## ENGINEERS AT THE MONTREAL CONVENTION.

Editor ELECTRICAL NEWS.

THE recent convention of the National Electric Light Association in Montreal has come and gone, but remaining are many pleasant reminiscences for those of us who were fortunate enough to be present. It goes without saying that our American cousins were agreeably disappointed. Many of them had the haziest of ideas concerning our Canadian people, our salubrious climate, our beautiful scenery, and last, but not least, the perfection and substantial character of our electrical establishments.

The newspaper man from over the border was there galore. From all appearances Canadian air has a very good effect on him, and if he would bide with us a little, he would return home with his ideas so refashioned that he would deride McKinley and his little bill as much as is done on this side of the line. Canadian institutions can and do thrive well on a McKinley freeze out.

Among others whom I had the pleasure of meeting in Montreal was P. G. Monroe, of the *Stationary Engineer*, and Wm. Swetland, of *Steam Power*. What they were fooling around with electricity for, passes all understanding. However, the Montreal members of the C.A.S.E. called a special meeting and engaged carriages in order that the visitors might see and meet some of the Canadian engineers.

The chair was taken by Bro. Hunt, of Montreal No. 1, and kind words of welcome expressed.

Mr. Swetland, being in a hurry to have a share in the festivities at the Windsor banquet, spoke first, expressing his surprise at our Canadian institutions, and his desire for the fullest and freest possible intercourse between the two nations.

P. G. Monroe was then called upon, but declined to say anything until after Bro. Wickens, of Toronto, had spoken.

Bro. Wickens gave an outline of the work of the C.A.S.E. from its inception, and also explained the position of the C.A.S.E. in regard to the recent amalgamation scheme. This was apparently what Mr. Monroe was waiting for, as he at once started to "rip us up the back." Fortunately for us, however, his good nature had dulled the knife, so that it did not cut very deeply.

Montreal No. 1 then made honorary members of the visitors. Bro. Monroe, after having thanked them for the honor conferred, gave a good common-sense talk on the subject of the good to be derived from such societies as the N.A.S.E. and C.A.S.E.

After adjournment, the members repaired to a neighboring restaurant and spent a social hour.

N. GINERE.

## SAFETY VALVES—THEIR HISTORY, ANTECEDENTS, INVENTION AND CALCULATION.

BY WILLIAM BARNET LE VAN.

*(Continued from August number.)*

*Example* 10.—A safety valve of the following dimensions, to find the weight W in pounds?

L=length of long lever in inches .......... 40
$l$=length of short lever in inches .......... 4
A=area of valve in square inches .......... 5
$p$=the steam pressure in pounds per square inch .......... 100

$$\text{Then by formula 11: } W=\frac{A\,p\,l}{L}.$$

$$\text{Weight } W=\frac{5\times100\times4}{40}=50 \text{ pounds.}$$

*Example* 11.—A safety valve of the following dimensions, at what pressure $p$ per square inch will it blow off?

W=the weight in pounds .......... 10
L=the long lever in inches .......... 24
$l$=the short lever in inches .......... 2
A=the area of the valve $v$ in square inches .......... 3

$$\text{Formula 12: } p=\frac{W\,L}{A\,l}$$

$$\text{Pressure } p=\frac{10\times24}{2\times3}=40 \text{ pounds per square inch.}$$

*Example* 12—A safety valve of the following dimensions, how long must the long lever L be to blow off at 80 pounds?

A=the area of the valve $v$ in square inches .......... 4
W=the weight in pounds .......... 30
$l$=the short lever in inches .......... 3
$p$=steam pressure in pounds per square inch .......... 80

$$\text{Formula 13: } L=\frac{A\,p\,l}{W}$$

$$\text{Long lever } L=\frac{80\times4\times3}{30}=32 \text{ inches.}$$

Lever safety valves, as generally made, are easily altered, and thus prevented from operating correctly. The lever arm $a$ of a safety valve should always be of a length suitable for the maximum pressure the boiler is to carry; or the weight secured to the lever arm $a$ at the proper working distance, and to prevent overloading only *one weight* shou'd be allowed on the lever arm $a$, and this placed at the end of the same.

EFFECTIVE AREA OF SAFETY VALVES.

