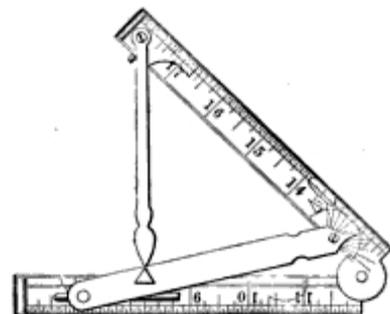


Fig. 1122.



Roman Tools.

Fig. 1121.



Carpenter's Rule.

Dingler's
Polytechnisches Journal.

33062

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BEITRÄGE ZUR
GESCHICHTE DER TECHNIK
UND INDUSTRIE

JAHRBUCH
DES VEREINES DEUTSCHER INGENIEURE

HERAUSGEGEBEN

VON

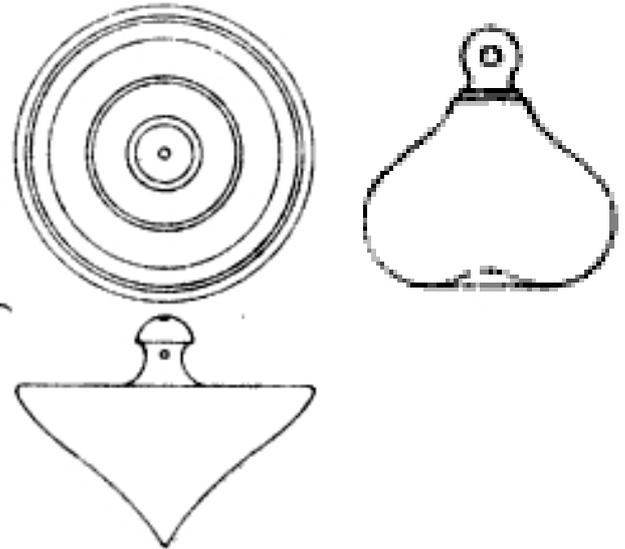
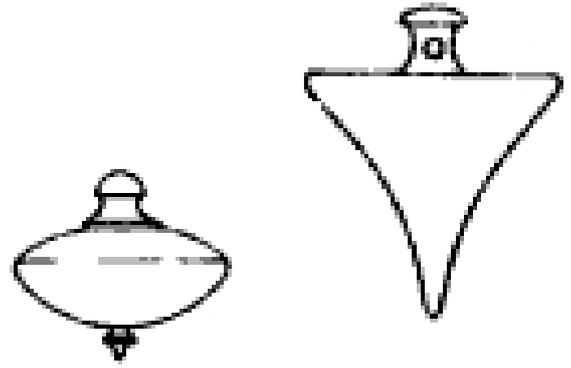
CONRAD MATSCHOSS

ZWÖLFTER BAND

MIT 164 TEXTABBILDUNGEN, 12 BILDNISSEN



BERLIN
VERLAG DES VEREINES DEUTSCHER INGENIEURE
IM BUCHHANDEL DURCH
JULIUS SPRINGER / VERLAGSBUCHHANDLUNG
1922



Different shapes found in Pompeii / Greece



Abb. 34. Senklot
(Töpferkolonie
Rheinzaubern).

Found in Rheinzaubern / South West Germany from
a Roman pottery-trade colony.

B 4 PLUMB BOB as an EXCUSE

A legal appeal from the County Court, KYNETON (north of MELBOURNE, AUSTRALIA) from 1883.

Asac A. Smith

THE
VICTORIAN
LAW REPORTS.

1883

In Five Series:

- I. CASES IN EQUITY. II. CASES AT LAW.
- III. INSOLVENCY, PROBATE, AND MATRIMONIAL CASES.
- IV. CASES ON APPEAL TO CHIEF JUDGE OF COURTS OF MINES.
- V. CASES IN THE COURT OF VICE-ADMIRALTY.

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EDITED BY

GEORGE H. F. WEBB, Q.C.

VOL. VIII.

1882—XLV AND XLVI VICTORIAE.

MELBOURNE:

Published under the direction of the Council of Law Reporting by
 CHARLES F. MAXWELL, 81 CHANCERY LANE.
 LONDON: WILLIAM MAXWELL & SON, 29 FLEET STREET.
 1883.

Digitized by Google

The evidence for the plaintiff was that he had been in the defendant's employment till March, 1880; that on Sunday, 27th November, 1881, some one called him up at 5 a.m. and sent him to the defendant's office, where the defendant asked him what he had been doing there that morning, that another person present had seen him inside the office and coming out of it; that the plaintiff denied this, and told the defendant to come to his house and see if any of his property was there; that, at 5 p.m., a constable came with a warrant, and arrested him; that the charge was afterwards dismissed.

The evidence for the defendant was that, before 5 a.m. on that morning, a workman called him up and told him that he had seen the plaintiff, at 4.20 a.m., coming out of the defendant's office, through a window, had spoken to him, and received the excuse that he was looking for his plumb-bob which the defendant had taken from him, to which the workman replied that it was not likely to be among the papers, and the plaintiff then entreated him not to tell; that the defendant and this workman went into the office and found the papers disturbed, and thereupon the plaintiff was sent for; that in the evening of that day the defendant obtained a warrant.

B 5 PLUMB BOB, RULE AND SPACER COMBINED

From ENGLISH MECHANIC AND WORLD OF SCIENCE
 No. 1420 JUNE 10, 1892 page 361

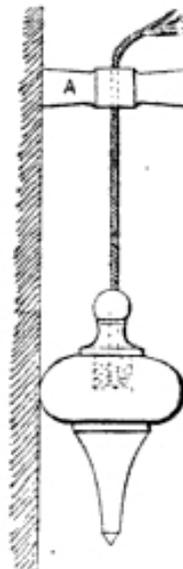
"The length of the piece A is equal to the diameter of the bob, and the line passing through the hole in the centre of A to a hole in the centre of the bob, it follows that if the bob is allowed to drop gradually down the angle or other part of a building or other object, while A is hold to a fixed point, in the position shown, it will indicate all hollows or projections on the vertical line, and show whether or not the object is plumb from any one point to another.

It is very handy for a clerk of works or building inspector to carry in his pocket.

Baku, April 28. Peotre Petrovitch"

PLUMB-BOB AND RULE COMBINED.

[33621].—This length of the piece A is equal to the diameter of the bob, and the line passing through the hole in the centre of A to a hole in the centre of the bob, it follows that if the bob is allowed to drop gradually down the angle or other part of a building or other object, while A is held to a fixed



point, in the position shown, it will indicate all hollows or projections on the vertical line, and show whether or not the object is plumb from any one point to another.

It is very handy for a clerk of works or building inspector to carry in his pocket.
 Baku, April 28. Peotre Petrovitch.

