

**J. E. BLAKE.**  
**Ore and Stone Crusher.**

No. 166,064.

Patented July 27, 1875.

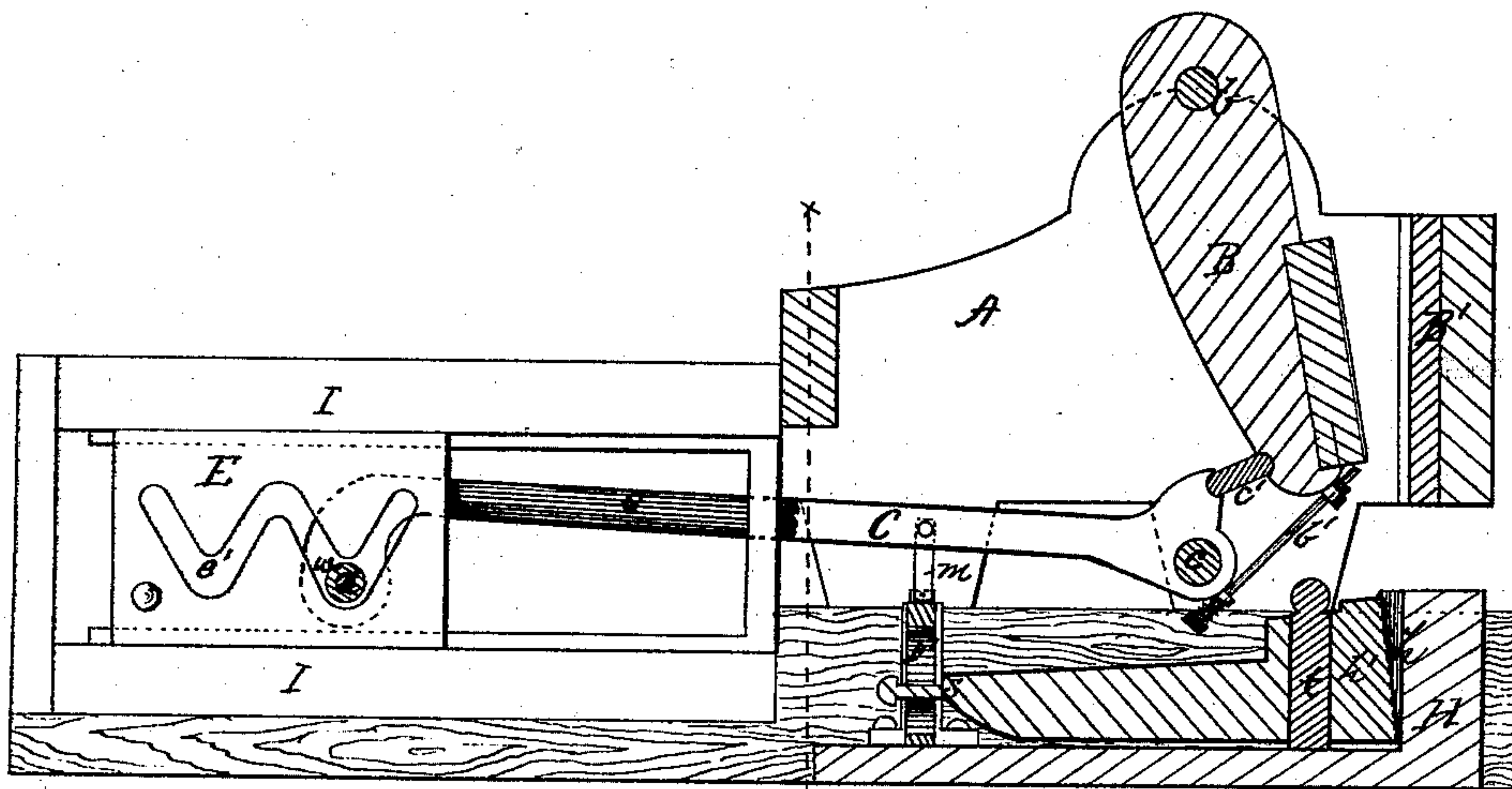


FIG. 1

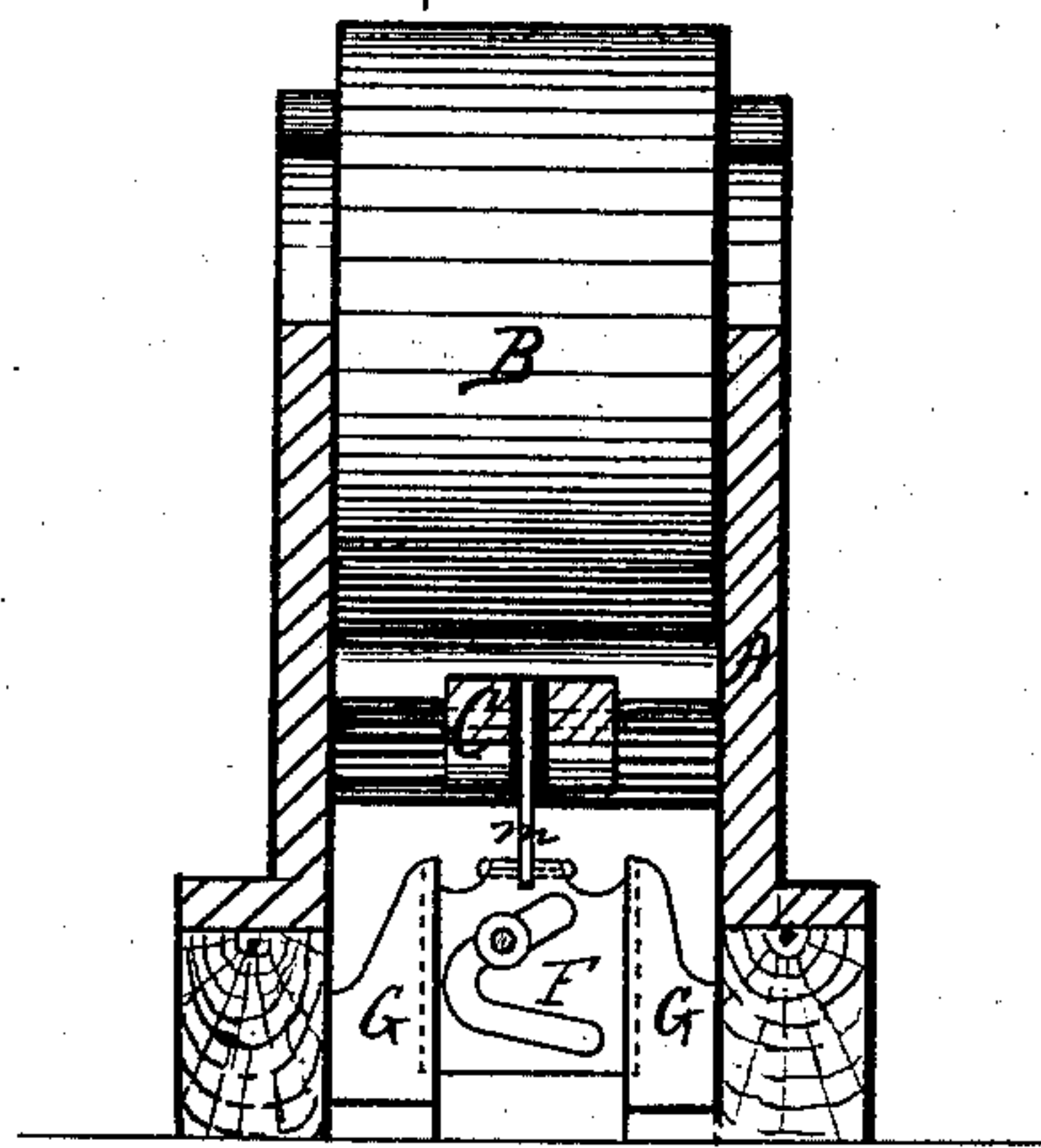


FIG. 2

WITNESSES.

James L. Ray

James K. Bakewell,

INVENTOR.

John E. Blake

by Bakewell & Kerr  
 Attys



# UNITED STATES PATENT OFFICE.

JOHN E. BLAKE, OF SEWICKLEY, PENNSYLVANIA.

## IMPROVEMENT IN ORE AND STONE CRUSHERS.

Specification forming part of Letters Patent No. 166,064, dated July 27, 1875; application filed June 17, 1875.

*To all whom it may concern:*

Be it known that I, JOHN E. BLAKE, of Sewickley borough, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Ore and Stone Crusher and Pulverizer; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 is a longitudinal vertical section of an ore or stone crusher, embodying my invention; and Fig. 2 is a vertical transverse section on the line *x x*, showing the crusher and pulverizer combined, and the manner of operating one from the other.

Like letters refer to like parts wherever they occur.