The *effective area* is the opening for the flow of steam, due to the height of lift of the valve. It is an annular opening, the area of which may be found by the following rules:

*Valve-Sit Notations.*

Æ represents the effective area of the annular opening through which the steam escapes.
$h$ represents vertical height in inches equal to the lift of the valve.
D represents the inner diameter of the valve sit in inches.
$d$ represents the depth of the valve sit in inches.
$v$ represents the angle of the valve sit to the plane of the valve.
$\pi$ represents the circumference of a circle whose diameter D=1, and stands for 3.14159265.
*Cos* represents the cosine or the sine of the completement of the angle of the valve sit.
*Sine* represents the sine of the angle of inclination.
*Tan* represents the tangent of the angle or bevel of the valve sit.

For safety valves with flat sit, Fig. 14 gives an opening, when lifted, equal

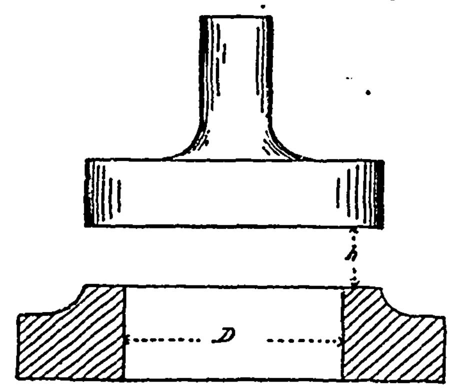


FIG. 14.
*Lift of valve one-quarter of the diameter. Flat sit.*

to the surface of a cylinder having the same diameter D, as that of the valve, and a height equal to the lift $h$.

The effective area Æ of the annular opening, when there is no bevel to the valve, will be

$Æ=h\,\pi$ .......... 14

*Rule.*—The effective area equals the vertical lift $h$, multiplied by the circumference $\pi$, when there is no angle, or

$Æ=D\,h\,3.1416$ .......... 15

*Rule.*—The effective area equals the diameter D, multiplied by 3.1416, and this product by the vertical lift $h$.

*Example* 13.—A flat valve sit (Fig. 14) without bevel, with D=2 inches, and lift $h$=1-16 or 0.0625 of an inch. What is the effective area Æ of the opening?

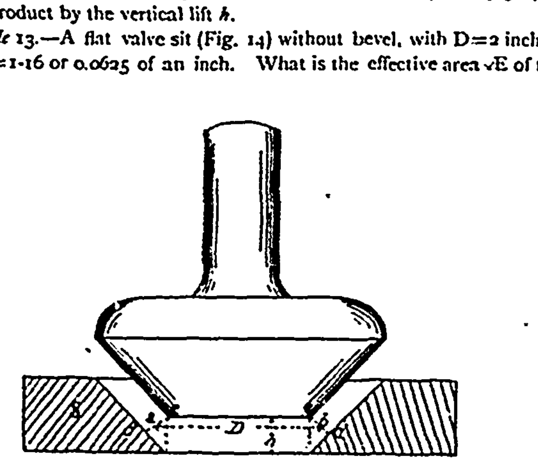


FIG. 15.
*Lift of valve, half the depth of sit. Angle of sit, 45 degrees.*

Formula 14: $Æ=h\,\pi$
Effective area $Æ=0.0625\times6.283=0.3927$ square inches.
Formula 15: $Æ=D\,h\,3.1416$.
Effective area $Æ=2\times3.1416\times0.0625=0.3927$ square inches.

In the case of a valve sit with an angle or bevel $v$, Fig. 15, it is clear that the effective area Æ of the annular steam passage will be equal to the surface of a frustrum of a cone, and is the perpendicular distance $d\,e$, multiplied by the mean circumference of the diameter $a\,b$.

The distance $a\,b=D+\frac{1}{2}h$, which, multiplied by $\pi$, gives the circumference; or, $\pi\,(D+\frac{1}{2}h)$, when the angle $v$ is 45 degrees.

*Rule.*—Multiply 3.1416 by the sum of the diameter D, added to one-half the vertical height $h$, when the angle, or bevel $v$, is 45 degrees.

For any other angle use formula 16.

The distance $d\,e=h$ cosine $v$. That is to say, that the distance $d\,e$ equals the vertical height $h$, multiplied by the cosine of angle $v$.

$Æ=\pi\,h\cos v\,(D+\frac{1}{2}h\text{ sine }2\,v)$ .......... 16

*Rule.*—First, to the diameter D of the valve, add one-half the vertical lif