NATIONAL REPORTER SYSTEM—STATE SERIES

THE SOUTHERN REPORTER

VOLUME 77 PERMANENT EDITION

COMPRISING THE DECISIONS OF THE SUPREME AND APPELLATE COURTS OF ALABAMA AND THE SUPREME COURTS OF FLORIDA, LOUISIANA AND MISSISSIPPI

WITH KEY-NUMBER ANNOTATIONS

JANUARY 19—APRIL 6, 1918

ST. PAUL WEST PUBLISHING CO. 1918



Collection Wolf Ruecker

In such cases they attach the bob to the line, let it become still when within a few inches of the floor through which the hole is to be bored, and then let it drop, when the point of the bob makes the required mark in which to insert the point of the bit or auger. In the old or common forms of plumb-bobs, unless the greatest care is taken in dropping the bob, the point is apt to waver or vary from the true line, and the result is thus rendered unsatisfactory.

RILEY et al. v. DENE GRE. (6 Div. 444.) (Supreme Court of Alabama. Dec. 20, 1917.)

1. ASSAULT AND BATTERY — SELF-DEFENSE—BURDEN OF PROOF.

Defendant in an action for assault and battery who set up self-defense has the burden of proving he was free from fault in bringing on the difficulty, the rule as to the burden of proof not being changed, because freedom from fault may be shown prima facie by proof of an imperative necessity for defendant's assault; such proof merely shifting the burden of going forward.

2. ASSAULT AND BATTERY — ACTIONS—EVIDENCE.

Where it appeared that defendant in assaulting plaintiff used a plumb bob, which was a pear-shaped metal piece attached to a chain, and used in defendant's office as a paper weight, testimony that several months before the assault defendant struck his hand with the plumb bob and remarked that he could make a nice round hole in a man's head with it was admissible to show defendant's consciousness of the efficiency of the plumb bob as a weapon of attack.

Appeal from City Court of Birmingham; C. W. Ferguson, Judge.

Action by John S. Denegre against J. Robert Riley and others. From a judgment for plaintiff, defendants appeal. Affirmed.

C. B. Powell, of Birmingham, for appellants. Allen, Bell & Sadler, of Birmingham, for appellee.

SOMERVILLE, J. The action is in trespass for an assault and battery, and there was verdict and judgment for plaintiff.

[1] Defendant pleaded several pleas of self-defense, each of which alleged that he was free from fault in bringing on the difficulty. The trial judge instructed the jury that the burden of proof was on defendant to show his freedom from fault in bringing on the difficulty, and this is assigned for error. This question was ruled adversely to appellant in Morris v. McClellan, 169 Ala. 90, 98, 53 South. 155. It is true, as there pointed out, that

I hope none of the plumb bobs from my collection was used in an "assault and battery" Although there are no patent claims as a weapon, VAJEN'S patent from Nov. 14, 1888 with 1750 grams =62 oz, was designed for "DROPPING". One certainly could have been a formidable assault weapon!

Consider using a plumb bob as a paperweight on the desk in your office, intimidating, at least, in delicate negotiations your clients? ☺

this freedom from fault may be shown prima facie by proof of an imperious necessity for the defendant's assault upon the plaintiff; yet this shifting of the burden of going forward with the evidence does not change the general burden of proof which requires the defendant to establish every element of his plea of justification.

[2] Plaintiff was allowed to show that about three months before the assault defendant had in his hand a plumb bob, a pear-shaped metal piece attached to a chain, and used in his office as a paper weight, with which he then struck his own hand, remarking "that he could make a nice round hole in a man's head with it." The evidence showed that defendant actually assaulted, beat, and seriously injured plaintiff about the head with this instrument; and some of the testimony tended to show that prior to the beginning of the difficulty defendant had the bob in his pocket, from which he drew it for the attack. Conceding that this declaration by defendant was not, under the evidence, admissible as a threat against this plaintiff, we nevertheless think it was admissible to show defendant's consciousness of the character and efficiency of the bob as a weapon of attack, and so to illustrate defendant's animus in its use, and the extent to which he intended to injure plaintiff. There was no error in its admission under the circumstances of this case.

Other assignments of error, being waived by noninsistence in brief, will not be considered.

Let the judgment be affirmed.

Affirmed.

ANDERSON, C. J., and MAYFIELD and THOMAS, JJ., concur.

Is this guy part of a survey team with a plumb bob in his overcoat pocket?? ☺



B 7 ACCIDENT BY USING A PLUMB BOB

National Reporter System—State Series

THE PACIFIC REPORTER

WITH KEY-NUMBER ANNOTATIONS

VOLUME 108

PERMANENT EDITION

CONTAINING ALL THE DECISIONS OF THE

SUPREME COURTS OF CALIFORNIA, KANSAS, OREGON, WASHINGTON
 COLORADO, MONTANA, ARIZONA, NEVADA, IDAHO, WYOMING
 UTAH, NEW MEXICO, OKLAHOMA, COURTS OF APPEAL
 OF CALIFORNIA, AND CRIMINAL COURT OF
 APPEALS OF OKLAHOMA

WITH TABLE OF PACIFIC CASES IN WHICH REHEARINGS
 HAVE BEEN DENIED

ST. PAUL
 WEST PUBLISHING CO.
 1910

(18 Idaho, 158)

CRAESAFULLI v. WINSTON BROS. CO.
 (Supreme Court of Idaho. April 29, 1910.)

(Syllabus by the Court.)

**1. MASTER AND SERVANT (§ 278*)—INJURY TO
 SERVANT—NEGLIGENCE OF MASTER—EVI-
 DENCE.**

Held, under the facts of this case, that it
 was the duty of the master to see that the scaf-
 fold from which the defendant fell and was in-
 jured was safely erected.

[Ed. Note.—For other cases, see Master and
 Servant, Dec. Dig. § 278.*]

What is the duty of the
 master builder to his
 worker if he falls down
 while using a PLUMB
 BOB?

**Attention: Using a
 plumb bob may be
 dangerous!**

SULLIVAN, C. J. This action was brought
 to recover damages in the sum of \$1,975 for
 injuries alleged to have been sustained by the
 plaintiff on or about the 2d day of December,
 1908, while in the employ of the appellant cor-
 poration, by reason of his having fallen from
 a scaffolding when engaged in holding a plumb
 line for the purpose of plumbing a post used
 in timbering a tunnel. The appellant at the
 time of the injury was engaged in driving
 what is known as the St. Paul Pass Tunnel
 on the Chicago, Milwaukee & St. Paul Rail-
 way through the Bitter Root Mountains,
 which mountains form the dividing line be-
 tween the states of Montana and Idaho. The
 accident occurred on the Montana side of the
 dividing line.

by the use of hammers. In order then to
 plumb the post, a scaffold or staging was
 erected along the sides of the tunnel as fol-
 lows: A piece of lagging was nailed between
 two plumb posts on each side of the tunnel,
 and on this was placed what is known as a
 "spreader" or crosspiece (a piece of timber
 four by six inches) crosswise of the tunnel.
 Against the face or breast of the bench a lad-
 der was placed, and from this spreader a
 plank (4 by 6) was placed, resting one end upon
 the spreader and the other on a rung of the
 ladder. Upon the staging a man was sent
 with a plumb line which he would hold up
 against the wall plate while the other men
 would hammer the post into line. Supervising
 the entire construction of the tunnel was
 a shift boss, who had authority to hire and
 discharge men working in said tunnel. The
 men were classified as machine men, helpers,
 muckers, steam shovel engineers, cranemen,
 skimmers, switchmen, motormen, breakmen,
 nippers, and ditchmen. The respondent was

B 8 MECHANICAL PLUMB BOB

I could not find other information (patent, catalogue etc.) WHO knows more about it?