My invention relates to that class of machines known as ore and stone crushers and pulverizers; and it consists, first, in actuating the converging jaws of an ore and stone crusher by means of a sliding cam and pivoted lever, whereby the movement or throw and number of strokes of the crushing-jaws may be readily adjusted and controlled; and second, in combining a set of crushers, one of which may act as a pulverizer, by means of sliding cams, or equivalent mechanism, whereby the speed or number of strokes of the moving jaws of the several crushers may be regulated relatively, and power transmitted from one crusher to another.

This invention is especially applicable to that class of crushers wherein the ore or rock is crushed between a vibrating and fixed jaw, or between two vibrating jaws, or by a pivoted jaw working laterally across the face of a fixed jaw; and in illustrating it I have shown the first crusher of the set as one wherein a vibrating jaw operates with a fixed jaw, and the second crusher as a pivoted jaw working laterally across the face of a fixed jaw, though the crushers are not necessarily of the specific form shown, as the invention is especially directed to the manner of applying the power to the converging jaws of a crusher.

I will now proceed to describe my invention, so that others skilled in the art may apply the same.

In the drawing, A indicates the main frame

of a crusher, provided with a vibrating jaw, B, pivoted to the frame A at *b*, and having a fixed jaw, B', secured to the frame, and bedded, if desired, in the usual manner. C is a lever, pivoted at *c* to the main frame A, and operating the vibrating jaws through a toggle, *c'*. This lever C is preferably bifurcated or slotted, as at *e*, to permit the forward movement of a sliding cam or cam-slide, E, though it is evident the pivoted lever might work to one side of the sliding cam, or between two sliding cam-plates. At the outer end of the lever C is pin or journal *i*, provided with an anti-friction wheel, *w*, which moves in the cam-slide. *b'* is a rod hinged to the lower part of jaw B, and extending through an eye on the lever C, said rod being provided with a spiral, volute, or other suitable spring, the devices acting together to retract the crushing-jaw. I is a vertical guide, in which moves the cam-slide E, said guide or ways being secured to the main frame A, the bed L, or in other suitable manner. E is the cam-slide for actuating the crushing-jaws through the medium of the pivoted or fulcrum lever, said slide being slotted, as at *e'*, the length of the slot, of course, being dependent on the slide, the length of its stroke and the pitch of the slot, and the pitch of the slot being regulated by the character of the blow desired for the jaw. Pivoted or otherwise movably connected to the lever C, between the cam-slide E and the fulcrum of the lever, is a link, *m*, which connects a second cam-slide, F, with lever C, the cam-slide or sliding cam F moving in guides or ways G, which may be secured to the bed L or to the frame of pulverizer H. H is a second crusher or pulverizer placed beneath the first, and so arranged as to receive and reduce the ore or stone broken by the first crusher. This pulverizer is composed of a fixed jaw, *h*, and a jaw, *h'*, pivoted as at *t*, and working laterally across the face of the fixed jaw. At the rear end of the jaw *h'* is a projection, *s*, provided with an anti-friction roller, if desired, or other suitable means for operating this jaw by means of the cam-slide F, which receives its motion from lever C.

The operation of these devices is as follows: The cam-slide or sliding cam E, as it is reciprocated, causes the rise and fall of the pivoted



lever C, which, through the medium of toggle  $c'$ , actuates the crushing-jaw B. At the same time the rise and fall of lever C reciprocates the sliding cam F, which actuates the movable jaw  $h'$  of the crusher or pulverizer H, and, as the slot of cam-slide F is shaped, the movement of lever C is multiplied in its transmission to  $h'$ .

It is evident from what has been said that the number and nature of the strokes of the first jaw will depend upon the shape of the first sliding cam, and also that the form of the coupling-cam will determine the relative speed or number of strokes of the several jaws.

In the drawing I have shown, in connection with the first crusher, a crusher or pulverizer consisting of a fixed jaw and a movable jaw, the movable jaw pivoted in front and working laterally across the face of the fixed jaw; but in this case I make no claim to a crusher so constructed, but I hereby reserve to myself

the right to make a separate application therefor in the future, should I elect to do so.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of two converging jaws, actuated by means of a pivoted lever and sliding cam, substantially as and for the purpose specified.

2. In combination with a crusher having converging jaws, and a pivoted lever for operating them, a pulverizer operated from the pivoted lever by means of sliding cam, substantially as and for the purpose specified.

In testimony whereof I, the said JOHN E. BLAKE, have hereunto set my hand.

JOHN E. BLAKE.

Witnesses:

T. B. KERR,

JOS. S. TRAVELLI.