328

SURVEYING.

A TREATISE ON SURVEYING

London

E. & F. N. SPON, LTD., 57 HAYMARKET

New York

SPON & CHAMBERLAIN, 123 LIBERTY STREET

1911

DEACON'S ADJUSTABLE PLUMB-BOB. (Fig. 146.)

The plumb-bob is cast in three parts, A, B and C, which are capable of being screwed together as in figs. 1, 2 and 3. The castings are hollowed out as shown in section in figs. 2 and 3, and in plan, fig. 4, and the wheel D, figs. 2, 3 and 4, is carried by the bearings E and F, figs. 1 and 2. This wheel is held stationary by the friction between one of its sides and the side of the casting at G, figs. 2 and 4. The small metal cylinder, H, fig. 2, fits into part of the space I (fig. 4) and rests against the spring J (fig. 2), which fills the remainder of the space. The spiral spring, K, figs. 2, 3 and 4 is attached to the hub of the wheel at L, figs. 2 and 3, and to the casting at M, figs. 2, 3 and 4. On pressing the button F, figs. 1 and 2, the wheel is shifted laterally from the face of the casting at G (fig. 2), and relieved of its friction, and the spring J, fig. 2, is compressed. The plumb-bob can then be raised or lowered to the desired position. When the button F is released, spring G throws the wheel into friction again, and the plumb-bob is held stationary. When the plumb-bob is lowered, spring K is wound up. When it is desired to raise the plumb-bob, press the button F; the wheel D will then be released and the spring K will cause it to revolve and to wind up the cord of the plumb-bob.

The plumb bob hangs quite freely without any movement, in any position.

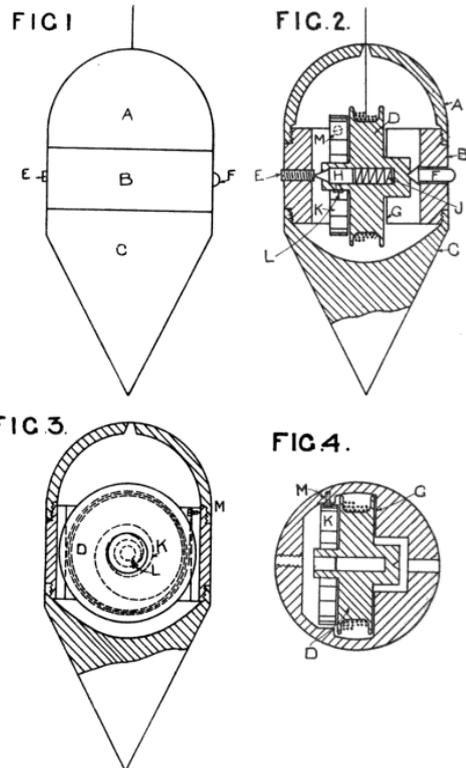


FIG. 146.

B 9 PLUMB BOB MOLD (TRY THIS NEXT EASTER)

Below you learn how to make an EGG SHAPED PLUMB BOB for your plumb level (Chicken egg size).

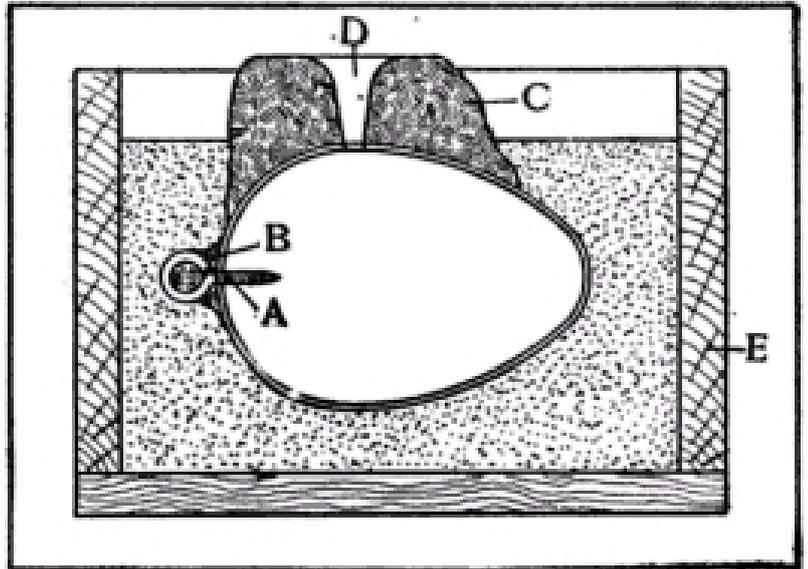
HOW TO MAKE A PLUMB-BOB MOLD

Make a small hole in the center of the large end of an egg, and another in the side, and blow out the contents. Dry the empty shell in an oven, and then fasten a small screw eye, A, in the end hole, by means of a piece of clay, B. Place another piece of clay, C, over the side of the egg, leaving an opening, D, to pour in the melted lead later.

Place the egg, with the clay on it, in a box, E, and pack with sand, having the opening, D, on top, as shown.

Having thus prepared the mold, melt about a pound and a half or two pounds of lead and pour in the opening. Allow plenty of time to cool, and then break away the egg shell, and you will have a good plumb bob.—Contributed by W. J. Slattery, Emsworth, Pa.

POPULAR MECHANICS JUNE 1906



Mold for a Plumb-Bob

This one (right) could *perhaps* be made with such a mold.



Perhaps BRIDGE BUILDERS in AFRICA use Ostrich eggs (picture left). An Ostrich egg could yield a 50 lb plummet compared to the 2 lbs or so product of a lead filled chicken or duck egg. ☺ ☺

An Ostrich egg is 25 to 30 times as big as a chicken egg.

A reward will be given for the first picture of an ostrich egg plummet!



B 10 DO IT YOURSELF PLUMB BOB HOLDER

As early 1904 (100+ years ago) **Hartford, Ct., USA** was the center of plumb bob collectors. That tradition is carried on today by noted collector, Nelson Denny, from his ranch on the outskirts that fair capitol city ☺

The plumb bob on the drawing looks like a “china hat” (No. 212 weight 8 or 11 oz) from a Berger catalogue 1908 and earlier. (Berger was from Boston Mass. U.S.A.)

A PLUMB-BOB POCKET.

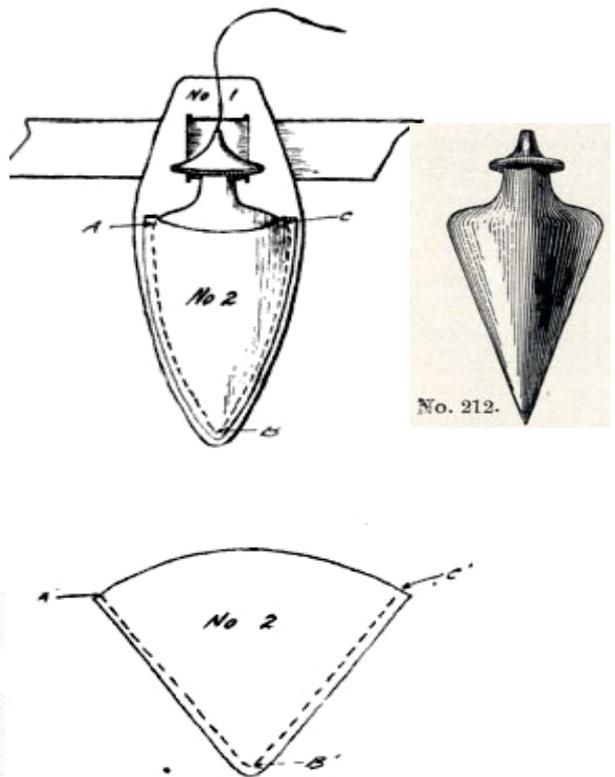
By Elijah H. Owen, Hartford.

The accompanying sketch shows a pocket for plumb-bob, to be worn on a belt. I first saw one of these devices in Mr. Minor's office at Greenwich. He got the idea from Mr. Kirby of Portchester, N. Y., who conceived it. As it is inexpensive and decidedly useful, I herewith, with consent of the “inventor,” bring it to the attention of the members of this association. As seen in the sketch, it is simple of construction. Any harness-maker can make one from two pieces of scrap leather.

No. 1, the back, should be fairly stiff, and is provided with two slits near the top, through which the belt passes. No. 2 should be cut so as to make a close fit for the bob, its entire length. Under the point enough room should be left to prevent the bob from resting on the point, in order to lessen its liability to be thrown out by a sudden jolt. For the same reason, the pocket should be deep enough to slightly overlap the widest part of the bob. The top, A'C', is an arc of a circle whose center is near B'.

When sewed together, the line A'B'C' coincides with abc, thus forming the pocket desired. The sizes and shapes of these pieces will, of course, vary with those of the bob, but patterns may be cut out of paper, and altered, until the desired fit is obtained.

In work requiring frequent use of the plumb-bob, the saving of one's pocket caused by the use of this little holder may repay the user, and it is certainly advantageous to have the bob always right-side up and easily withdrawn.



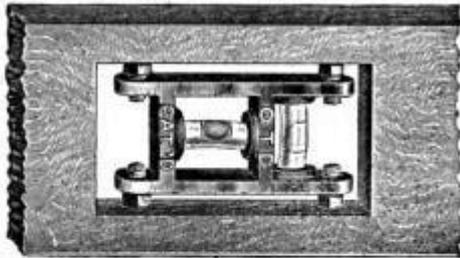
B 11 THE DEVICE THAT WOULD PUT AN END TO PLUMB BOBS (or so he thought)

Don't obey this advice: from an ad 1921:

“... So do not hold yourself down by clinging to the old fashioned plumb bob and stationary level. THROW AWAY YOUR PLUMB BOB and be up to date by using an O. T. D. level”

The O.T.D. LEVEL you can find in the patent **US 1,393,328 Oct. 11, 1921** and **US 1,281,096 Oct. 8, 1917** given to Christopher F. Thullen Chicago.

ON-THE-DOT LEVEL DEVICE



Price \$3.00 at Your Dealer, or direct

Be progressive, check your level now and then. The best recommendation a mechanic can give is his tools, if your employer sees that you use up to date tools he knows at once that you are the man he wants. So do not hold yourself down by clinging to the old fashioned **plumb bob** and stationary level. Throw away your **plumb bob** and be up to date by using an O. T. D. level. It entirely eliminates the use of a **plumb bob**, and you can make your level bar of any length that the job may require for the accurate adjustment of your work. It is adjustable and by the use of the set screws you can always keep it on the dot, and thereby insure yourself at all times against the use of an imperfect level.

Check the level you are using and see if it is worth carrying around with you. Place it flat against the wall, make it level and mark both ends, at the bottom, then reverse placing ends on the opposite marks, look at the glass and if it does not check throw it away and order an O. T. D. Level.

CHAS. M. NEIMES SALES CO.

144 No. Waller Ave. Chicago, Ill.

B 12 NEW SHAPES OF MINING PLUMMETS

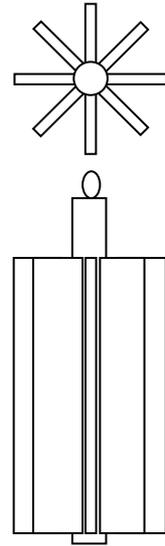
In THE JOURNAL OF THE IRON AND STEEL INSTITUTE LONDON and NEW YORK 1891 I found a shape of a mining plummet that was unknown for me:

Plummet for Deep Shafts.—In surveying the mines of the Lehigh Valley Coal Company a new form of plummet is used. It consists of a vertical core 12 inches long, with eight radiating flanges 9 inches high by 3 inches wide of $\frac{1}{4}$ -inch metal. At the bottom there is a circular disc acting as a web. This plumb-bob weighs 20 lbs., and has a surface area of about 630 square inches. An ordinary bob of equal weight would have a surface of 90 square inches. In a dry shaft, 500 feet deep, this form of plumb-bob will settle, under ordinary conditions, in about one hour instead of in five or six hours, as is the case with the older form.†

* *Comptes Rendus Mensuels de la Société de l'Industrie Minière*, 1891, pp. 93-99.

† *Ibid.*, 1890, p. 157.

‡ *Engineering and Mining Journal*, vol. li. p. 743.



Drawing made by Wolf with the information of the article.

A similar shape was described in:

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MINING SURVEYING

[CHAP. XI.]

THE PRINCIPLES AND PRACTICE OF SURVEYING

BY
CHARLES B. BREED AND GEORGE L. HOSMER
INSTRUCTORS IN CIVIL ENGINEERING, MASSACHUSETTS
INSTITUTE OF TECHNOLOGY

SECOND EDITION
THIRD THOUSAND

NEW YORK
JOHN WILEY & SONS
LONDON: CHAPMAN & HALL, LIMITED
1907

327. PLUMBING THE MERIDIAN DOWN A SHAFT.—To the mine surveyor the plumb-line is an instrument of precision, excelling even the transit, and under most conditions, the work of transferring the meridian down a mine can be accomplished more accurately by means of the plumb-line than by any other method accessible to the surveyor.

The method usually followed is to suspend two bobs from the staging above the mine so that a horizontal line in their plane can be sighted both from above and from below. The transit is set up both above and below on this line and thus an azimuth connection is established between the surface and the workings. Sometimes a much longer base-line than can be directly sighted can be obtained by plumbing down at the corners of a shaft as shown in Fig. 134. Points A and B have been plumbed down

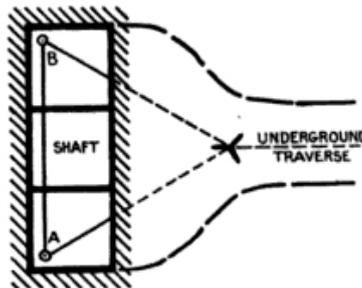


FIG. 134. TRIANGULATING AT THE BOTTOM OF SHAFT.

and, by the triangulation method there indicated, a connection with the underground traverse can be established. In this triangle the angles should be chosen so as to give good intersections.

All kinds of drafts in the shaft should be avoided during the alignment at the bottom. No cages or skips should be run and the passages leading to the shaft may have to be damped with sheets of canvas. No lateral streams of water should impinge on the plumb-lines; in fact it is desirable that no water at all should drop in their vicinity.

The best plumb-line for this work is one made of wire. Annealed copper wire is most flexible, but soft steel or piano wire being thinner will be less affected by drafts and will also stretch less. The plumb-bob should not weigh less than five pounds and should be heavier for a deep shaft. A good working weight is one-third of the load at which the wire will break.

The plumb-bob is hung in a bucket or a barrel of viscous liquid so as to bring it to a standstill in the shortest possible time. The shape of the plumb-bob is of importance in this respect

and the form shown in Fig. 135 is a good one, since it prevents rotary as well as lateral oscillations. It should hang near the top of the vessel as the wire will be in a high state of tension and will stretch considerably. A mark should also be made on the wire showing how far the bob is above the bottom of the vessel.

The liquid must be a true one (not a mud or slime) and it must be neither too limpid nor too viscous; for in the former case it will not stop the oscillations within a reasonable period, and in the latter the bob may not reach the central position quickly enough. The amplitude of the vibrations of the plumb-bob decreases in a fixed ratio with equal increments of time, and the viscosity of the fluid should be such as to make each oscillation, say, about one-quarter of the preceding. The ratio of decrease during equal increments of time is independent of the length of the plumb-line and of the amplitude of the oscillations if the resistance is purely viscous. This law makes it possible to select the fluid above ground, with the aid of a short length of wire attached to the bob; it applies only when the bob swings through a very small arc so that the resistance is wholly viscous. It may be noted that the period of oscillation varies approximately as the square root of the length of the plumb-line, the same as for a pendulum swinging in air.

If the shaft is wet the vessel should be covered with a sloping lid having a hole in it of an inch or so in diameter so that the wire can swing freely. In order to obtain as long a base-line as possible the wire should be hung as near to the casing of the shaft as is consistent with the precaution that it shall be perfectly plumb. It should be carefully examined along all its length to make sure that there are no obstacles to interfere with it. In some cases it may be sufficient to pass a lighted candle around the wire at the bottom and observe any obstacles by sighting from the top. The distance between the wires at the bottom and top of the shaft should always be measured and compared,

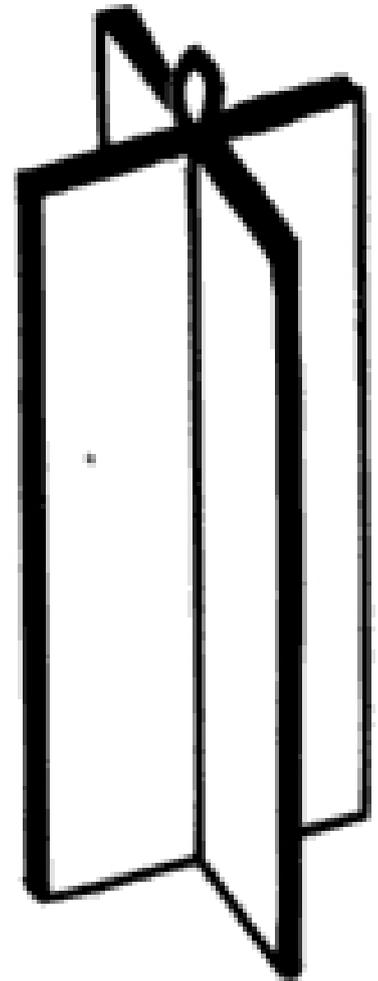


FIG. 135. TYPE OF PLUMB-BOB USED IN PLUMBING MERIDIAN DOWN A SHAFT.

B 13 WINGED MINING PLUMB BOB

This is another shape for a mining plummet:

TRANSACTIONS
 OF THE
 AMERICAN INSTITUTE OF MINING
 ENGINEERS.
 VOL. XXIV.

FEBRUARY, 1894, TO OCTOBER, 1894,
 INCLUSIVE.

NEW YORK CITY:
 PUBLISHED BY THE INSTITUTE,
 AT THE OFFICE OF THE SECRETARY.
 1895.

SURVEY OF UNDERGROUND CONNECTION AT LEAVENWORTH, KANSAS.

BY EDWIN A. SPERRY, GOTHIC, COLO.

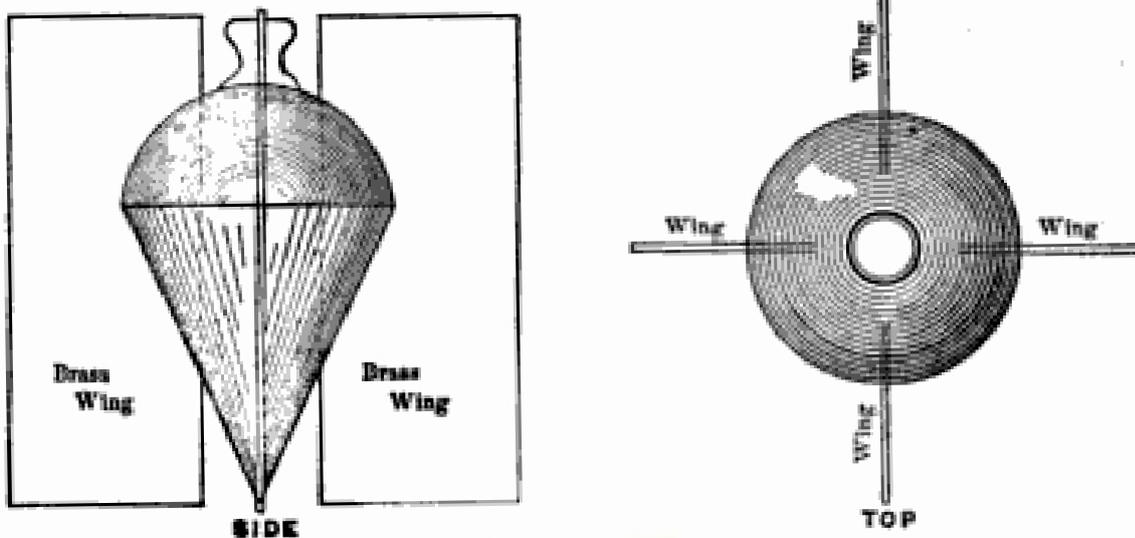
(Virginia Beach Meeting, February, 1894.)

28

SURVEY OF UNDERGROUND CONNECTION.

The second problem, that of dropping the bases in the shafts, was one of great importance, and demanded, of course, the utmost care and accuracy of instrumental work. I first tried **plumb-lines**, with **5-pound plumb-bobs**. I used braided linen line at first, thinking that the lightness of the line would be an advantage, but found that this would not do. Next I tried fine piano-wire; and although it was an improvement, it was not much better. I then sawed slits in the sides of the **plumb-bobs**, into which I inserted square pieces of sheet-brass, in order to offer more resistance to the oil or water in which I hung them. I found this a great improvement, but even then they were not steady. Water was dropping considerably in the shafts, more especially in the Home shaft, and notwithstanding the fans were stopped, there was a constant whirl of air, which threw the drops of water from side to side, so that when they struck the line it was with considerable force, enough, it seems, to prevent its settling perfectly.

Fig. 2 represents my "winged" plumb-bob. I think it would be highly serviceable in shafts not more than 200 or 300 feet in depth. As a final measure, I obtained from Messrs. Gurley a side telescope, which A. S. Aloe & Co., of St. Louis, attached to my transit. In order to adjust the instrument thoroughly, I suspended one of my "winged" **plumb-bobs** in oil, with fine piano-wire, from a high trestle, on which I adjusted the axis on the standards after having adjusted the line of collimation in the main telescope.



Winged Plumb-Bob.

This modification could only be used in liquids; in the air you get extremely bad results! It is contrary to a Mercury-filled plumb bob.

B 14 PLUMB BOB HOLDER for Transit-Leg

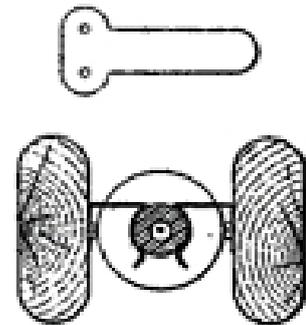
In "COAL MINING KINKS" New York 1916 I found:

24

Coal Mining Kinks

Plumb-Bob Holder for Transit Leg

In making the plumb-bob holder illustrated, cut two pieces of thin spring brass as shown in the accompanying sketch. Bend as shown, and fasten in the split leg with $\frac{1}{4}$ -in. round-head brass screws. Cut from the same material an oval plate, and tack it on the block below with brass brads before boring the $\frac{1}{8}$ -in. hole for bob point. A very light grip will hold the bob, even up to a jolt which would put the instrument out of business. No parts project. And no "trigger work."



From "MINING" 1895 I got the article below about a wood level:

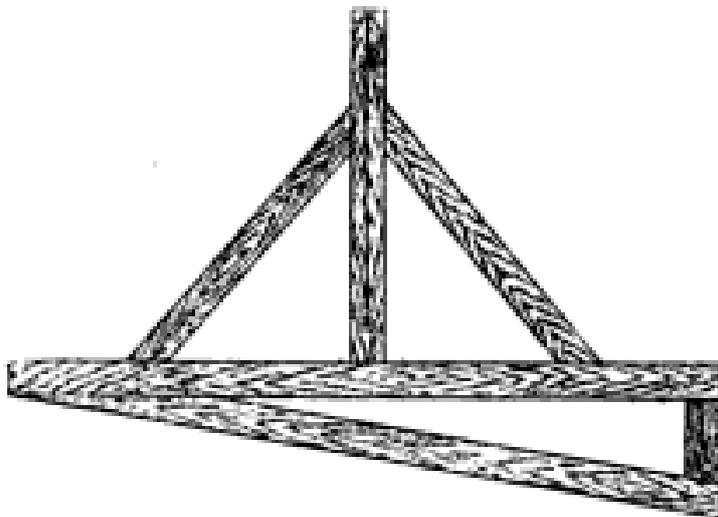
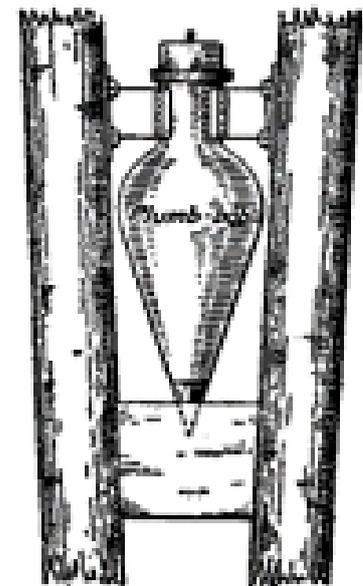


Fig. 104

To keep a tunnel at a given inclination, the instrument shown by fig. 104 is often used. To the centre vertical piece is attached a plumb-bob, and the lower foot-piece is set at the angle or inclination which it is required the tunnel should be driven at. The illustration represents the proper dimensions and angle for an inclination of one in six, the length of the main horizontal piece being 6 feet, and the distance from the bottom of this piece to the bottom of the inclined piece being one foot.



A Brass Spring Plumb-Bob Holder for Transit Leg

THE
 57 1957
 ENGINEERING MAGAZINE

DEVOTED TO
 INDUSTRIAL PROGRESS

VOLUME X

October, 1895, to March, 1896

NEW YORK
 THE ENGINEERING MAGAZINE CO.
 1896

A Word About Plumb Bobs.

IN an article on erecting and starting steam engines, by "Spike" in *Machinery* (New York, Oct.), some useful hints regarding the plumb-line and plumb-bob are given. This implement, when well-made, ought to be classed among tools and instruments of accuracy; but "Spike" shows that, as ordinarily made and kept on sale in the hardware and tool stores, it is an instrument of inaccuracy. He says:

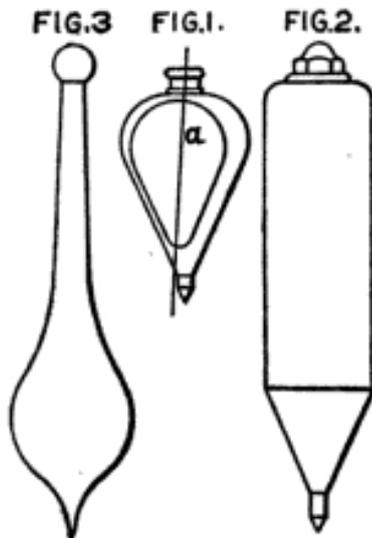
"The first plumb-bob that I used was the regulation hardware store arrangement familiar to all (see Fig. 1), and it got me into lots of trouble. It was brass, cast hollow, and filled with lead, and the brass was about $\frac{1}{8}$ in. thick on one side, or $\frac{1}{16}$ in. on the other. The lead, being heavier than the brass, brought the center of gravity to one side, or on a line *a* (Fig. 1), and the shape kept it well up; consequently the error was magnified considerably at the point. That plumb-bob met with an accident, or I probably should have never known how it was constructed or why its point would scribe a circle if it got to whirling. Then I made one like that shown in

MECHANICAL ENGINEERING.

351

Fig. 2, of a piece of steel $1\frac{1}{2}$ in. diameter by 4 in. long, which I considered all right, and used it for a long time, with lots of good chances to give it away, which I

named, only 9 in. long, while that shown in Fig. 3 is only 5 in. long. The new one will have a long, slim neck of $\frac{1}{4}$ in. diameter, and will be of tool steel instead of soft steel. For lines use braided silk, and in the long run you will find it much cheaper, and better satisfaction will offset the extra cost."



finally did, and then made one like that shown in Fig. 3, which I thought couldn't be improved upon; but I am going to make one more, and it will be like the last

SHOP KINKS
AND
MACHINE-SHOP CHAT
A SERIES OF
OVER FIVE HUNDRED PRACTICAL PARAGRAPH

In familiar language, showing special ways of doing work better, more cheaply and more rapidly than usual.

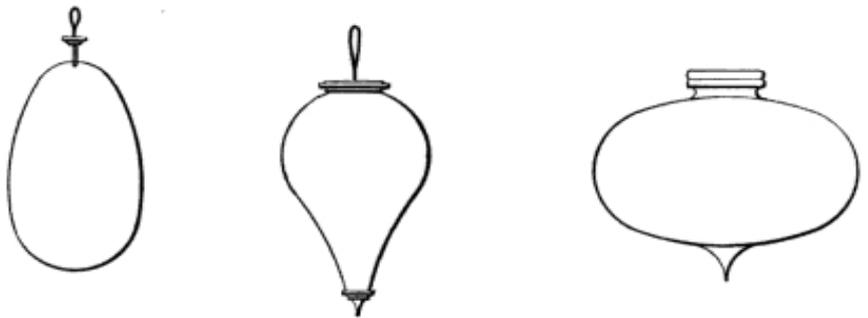
By ROBERT GRIMSHAW, M.E., etc.



WITH 222 ENGRAVINGS.

NEW YORK:
NORMAN W. HENLEY & CO.,
132 NASSAU STREET.
1896.

Plumb-Bobs are seldom if ever made of the right shape to insure their coming to rest soon. They are usually made of pear shape with the string where the stem would be; or when they are intended to indicate a point underneath them, instead of a line alongside of the line, they are top-shaped with a sharp spike. In the former case the swinging is stopped in the least possible time permissible with such a bob, by letting it hang in a pail of water or very thin mud, or some other liquid.



FIGS. 163 TO 165.—FORMS OF PLUMB-BOBS.

But both of these forms are all wrong. Any body tends to rotate about its shorter axis; and if not hung in this line it will not make any difference, but will wobble about and try to assume that line. That this is a fact, any school-boy who has attended lectures on physics, and seen a whirling-machine cause a chain ring hung by one edge to flatten out and revolve about an imaginary axis, can attest. Now the plumb-bob should be turnip-shaped, so that it can be hung

Dig

on its shortest axis; and then all the whirling that it can undertake will not make this axis swerve from a vertical line. If for ordinary use in plumbing columns, etc., it needs no points; but if it is to be hung so as to point to a particular spot on the ground it should have a spike as a prolongation of this shorter axis.

Plumb-Bob Lines may be readily reeled up by using the cheapest kind of fishing-rod reel on a short pine stick. It is just as good as though it cost forty dollars.

Plumb-Bob Tips screwed to the body of the bob may have a milled flange about half an inch from the butt end, and a thread cut on both sides of this flange, so that when the bob is not in use the point may be unscrewed and turned into the body of the bob, thus lessening the room required and diminishing the chance of injury to the point.

MINUTES OF PROCEEDINGS

OF

THE INSTITUTION

OF

CIVIL ENGINEERS

WITH OTHER

SELECTED AND ABSTRACTED PAPERS.

VOL. XCII.

EDITED BY

JAMES FORREST, ASSOC. INST. C.E., SECRETARY.

LONDON:

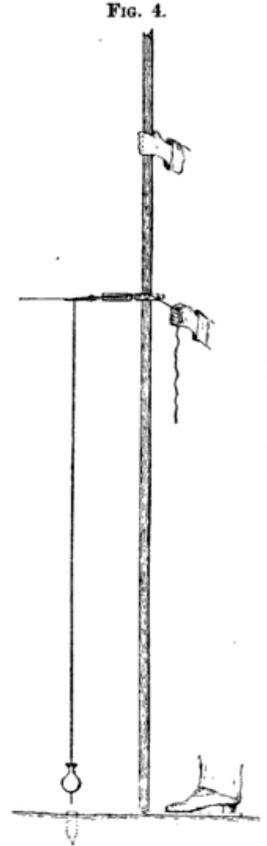
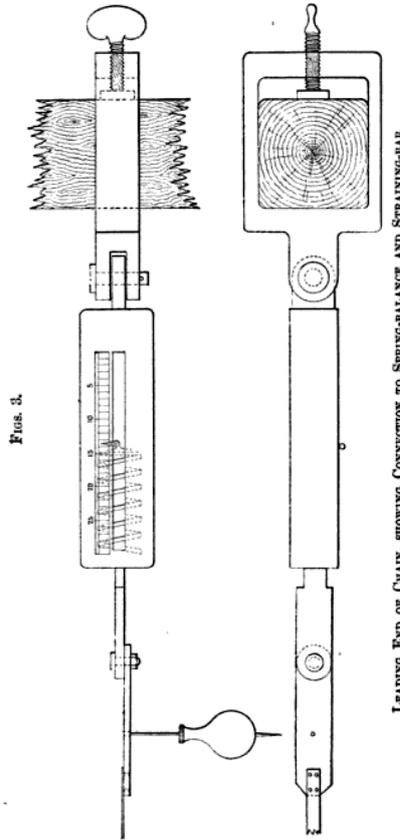
Published by the Institution,

25, GREAT GEORGE STREET, WESTMINSTER, S.W.

[TELEGRAMS, "INSTITUTION, LONDON." TELEPHONE, "3051."]

1888.

Papers.] THOMPSON ON IMPROVED SYSTEMS OF CHAINING. 271
balance. In the centre of this plate was drilled a hole $\frac{3}{8}$ inch



in diameter, to allow the string of a plumb-bob to pass through, STRAINING-BAR, LEADING END.

[7

FIG. 5.

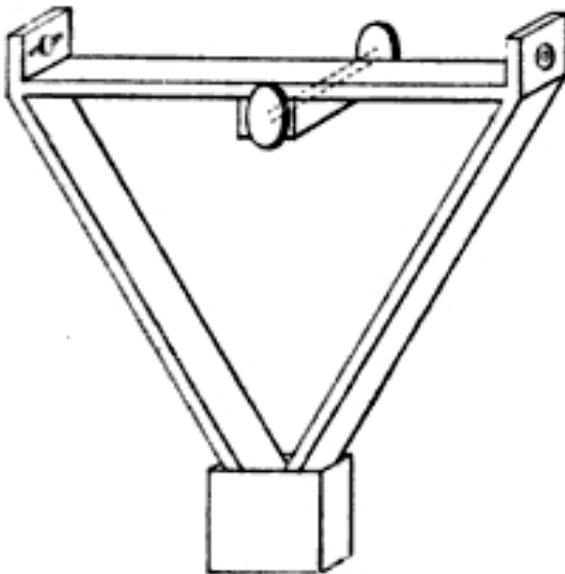
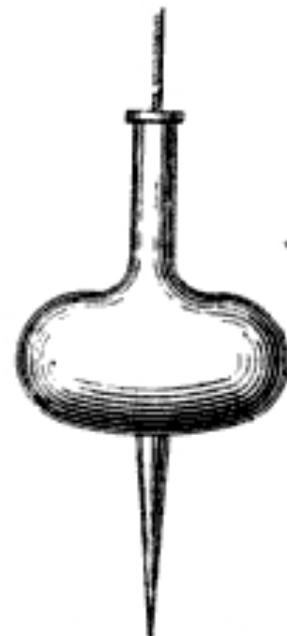


FIG. 6.



then sights the back end of the chain with a small self-adjusting plumb-level (Fig. 5), and gives the leading man the height to which he must slip the collar on the straining-bar. This fixed (and the temperature from the attached thermometer noted), the leading man puts his foot upon the shoe, and pulls the bar until 16 lbs. is registered on the balance, then, holding the bar with one hand, with the other he raises or lowers the plumb-bob until it just swings clear. An assistant now notes the approximate position of the point of the plumb-bob, and drives into the ground either a small wooden peg about 1 inch by 1 inch, or else a clout-headed nail, according to the nature of the soil (if rock, a scratch is made); a piece of gummed paper is then affixed to the nail or peg, on which, when the plumb-bob is allowed to swing again, the point directly under its centre is marked. A special plumb-bob with a low centre of gravity, and a long, fine steel point, is used for this purpose (Fig. 6).

Lately it has been found better to dispense with the plumb-bob swinging from the riband to the ground, on account of the error caused by currents of air, and to use instead a small plumb-bob hung about $\frac{1}{2}$ inch from the plate (Fig. 3). After setting a light theodolite up as near as possible at right-angles to the end of the chain to sight the string where it passes through the plate, the telescope is depressed and a sharp pointed pencil held vertically on the peg is put in line, which when in correct position is twisted, making a small dot sufficiently distinct for the back chainman to see. The chain is now carried onward and the process repeated for

[THE INST. C.E. VOL. XCL.]

T

TRUING UP LINE SHAFTING

From:
 SHAFTING; PULLEYS, BELTING, ROPE
 TRANSMISSION AND SHAFT GOVERNORS
 Compiled and written by
 HUBERT E. COLLINS
 NEW YORK
 C 1908

It is assumed, for the purposes of this description, that the modern style of shafting, increasing in diameter by the $\frac{1}{2}$ inch, is used, and that all pulleys and belts are in place. We will take a line composed of sizes ranging between $3\frac{1}{8}$ and $2\frac{7}{8}$ inches. This gives us four sizes, $3\frac{1}{8}$, $3\frac{7}{8}$, $2\frac{1}{2}$ and $2\frac{7}{8}$ inches in the line.

We will first consider the plumb-bob. The accompanying sketch, Fig. 47, illustrates a good one.

The ball is $1\frac{1}{2}$ inches diameter, and the large end of the tapered stem $\frac{1}{2}$ inch in diameter, turned parallel for a short distance at the lower end. The two thin sheet-steel disks, 1 and 2 inches in diameter, are drilled to fit snugly when pushed on to the $\frac{1}{2}$ -inch part of the stem, and stay there until pulled off. These disks are turned true. This arrangement of plumb-bob and disks enables us to deal with five sizes on one line, and there are not many lines that contain more.

Now having our plumb-bob ready, we will stretch the line. The stretchers should be set horizontally by nailing a strip of wood, say $1 \times 1\frac{1}{2} \times 12$ inches, with a piece at each end to form a space between it and the wall, or place of location in line with the edge of the shaft, as in Fig. 48. The top of this stretcher should

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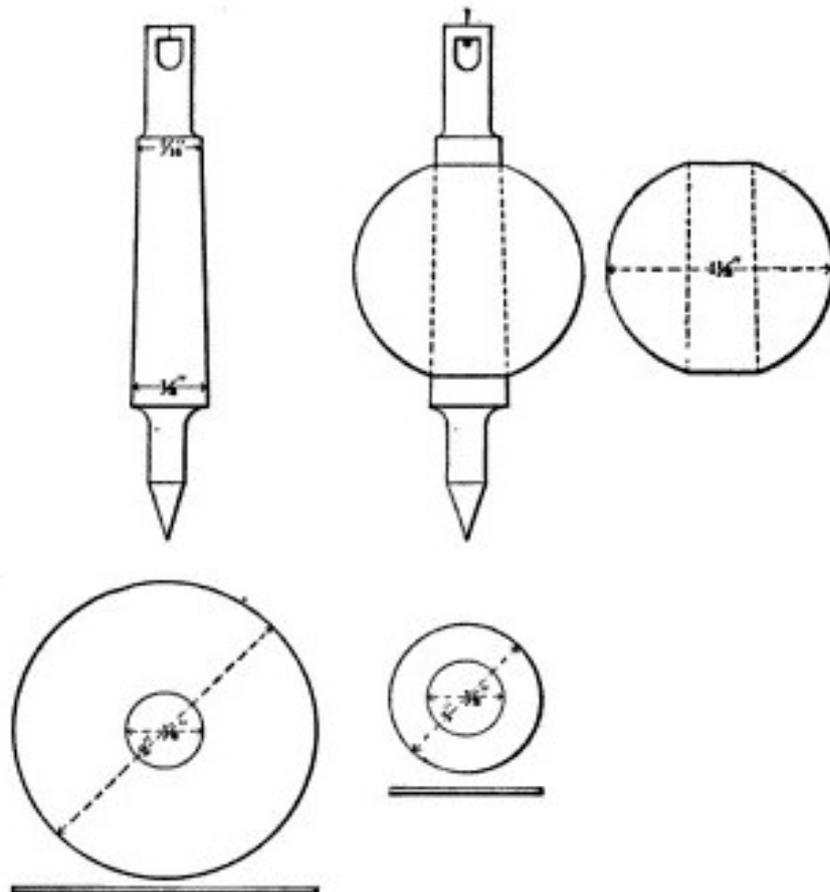


FIG. 47.

B 19 PLUMB BOBS IN THE NEPEAN TUNNEL IN AUSTRALIA 1888

Dear Fellow Collector,

I will not overload this monthly issue.

That's, why you can get the chapter B 19 (9 pages), the story of "THE ALIGNMENT OF THE NEPEAN TUNNEL, NEW SOUTH WALES, Australia", published in the book "MINUTES OF PROCEEDING ... 1888." on demand from plumbbobwolf@t-online.de as an email attachment (PDF-file).

Ask for: WOLF'S PLUMB BOB NEWS 2009-07 **SUPPLEMENT**

On these 9 pages you learn a lot about the USE OF PLUMB BOBS etc. during the construction of the over 4 miles long NEPEAN TUNNEL in Australia.

This tunnel was built for supplying SYDNEY with water. (1869 – 1888)

Really a very interesting paper for plumb bob collectors and surveyors.

I am waiting for your email

Wolf

C CONCLUSION

As you can see there is always a new twist in the story of the "PLUMB BOB, THE MOST UNIVERSAL OF ALL TOOLS."

Some are technical, some are nonsense, some just to make you smile. I expect as previously un-scanned documents are added to the great computer in the sky, there will be many more tidbits of curious information on the subject of plumb bobs to be found!

I am forever diligent.

If YOU have any additional information or remarks to this issue, please let me know.

You can contact me by email: plumbbobwolf@t-online.de

Thanks.

Wolf Ruecker

This article is a part of the monthly edited WOLF'S PLUMB BOB NEWS.

More information you get on www.plumbbob.de